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THE MEMPHIS DEPOT
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DEFENSE DISTRIBUTION DEPOT MEMPHIS

SCREENING SITES LETTER REPORTS

MARCH 1998

CH2MHILL

U.S. Army Engineering and Support Center, Huntsville

Preface

This report presents a summary of the Screening Sites Sampling Program conducted at the Defense Distribution Depot Memphis, Tennessee (DDMT). Given the need to combine the Base Realignment and Closure (BRAC) and Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) programs, the Huntsville Division Corps of Engineers (CEHNC) directed CH2M HILL to prepare separate modular reports that present the screening sites information for each property parcel.

The following Letter Reports are presented in a modular style so that the DDMT property parcels may be evaluated individually. Each parcel report is an independent stand-alone document so that parcel reports may be easily provided to potential property buyers. The parcel reports have been combined in a single notebook for management ease. Parcel Letter Reports for 14 parcels that contain screening sites and 3 Parcel Letter Reports that cover multiple parcels are included in this compilation. The Parcel Letter Reports consist of a brief site description, previous investigation results, sampling procedures, site maps, data summary tables, contaminant fate and transport evaluation, preliminary risk evaluation, and summary and recommendations for further activities at each screening site.

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Acronyms

AWQC-AO	ambient water quality criteria–protection of freshwater aquatic life
AWQC-HH	ambient water quality criteria–protection of human health
BCT	BRAC Cleanup Team
BRAC	Base Realignment and Closure
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COE	United States Army Corps of Engineers
COPC	contaminant of potential concern
DDD	dichlorodiphenyldichloroethane
DDE	dichlorodiphenyldichloroethylene
DDMT	Defense Distribution Depot Memphis, Tennessee
DDT	dichlorodiphenyltrichloroethane
DQE	Data Quality Evaluation
EPA	United States Environmental Protection Agency
FOSL	Finding of Suitability to Lease
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
NOAA	National Oceanic and Atmospheric Administration
NPL	National Priorities List
OU	Operable Unit
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyls
PID	photoionization detector
PRE	Preliminary Risk Evaluation
PRG	Preliminary Remediation Goal
RBC	risk-based concentration
RI/FS	Remedial Investigation/Feasibility Study
SVOC	semivolatile organic compound
TCDD	tetrachlorodibenzo-p-dioxin
TCL/TAL	target compound list/target analyte list
TDEC	Tennessee Department of Environment and Conservation
µg/kg	micrograms per kilograms
µg/L	micrograms per liter
USAESC	United States Army Engineering Support Center
VOC	volatile organic compound

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TAB

Executive Summary

Executive Summary and Overview

Screening Sites Sampling Program

for

Defense Distribution Depot Memphis, Tennessee

March 1998

Prepared for

U.S. Army Engineering and Support Center, Huntsville

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Executive Summary and Overview Screening Sites Sampling Program Defense Distribution Depot Memphis, Tennessee

Background

The Base Realignment and Closure (BRAC) 95 Commission selected the Defense Distribution Depot Memphis, Tennessee (DDMT) for closure under the BRAC process. All 642 acres of this facility are considered BRAC property. In preparing the *Environmental Baseline Survey* (Woodward-Clyde, 1996), the DDMT facility was divided into 35 parcels based on the environmental condition of the property. DDMT is currently undergoing a dynamic process wherein properties defined as BRAC Parcels are being transferred from government control to other private- and public-sector uses.

In October 1992, DDMT was placed on the National Priorities List (NPL) by the United States Environmental Protection Agency (EPA). Therefore, DDMT must fulfill requirements under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and National Contingency Plan (NCP). A remedial investigation/feasibility study (RI/FS) is being conducted to determine the nature and extent of contamination, evaluate the risk to human health and the environment, and screen potential cleanup actions. The purpose of the Screening Sites Sampling Program, which is part of the RI/FS, is to identify whether past activities at each site have resulted in releases from the site that would require further investigation. The program's intent is not to fully delineate the nature and extent of soil or groundwater contamination attributable to past operations, but to conduct technically based screening analyses sufficient to identify the likelihood of contamination. Once the sites have been screened, the data will be evaluated and used to make a decision about whether to upgrade the site to an RI site, to downgrade the site to a No Further Action site, or to recommend a site for an Early Removal evaluation.

Data and information the CERCLA-governed screening sites investigation have been organized and presented by BRAC parcel to support parcel leasing. Early risk-based evaluation of BRAC Parcel and CERCLA Site environmental data is needed to establish a Finding of Suitability to Lease (FOSL) or Finding of Suitability to Transfer (FOST), which permits lease or transfer of parcels and buildings.

A BRAC Cleanup Team (BCT) is formed at each facility affected by the BRAC process. At DDMT, the BCT consists of representatives from DDMT, EPA Region IV, Tennessee Department of Environment and Conservation (TDEC), with support from the U.S. Army Corps of Engineers (COE), Huntsville (CEHNC), and CH2M HILL.

Methodology

The Screening Sites Sampling Program was based on the *Screening Sites Field Sampling Plan* (CH2M HILL, 1995). Sampling was conducted for areas where data gaps exist and where sampling and analyses are required to identify whether past activities have resulted in releases from the site that would require further investigation.

Screening sites data were collected for surface soil, subsurface soil, surface water, and sediments. With one exception, samples were collected and sent to CH2M HILL Analytical Services in Montgomery, Alabama in accordance with the procedures outlined in the *Generic Quality Assurance Project Plan* (CH2M HILL, 1995). Table ES-1 summarizes the analytical methods used for the Screening Sites Sampling Program. Samples collected from the Off-Site Drainage Pathways site were sent to Southwest Laboratory of Oklahoma, Inc, of Broken Arrow, Oklahoma. COE's split samples were collected from approximately 10 percent of the samples collected at DDMT for a quality control check by the COE laboratory in Georgia. The TDEC split samples were taken at Screening Sites 28 and 70/71. The results of the split samples will be reported in the final RI Report.

A relational, statistical database was used as the basis for creating data summary tables and for comparing Screening Sites' data with screening level data. Screening level data are comparison criteria that were developed from applicable regulatory criteria for each media or from background values. The comparison criteria are used to "screen" sites to evaluate whether a potential release has occurred that exceeds an acceptable risk. In addition, the BCT established parameter-specific screening criteria for surface soils during a workshop held in Memphis, Tennessee, in August, 1997. These screening criteria were developed for parameters that were frequently detected at elevated concentrations and were based on background concentrations from the residential and recreational areas surrounding DDMT, residential land use, risk-based concentrations (RBCs), or CERCLA criteria. Updated background values were also used in the screening tables (found in the *Final Background Sampling Program Technical Memorandum* [CH2M HILL, 1998]). Figures are provided with each screening site that show the parameters exceeding RBC at each sampling location within the site. These parameters are also shown in bold in the data summary tables.

Constituents of potential concern (COPCs) are parameters that exceed both background values and the screening criteria. COPCs are discusssed in Section 3.1 of each parcel report. Not all exceedances shown in the figures for each site are COPCs. A site may have several exceedances of a particular parameter at various sample locations, but the exceedances are only COPCs if both the background value and at least one screening criteria are exceeded. COPCs for each site are summarized in Table ES-2, but are not itemized by sample location. For a complete discussion of which specific sample location had a COPC, refer to Section 3.1 of each parcel report.

A Preliminary Risk Evaluation (PRE) was conducted to provide a preliminary evaluation of environmental data and, thereby, provide input into the risk management decisions for the BCT. The PRE methodology and results are fully presented in the *Defense Depot Memphis, Tennessee, Draft Preliminary Risk Evaluation Report* (CH2M HILL, 1998). EPA Region IV has published guidance on performing a PRE to determine the suitability to lease parcels based on their known or suspected environmental condition (EPA, 1994), and this guidance was followed in preparing the PRE. The PRE calculation and evaluation were performed for all

screening sites sampled. The PRE methodology results in a conservative risk calculation that will not be exceeded if the site undergoes a baseline risk assessment. The PRE results are summarized by generally categorizing sites into one of the following categories: No Further Assessment, Further Risk Assessment, or Interim Remedial Action.

Results

Table ES-2 summarizes the COPCs by media for all the screening sites in the Main Installation. These COPCs are discussed in detail in each parcel report and are summarized by media below. The media tables presented for each site provide more details on the COPCs.

Surface Soils

Compounds detected in surface soils were compared to five types of screening levels to determine the COPCs for surface soil. The five types of screening levels include background values; soil ingestion; RBCs (EPA, 1997) in both a residential and industrial setting; and soil-screening levels for transfer from soil to groundwater. Background values are based on 22 surface soil samples taken from the perimeter of the DDMT Main Installation and Dunn Field (11 on-site samples), as well as residential areas, golf courses, cemeteries, schools, and recreational areas (11 off-site samples) within two miles of DDMT.

More COPCs were found in surface soil for more sites than any other media. A total of 32 parameters were identified as COPCS for surface soils, at a total of 29 sites. The most common COPCs were arsenic, which was identified at 17 sites, and chromium, found at 12 sites; arsenic and chromium were common COPCs at nine sites.

The second most common COPCs were a subgroup of polycyclic aromatic hydrocarbon (PAH) compounds (specifically benzo(a)anthracene, benzo(a)pyrene, and benzo(b)flouranthene), each of which occurred as COPCs at ten sites; also, indeno(1,2,3-cd)pyrene occurred at seven sites. The ten sites were Screening Sites 33, 36, 51, 65, 66, 75, 77, 79, 80, and 84, and the seven sites were all included in the group of ten. PAHs are observed throughout the DDMT Main Installation from samples in proximity to railroad tracks. Sitewide PAHs will be evaluated in the *Main Installation Remedial Investigation Report*.

The pesticide dieldrin was determined to be a COPC in surface soils at ten screening sites. Dieldrin is found in many surface soil samples collected throughout the DDMT Main Installation. The dieldrin concentrations in these surface soil samples result from general pesticide application in grassy areas and around warehouses that is not associated with management of hazardous substances in specific screening sites. Dieldrin, currently being evaluated as a sitewide constituent, will be reported in the *Main Installation Remedial Investigation Report*. Dieldrin is further discussed below in "Sitewide Issues."

Polychlorinated biphenyls (PCBs) that are COPCs are confined to two sites (Screening Sites 33 and 70), except for Arochlor 1260, which is a COPC at Screening Site 80.

Dichlorodiphenyldichloroethene (DDE) and dichlorodiphenyltrichloroethane (DDT) are COPCs at Screening Site 73 and at Screening Sites 33 and 36 (DDT only). Although dichlorodiphenyldichloroethane (DDD) is a COPC in sediments, it was not found to be a COPC in surface soils at any sites.

Other metals that were COPCs at multiple sites include aluminum (Screening Site 56), barium (Screening Site 83), copper (Screening Site 36), iron (Screening Site 56), and zinc (Screening Site 83); manganese (Screening Sites 52 and 56); antimony (Screening Sites 31, 33, 36, 70, and 83); and cadmium (Screening Sites 31, 33, 36, 65, 72, and 83).

Dioxins and furans were identified as COPCs at five sites (Screening Sites 42, 43, 46, 54, and 55).

Subsurface Soils

Compounds detected in subsurface soils were compared to two types of screening levels. Subsurface soil screening levels consist of background values and soil screening levels for transfer from soil to groundwater. The groundwater protection criteria (GWP) values are the generic soil screening levels (SSLs) from EPA guidance (EPA, 1996, EPA/540/R-95/128). These values are based on a dilution-attenuation factor (DAF) of 20 applied to a health-based groundwater concentration, which accounts for natural processes that reduce contaminant concentrations in the subsurface Background values are based on 22 subsurface soil samples taken from the perimeter of the DDMT Main Installation and Dunn Field, as well as residential areas, schools, and recreational areas within two miles of DDMT. Table ES-2 summarizes the parameters that met the criteria for subsurface soil COPCs.

Chromium and lead were the two most common COPCs, with lead occurring as a COPC at 18 sites and chromium occurring as a COPC at 15 sites. At every site where chromium is a COPC, lead is also a COPC; lead is a COPC at three additional sites.

DDT is the next most abundant COPC in subsurface soils, occurring at four sites (Screening Sites 52, 54, 74, and 79). Degradation products of DDT, DDD, and DDE are not COPCs in subsurface soils.

Other metals that occur infrequently as COPCs include antimony, arsenic, cadmium (two sites), and copper (one site).

Dieldrin occurred as a subsurface COPC at three sites (Screening Sites 52, 54, and 79), but was not a COPC in surface soil at Screening Site 52.

Surface Water

COPCs in surface water were those compounds that exceeded background values and at least one screening level (Table ES-2). Surface water screening levels consist of background values, Tennessee state values, federal ambient water quality criteria for the protection of human health for the ingestion of organisms and water (AWQC-HH), and federal ambient water quality criteria, chronic for the protection of freshwater aquatic life (AWQC-AO) values. Surface water background criteria are based on 22 surface water samples taken from streams at locations upgradient from DDMT surface water drainage.

Three of the five sites sampled for surface water had COPCs: Screening Sites 51, 54, and 55. Arsenic (or dissolved arsenic), lead, and DDT were common at two of the three sites. Zinc was a COPC at Screening Site 51 only, and pentachlorophenol (PCP) was a COPC at only Screening Site 55.

Sediments

Detected compounds were compared to three types of screening levels: background values, sediment preliminary remediation goal (PRG) values, and National Oceanic and Atmospheric Administration (NOAA) values to determine the sediment COPCs. Parameters that were COPCs in sediments are shown in Table ES-2. Sediment background criteria are based on 22 surface water samples taken from streams at locations upgradient from DDMT surface water drainage.

Sediments were sampled at six sites, but only five sites had COPCs. DDD, DDE, and DDT were found in four of the five sites with at least two of these three compounds occurring at each of the four sites (Screening Sites 52, 54, 56, and Off-Site Drainage Pathways). Lead was a COPC at three of the five sites. Other metals that were COPCs for sediments at these sites include arsenic, chromium, copper, silver, and zinc.

Sitewide Issues

Dieldrin

Dieldrin is present at DDMT in surface soils, subsurface soils, and sediments. It is a COPC in surface soils at ten sites (Screening Sites 33, 51, 54, 70, 73, 76, 77, 79, 80, and 82), in subsurface soils at three sites (Screening Sites 52, 54, and 79), and in sediments at Screening Site 54. It is a COPC at Screening Site 54 in three of the four media.

Since dieldrin is only minutely soluble in water, its most likely migration pathway at DDMT is via erosion as suspended soil particles in the surface water, where it potentially would be available to aquatic organisms. Dieldrin in the subsurface soils should be relatively immobile and not impact groundwater quality.

Dieldrin has been identified as a sitewide problem in surface soils, and the need for a sitewide risk evaluation has been identified. Attachment 1 shows the dieldrin concentrations in surface soil across the Main Installation. The residential RBC for soil ingestion for dieldrin is 0.04 milligrams per kilogram (mg/kg), and the industrial RBC for soil ingestion is 0.36 mg/kg. Detected concentrations of dieldrin relative to the industrial RBC screening criteria are plotted in Attachment 1.

Appendix B of the Draft PRE (CH2M HILL, 1997) contains a draft technical memorandum that statistically compares the dieldrin data from DDMT itself with background data obtained for dieldrin in the Memphis vicinity. Preliminary risk considerations indicated the elevated concentrations of dieldrin detected in many surface soil samples across the Main Installation of DDMT were well above risk-based criteria for both residential and industrial land uses.

Most of the detected concentrations at the site, as well as background, are above health-based screening levels. However, dieldrin has not been in use at DDMT since the 1970s when it was banned for surface applications within the U.S. Thus, observed concentrations are from historical rather than current pesticide application. Because concentrations of dieldrin remain elevated for approximately 20 years after application, dieldrin is persistent in the environment.

A risk evaluation of dieldrin and other associated pesticides in environmental media across the DDMT Main Installation will be performed and reported in the Remedial Investigation Report.

Polycyclic Aromatic Hydrocarbon (PAH) Compounds

PAH compounds, found sitewide in surface soil at DDMT, are attributed to railroad operations. PAHs may come from creosote seepage from railroad track cross ties, historical railcar leaks to the surface, or application of a PCP/used-oil mixture that was historically applied for weed control along the tracks. Migration of PAH compounds across the surface may occur with surface soil transport mechanisms including surface water runoff and wind action.

These compounds were not detected in subsurface soils or surface waters or in any sediments except those sampled for the Off-Site Drainage Pathways site. PAH compounds will be addressed as a sitewide problem as part of an upcoming risk evaluation.

PAH compounds are a mixture of heavier hydrocarbons, are similar in chemical and physical characteristics, and tend to migrate and behave similarly in the environment. Generally, these compounds have low vapor pressures, are only marginally soluble in water, and have a high affinity for soils. They would be expected to migrate as adsorbed components of soils and potentially would be available to aquatic organisms in turbid surface water or to bottom feeders in areas with contaminated sediments. That none of these compounds were detected in sediments (except Off-Site Drainage Pathways) indicates that this is not a major source of contaminant migration for these compounds at this site. These compounds do not bioaccumulate significantly because of their rapid metabolism and excretion by most aquatic organisms.

Dichlorodiphenyldichloroethene (DDE) and Dichlorodiophenyltrichloroethane (DDT)

DDE and DDT, found in surface soils sitewide at DDMT because of historical pesticide application, will be addressed in an upcoming risk evaluation. Not only is DDT found as a COPC in surface soil at Screening Sites 33, 36, and 73, but it is also a COPC in subsurface soils at four sites (Screening Sites 52, 54, 74, and 79), in surface water at two sites (Screening Sites 54 and 55), and in sediments at two sites (Screening Sites 54 and Off-Site Drainage Pathways).

DDE is a COPC in surface soils at only one site (Screening Site 73) and in sediments at four sites (Screening Sites 52, 54, 56, and Off-Site Drainage Pathways). DDD is a COPC in only one media: in sediments at Screening Sites 52, 54, 56, and Off-site Drainage Pathways. DDD is also part of the upcoming risk evaluation.

DDT and two of its degradation breakdown products, DDD and DDE, exist in surface soils at DDMT and should not be mobile in this environment. These compounds have an extremely high affinity for soil and, essentially, are insoluble in water. DDT also was reported in sediments at four sites on DDMT, indicating that migration via this pathway has occurred from surface soil at DDMT. These compounds can bioaccumulate and become more concentrated as they move up in the food chain and potentially could affect receptors via this migration pathway.

Conclusions and Recommendations

The following are the overall conclusions for the Main Installation:

- Of all four media, surface soils have the most COPCs at the greatest number of sites. COPCs in surface soils include metals, PAH compounds, pesticides, and dioxin.

- PAH compounds appear to be a concern in surface soils and the Off-Site Drainage Pathways, but not in other media.
- Metals in subsurface soils are of primary concern, followed by DDT, dieldrin, and trichloroethene (TCE).
- COPCs in surface water are found only in Screening Sites 51, 54, and 55, while Screening Sites 52, 56, and Off-Site Drainage Pathways had no COPCs.
- At least one COPC was found in sediment at each site with sediments, but overall the Off-Site Drainage Pathways was by far the site with the most (16) COPCs.
- Of the 34 screening sites on the Main Installation, 13 require No Further Action. These sites are shown in Table ES-3.
- Of the remaining 21 sites that do require some further action, 10 of those 21 sites require further sampling (described in Table ES-3).
- There is a need for a sitewide risk evaluation for dieldrin, PAH compounds, DDE, and DDT.

Recommendations for the Main Installation involve conducting sitewide risk evaluations for a few parameters of concern across the Main Installation, conducting risk evaluations for specific parameters at a site, and conducting additional sampling at some of the sites requiring further action. The recommendations are summarized by site in the comments column of Table ES-3.

In some cases a further evaluation of metals data against background values in surface and subsurface soils is recommended. This evaluation can be performed without additional sampling.

Generally, the most common type of additional sampling needed was in surface soils, although in a few cases subsurface soils (Screening Sites 67 and 78) and groundwater sampling (Screening Sites 67, 36-39, 79, and 82) are also recommended.

Further risk evaluations are recommended, with or without additional sampling. These risk evaluations included sitewide assessments (dieldrin, PAH compounds, DDE, and DDT) and site-specific assessments.

Remediation is specifically recommended at only one site at this point. Screening Site 89 is recommended for remediation to remove elevated metals to be protective against potential future exposures.

Table ES-1
Summary of Analysis Methods for Screening Sites Sampling on Main Installation
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Matrix	QA/QC Level	Parameter Analysis	Method of Analysis
Soil	2	TCL-Dioxins/Furans	CLP-SOW DFLM1.1
Soil	2	Zinc	SW846 Method 6010B
Soil	2	TCL-Semivolatiles GC/MS	SW846 Method 8270B
Soil	2	TCL-Volatiles GC/MS	SW846 Method 8260A
Soil	2	TCL-Pesticides GC	
Soil	2	Herbicides	SW846 Method 8151
Soil	2	PNA'S GC	SW846 Method 8100
Soil	2	Fluoride	EPA 340.2 (Mod.)
Soil	2	pH	SW846 9045
Soil	2	Priority Pollutant Metals (PPM)	SW846 Method 6010B/7000 SERIES
Soil	2	TAL Metals (TAL)	SW846 Method 6010B/7000 SERIES
Soil	2	PCB'S GC	SW846 Method 8081
Soil	3	TCL-Volatiles GC/MS	SW846 Method 8260A
Soil	3	TCL-Semivolatiles GC/MS	SW846 Method 8270B
Soil	3	Priority Pollutant Metals (PPM)	SW846 Method 6010B/7000 SERIES
Soil	3	TAL Metals (TAL)	SW846 Method 6010B/7000 SERIES
Soil	3	Zinc	SW846 Method 6010B
Soil	3	TCL-Dioxins/Furans	CLP-SOW DFLM1.1
Soil	3	Herbicides	SW846 Method 8151
Soil	3	PCB'S GC	SDW846 Method 8081
Soil	3	Phenols GC	SW846 Method 8040
Soil	3	PNA'S GC	SW846 Method 8100
Soil	3	TCL-Pesticides/PCB'S GC	SW846 Method 8081
Soil	3	Fluoride	EPA 340.2 (Mod.)
Soil	3	pH	SW846 Method 9045
Surface Water	3	TCL-Volatiles GC/MS	SW846 Method 8260A
Surface Water	3	TCL-Semivolatiles GC/MS	SW846 Method 8270B
Surface Water	3	Priority Pollutant Metals (PPM)	SW846 Method 6010B/7000 SERIES
Surface Water	3	Priority Pollutant Metals, Soluble (PPM)	SW846 Method 6010B/7000 SERIES
Surface Water	3	TAL- Metals (TAL)	SW846 Method 6010B/7000 SERIES
Surface Water	3	TAL- Metals, Soluble (TAL)	SW846 Method 6010B/7000 SERIES

Table ES-1
Summary of Analysis Methods for Screening Sites Sampling on Main Installation
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Matrix	QA/QC Level	Parameter Analysis	Method of Analysis
Surface Water	3	TCL- Pesticides Only GC	SW846 Method 8081
Surface Water	3	TCL-PCB'S GC	SW846 Method 8081
Surface Water	3	TCL-Dioxins/Furans	CLP-SOW DFLM1.1
Surface Water	3	PNA'S GC	SW846 Method 8100
Surface Water	3	Thiodiglycol	USACOE Method UL09/LL9
Surface Water	3	Solids, Total Suspended (TSS)	EPA 160.2
Surface Water	3	Carbon, Total Organic (TOC)	EPA 415.2
Surface Water	3	TCL- Pesticides/PCB'S	SW846 Method 8081

Notes:
[1]Includes surface and subsurface soil, and sediment samples.

Table ES-2
Summary of COPCs
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Constituent of Potential Concern	Surface Soil	Subsurface Soil	Surface Water	Sediment
Metals				
Aluminum	561			
Antimony	31, 33, 36, 70, 83	33, 36		
Arsenic	28, 31, 35, 36, 43, 51, 52, 54, 56, 67, 70, 72, 77, 79, 80, 82, 89	36, 79	51, 54	51
Dissolved Arsenic			54	
Barium	83			
Cadmium	31, 33, 36, 65, 72, 83	31, 78		
Chromium	31, 33, 36, 52, 56, 70, 72, 79, 80, 84, 83, 89	31, 33, 35, 36, 51, 52, 74, 76, 78, 79, 80, 82, 83, 84, 89		ODP[2]
Copper	36	36		ODP
Silver	56			
Lead	31, 33, 36, 72, 79, 83, 89	28, 31, 33, 35, 36, 51, 52, 54, 56, 74, 76, 78, 79, 80, 82, 83, 84, 89	51, 55	54,56, ODP
Manganese	52, 56			
Silver				ODP
Thallium		79		
Zinc	83		51	ODP
PCBs				
Polychlorinated biphenyl – 1016	33 , 70			
Polychlorinated biphenyl – 1221	33			
Polychlorinated biphenyl – 1232	33 , 70			
Polychlorinated biphenyl – 1242	33), 70			
Polychlorinated biphenyl – 1254	33, 70			
PCBs (Cont'd)				
Polychlorinated biphenyl - 1260 (Arochlor 1260)	80			
PAHs				
Anthracene				ODP
Benzo(a)anthracene	33, 36, 51, 65, 66, 75, 77, 79, 80, 84			ODP
Benzo(a)pyrene	33, 36, 51, 65, 66, 75, 77, 79, 80, 84			

Table ES-2
Summary of COPCs
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Constituent of Potential Concern	Surface Soil	Subsurface Soil	Surface Water	Sediment
Benzo(b)flouranthene	33, 36, 51, 65, 66, 75, 77, 79, 80, 84			
Benzo(k)flouranthene	65			
Chrysene				ODP
Dibenzo(a,h)anthracene	36, 70			
Flouranthene				ODP
Flourene				ODP
Indeno(1,2,3-cd)pyrene	33, 36, 65, 66, 75, 77, 84			
Phenanthrene				ODP
Pyrene				ODP
VOCs				
1,1,2,2,-Tetrachloroethane		36		
Trichloroethene	36, 78	36, 78		
Methylene Chloride		33		
SVOC				
Pentachlorophenol			55	
Pesticides				
Alpha-Chlordane	46, 84			
Beta BHC	70	70,		
Dichlorodiphenyldichloroethane				52, 54, 56, ODP
Dichlorodiphenyldichloroethene	73			52, 54, 56, ODP
Dichlorodiphenyltrichloroethane	33, 36, 73	52, 54, 74, 79	54, 55	54, ODP
Dieldrin	33, 51, 54, 70, 73, 76, 77, 79, 80, 82	52, 54, 79		54
Endrin				ODP
Gamma-Chlordane	46, 84			
Dioxin				
TCDD Equivalent	42, 43, 46, 54, 55			55
Notes:				

[1]The numbers denote in which Screening Site a COPC was found, however, not all detections of a parameter meet the COPC definition. For a complete discussion of which sampling locations had detections that are COPCs, see Section 3.1 of the parcel reports.
[2]ODP = Off-Site Drainage Pathways

Table ES-3
Summary of Site Recommendations
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Parcel	Site	Site Name	Further Action Required (Yes or No)	Additional Samples Required (Yes or No)	Comments
3	51	Lake Danielson Outlet Drainage Ditch	No	No	Additional data may be needed for the dieldrin and PAH sitewide risk evaluation.
3	52	Golf Course Pond Outlet Ditch	Yes	No	Further evaluation of metals in surface soils against background values, using existing data, is recommended.
3	69	Flame-thrower Liquid Fuel Application	No	No	Additional data may be needed for the dieldrin and PAH sitewide risk evaluation.
4	66	Petroleum, Oil and Lubricants (POL) Building 253	No	No	Additional data may be needed for the dieldrin and PAH sitewide risk evaluation.
4	67	Installation Gas Station, Building 257	Yes	Yes	Additional subsurface soil samples should be taken to evaluate a potential gasoline release. If BTEX compounds are detected at the 40 ft depth, groundwater monitoring may also be required.
4	68	POL Building 263	No	No	Most of the area is paved and no surface soil samples were taken. No risks to human health from direct exposure is expected at this site.
7	65	XXCC-3, Building 249	Yes	No	Further risk evaluation of PAHs and pesticides in surface soils, without additional sampling data, is recommended. Additional data may be needed for the PAH and pesticide sitewide risk evaluation.
15	35	Defense Reutilization Marketing Office (DRMO) Building T-308, HazWaste Storage	No	Yes	Resampling needed near Sample SS-4 due to elevated arsenic concentrations detected in past sampling event.
15	36-39	DRMO Drum Storage	Yes	Yes	Groundwater at the site should be sampled to investigate if the chlorinated solvents have migrated to the regional aquifer. Further evaluation of metals in surface and subsurface soils against background values, using existing data, is recommended.

Table ES-3
Summary of Site Recommendations
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Parcel	Site	Site Name	Further Action Required (Yes or No)	Additional Samples Required (Yes or No)	Comments
15	54	DRMO East Storm Water Runoff Canal	No	No	Additional data may be needed for the dieldrin and PAH sitewide risk evaluation.
15	55	DRMO North Storm Water Runoff Area	No	No	No further action is recommended for Site 55.
15	72	PDO Yard	Yes	No	Further risk evaluation of arsenic in surface soils, without additional sampling, is recommended.
15	74	Flammables and Toxics, Building 319	No	No	No further action is recommended for Site 74.
15	79	Fuels, Miscellaneous Liquids, Wood and Paper, Building 702	Yes	Yes	Further risk evaluation, without additional sampling, is recommended at this site. Groundwater sampling may be needed due to elevated chromium concentrations at the lower subsurface soil depths.
21	75	Unknown Wastes near Building 689	No	No	Additional data may be needed for the PAH sitewide risk evaluation.
21	76	Unknown Wastes near Building 690	No	No	Additional data may be needed for the dieldrin sitewide risk evaluation.
21	78	Alcohol, Acetone, Toluene and Hydrofluoric Acid Area, Building 689	Yes	Yes	Additional subsurface soil sampling is needed to evaluate the vertical and lateral extent of TCE in the vicinity of SB78B. Groundwater may need to be sampled at the site.
22	77	Unknown Waste near Building 689 and 690	Yes	No	Further risk evaluation of PAHs in surface soils, without additional sampling, is recommended. Additional data may be needed for the dieldrin and PAH sitewide risk evaluation.
23	82	Flammables (Building 783 and 793)	Yes	Yes	Groundwater samples need to be taken from the source area or immediate downgradient to evaluate the presence of chromium.
27	84	Building 972	Yes	No	Further risk evaluation of PAHs in surface soils, without additional sampling, is recommended. Additional data may be needed for the PAH sitewide risk evaluation.

Table ES-3
Summary of Site Recommendations
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Parcel	Site	Site Name	Further Action Required (Yes or No)	Additional Samples Required (Yes or No)	Comments
28	89	Building 1089	Yes	Yes	This site should undergo remediation activities. Localized elevated metals (lead, chromium, arsenic and zinc) should be removed to be protective against potential future exposures.
29	56	West Gate Stormwater Drainage Canal	Yes	Yes	Offsite sediment and surface water data should be collected to determine if there has been transport of constituents offsite.
30	83	Dried Paint Disposal Area	Yes	Yes	The extent of metal contamination in surface soils from paint chip disposal needs to be defined for site management decisions.
32	28	Recoup Area Building	Yes	No	Further evaluation of arsenic and lead in surface and subsurface soils against background values, using existing data, is recommended.
33	42	Former PCP Dip Vat Area	No	No	Additional data may be needed for the dieldrin and PAH risk evaluation
33	43	Former Underground PCP Tank Area	No	No	Human health risks were well below the risk level for this site.
33	46	Pallet Drying Area	Yes	No	Further risk evaluation of arsenic and pesticides in surface soils, without additional sampling, is recommended. Additional data may be needed for the dieldrin and PAH sitewide risk evaluation.
33	80	Fuel and Cleaner Dispensing, Building 72	Yes	Yes	Additional sampling is recommended at this site to evaluate the extent of PAH and PCB constituents in surface soil and to support a human health risk evaluation for the site.
33	81	Fuel Oil Building 765	No	No	Additional data may be needed for the dieldrin and PAH sitewide risk evaluation.
35	31	Former Spray Paint Booth, Building 1087	Yes	No	Further risk evaluation of metals in surface soils, without additional sampling, is recommended.

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Table ES-3
Summary of Site Recommendations
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Parcel	Site	Site Name	Further Action Required (Yes or No)	Additional Samples Required (Yes or No)	Comments
35	33	Sandblasting Waste Drum Storage, Building 1088	Yes	No	Further risk evaluation of metals in surface and subsurface soils, without additional sampling, is recommended. Additional data may be needed for the dieldrin and PAH sitewide risk evaluation.
Multiple Parcel	73	All Grassed Areas	Yes	No	A risk evaluation, without additional sampling, is recommended to evaluate pesticides that have been observed in surface soil on a sitewide basis at DDMT. Critical evaluation of the need for remediation is recommended, as the cost benefit aspects may present a challenge due to the wide spread nature of pesticides in surface soil.
Multiple Parcel	70/71	All Railroad Tracks	Yes	Yes	A site-specific human health evaluation is recommended for this site, to determine appropriate risk management actions for the site.
Multiple Parcel	OSDP	Offsite-Drainage Pathways	Yes	No	Evaluate potential offsite releases, and ecological and health implications.

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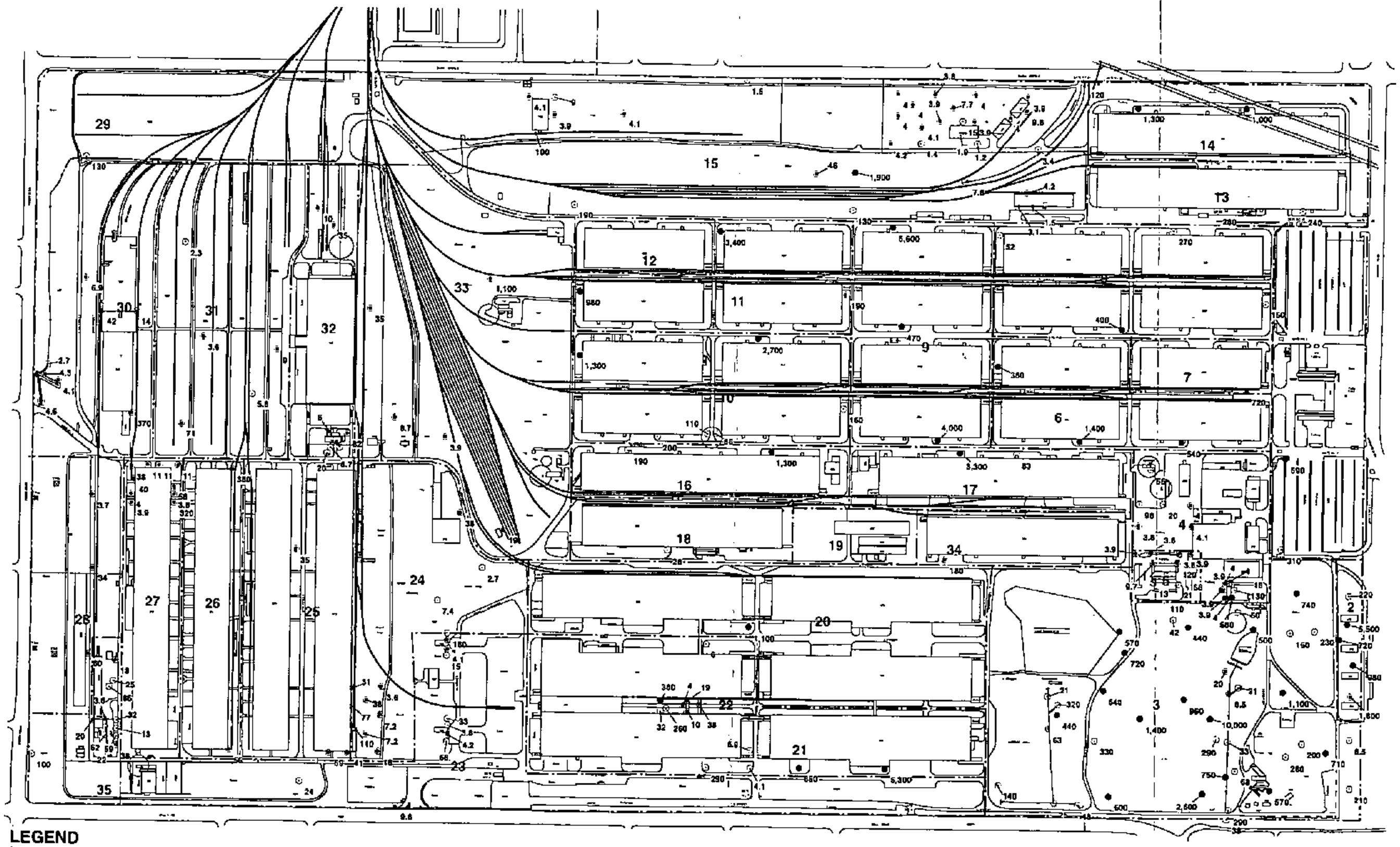


LEGEND

- NON-DETECT DIELDRIN CONCENTRATION
- DIELDRIN CONCENTRATION < 360 ug/kg
- DIELDRIN CONCENTRATION > 360 ug/kg and < 500 ug/kg
- DIELDRIN CONCENTRATION > 500 ug/kg

N
W E
S

SCALE: 1" = 600'

Attachment 1

DIELDRIN CONCENTRATIONS IN SURFACE SOIL

DEFENSE DISTRIBUTION DEPOT MEMPHIS, TENNESSEE

CH2MHILL

TAB

Parcel 3

Parcel 3

Screening Sites Sampling Program
for
Defense Distribution Depot Memphis, Tennessee

March 1998

Prepared for

U.S. Army Engineering and Support Center, Huntsville

Prepared by

CH2M HILL

2567 Fairlane Drive

Montgomery, Alabama 36116

137449.RR.ZZ

Parcel 3
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Parcel 3 is a 15,022-square-foot (ft^2) parcel in the southeastern corner of the Main Installation in Operable Unit (OU)-3, as shown in Figure 1. Parcel 3 is made up of the golf course, Lake Danielson, the golf course pond, and Buildings 188, 189, 192, 193, 194, 195, 196, 197, and 198.

The screening sites in this document have been identified by the Defense Distribution Depot Memphis, Tennessee (DDMT) through a review of existing documents, interviews with facility personnel, and knowledge of the facility's operations. Screening sites are locations at DDMT where there is a potential for materials to have been released to the environment from past operations. Screening sites in Parcel 3 include the following:

- Screening Site 51–Lake Danielson Outlet Ditch
- Screening Site 52–Golf Course Pond Outlet Ditch
- Screening Site 69–Flamethrower Liquid Fuel Application

Sites where there is a confirmed presence of contaminants from past operations are addressed in the Remedial Investigation Sampling Program. Other facilities have been addressed in the Base Realignment and Closure (BRAC) Sampling Program. Results of these programs are addressed in separate reports.

The purpose of the Screening Sites Sampling Program is to identify whether past activities at each site have resulted in releases from the site that would require further investigation. The intent is not to fully delineate the nature and extent of soil or groundwater contamination attributable to past operations, but to conduct technically based screening analyses sufficient to identify the likelihood of contamination.

The purpose of this letter report is to evaluate the results of the Screening Sites Sampling Program and the sampling from previous investigations and to recommend No Further Action or further investigation at screening sites in this parcel. The remainder of this report presents the results of past investigations; Screening Sites Sampling Program strategy, procedures, and results; and recommendations for each site.

Surface soils, subsurface soils, surface water, and sediments were investigated as part of the Screening Sites Sampling Program. Surface soil samples (any sample whose lowest depth is 2 feet or less) were taken both as independent samples and as the upper interval of a soil boring profile. Thus, surface soil samples taken as part of a soil boring may have an "SB" designation and are initially discussed under Subsurface Soil Sampling Procedure (Section 2.2.2.2). However, the results from that upper interval are presented in the surface soils tables and discussions in Section 3.0.

Screening Site 51–Lake Danielson Outlet Drainage Ditch

1.0 Introduction

The chart below presents the location and status information for this screening site.

Parcel	Building Number	RI/FS[1] OU	Site Number	CERCLA[2] Status
3	SW Golf Course	3	51	Screening

[1]RI/FS = Remedial Investigation/Feasibility Study
[2]CERCLA = Comprehensive Environmental Response, Compensating and Liability Act

Screening Site 51 is a 3-foot-wide concrete channel originating at the southern end of Lake Danielson and running approximately 600 feet south to the fence line. Originally, this channel was an unlined ditch. Stormwater runoff from the surrounding areas constitutes most of the flow through this ditch. The ditch is normally dry and receives only intermittent flow from the lake and surrounding areas during periods of excessive precipitation. The lake originally was constructed to store water for fire-fighting purposes. Figure 1 presents the location of the lake and the stormwater outlet drainage ditch.

2.0 Study Area Investigation

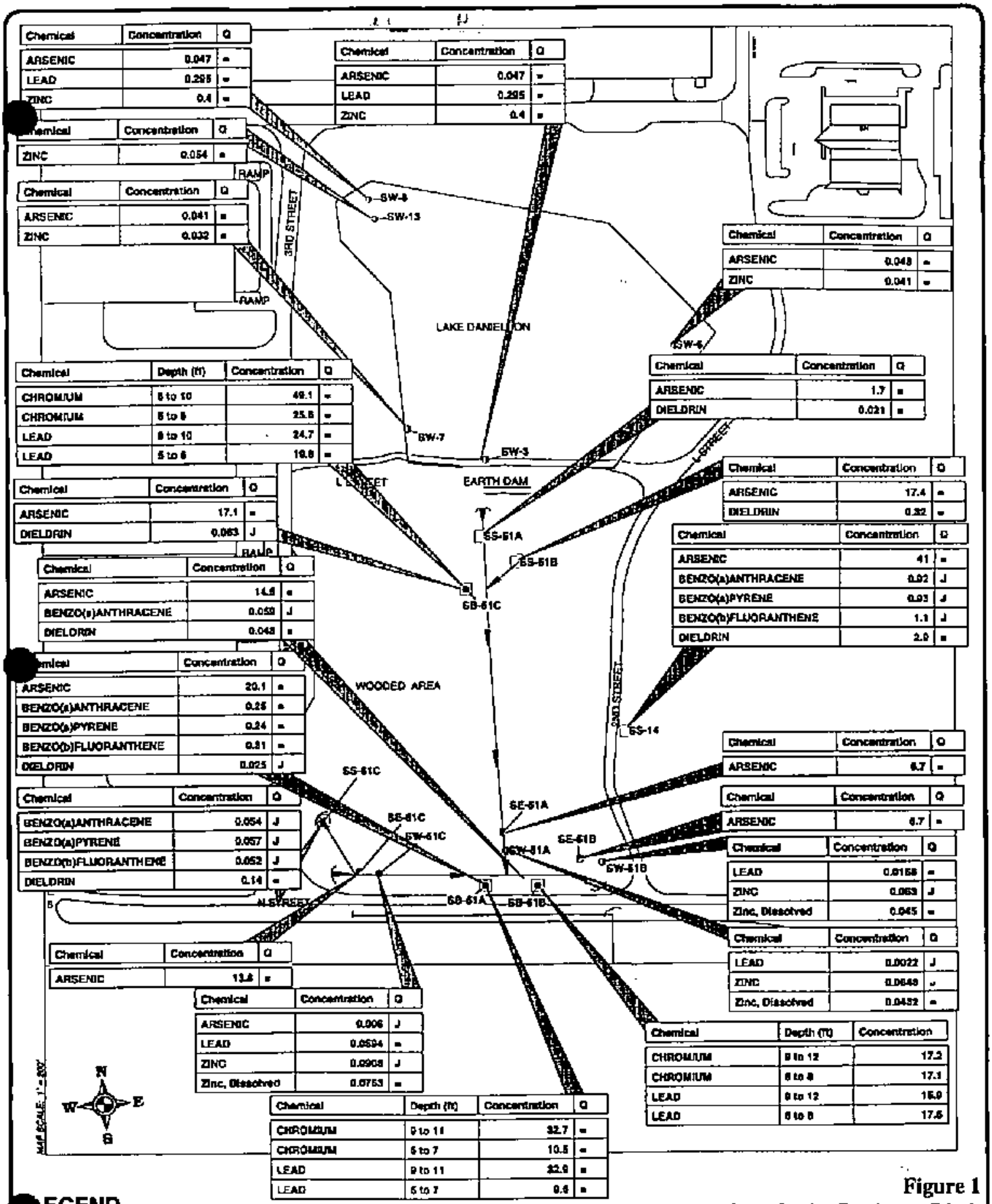
2.1 Previous Investigations

According to the *Remedial Investigations at DDMT, Final Report* (Law Environmental, 1990), one surface soil sample (SS14) and seven surface water samples (SW3, SW6, SW7, SW8, SW9, SW12, and SW13) were collected at Screening Site 51 in 1989. In addition, according to the *Defense Distribution Depot Memphis, Tennessee Sediment Sampling Program; Sediment Sampling Analysis Report* (EDRW, Inc., 1996), two sediment samples (SD17 and SD18) were collected at Screening Site 51 during the 1995 Sediment Sampling Program. Historical data from Screening Site 51 are summarized by media below, and contaminants of potential concern (COPCs) at historical sites are shown in Figure 1.

2.1.1 Surface Soil

In Sample SS14, chloroform, methylene chloride, acetone, and toluene were estimated at 2, 15, 24, and 6 milligrams per kilogram (mg/kg), respectively. All volatile organic compound (VOC) concentrations, except acetone, were either estimated at a value less than the sample quantitation limit or found in the method blank. Both bis(2-ethylhexyl)phthalate and fluoranthene (the only semivolatile organic compounds [SVOCs] that were detected at concentrations greater than sample quantitation limits) were detected in Sample SS14 at 2,700 mg/kg. Bis(2-ethylhexyl)phthalate, however, was found in the method blank.

Dieldrin, the only pesticide detected in surface soil at Screening Site 51, was present in Sample SS14 at a concentration of 2,900 mg/kg. Several inorganic compounds common in soil also were detected in Sample SS14. The concentrations of these compounds will be compared to established background concentrations and screening criteria in Section 3.1.



LEGEND

- Surface Soil Sampling Location (mg/kg)
- Soil Boring Sampling Location (mg/kg)
- Surface Water Sampling Location (mg/L)
- Sediment Sample Location (mg/kg)

(Q) Qualifier Definitions
= - Indicates unqualified detection
J - Indicates estimated value above detection limit, but below reporting limit.

Sampling locations without data boxes had no constituents exceeding risk-based criteria

Figure 1
Site 51, Lake Danielson Outlet Drainage Ditch
Constituents Exceeding Risk-Based Criteria
Defense Distribution Depot Memphis, TN

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2.1.2 Surface Water

Methylene chloride and acetone were found in four and five of the seven surface water samples, respectively; however, none of the detected concentrations were greater than the sample quantitation limit. Benzoic acid, bis(2-ethylhexyl)phthalate, and N-nitrosodiphenolamine were the only SVOCs detected in the surface water. But, as with the VOCs, no concentrations were detected at greater than the sample quantitation limit.

Both dichlorodiphenyldichloroethene (DDE) and dichlorodiphenyltrichloroethane (DDT) were detected in two of the seven surface water samples. The highest concentrations of DDE and DDT were detected in SW12 at 0.65 and 2.2 mg/kg, respectively. Several inorganic compounds common in soil also were detected in surface water. The concentrations of these compounds will be compared to established background concentrations and screening criteria in Section 3.1.

2.1.3 Sediment

Acetone was the only VOC detected in sediment at Screening Site 51; however, the datum was below the sample quantitation limit and has been qualified as possibly being the result of sample contamination at the laboratory. Several SVOCs also were detected in both sediment samples, but no concentrations were detected at greater than the sample quantitation limit. Although several pesticide concentrations were estimated at levels below sample quantitation limits, only dichlorodiphenyldichloroethane (DDD) (present in SD17 at 230 mg/kg) was detected at a quantifiable concentration. Several inorganic compounds common in soil also were detected in sediment. The concentrations of these compounds will be compared to established background concentrations and screening criteria in Section 3.1.

2.2 Screening Site Sampling Program

2.2.1 Sampling Strategy

The sampling strategy was developed to evaluate whether releases have occurred to surface soils, subsurface soils, sediment, and surface water. Samples were analyzed for SVOCs, VOCs, pesticides, and metals. At least one sample from each media for each site was analyzed for target compound list/target analyte list (TCL/TAL) constituents in accordance with the *Screening Sites Field Sampling Plan* (CH2M HILL, 1995).

2.2.2 Sampling Procedures

Sections 2.2.2.1 through 2.2.2.3 describe the sampling procedures and laboratory analyses performed for surface soils, subsurface soils, and surface water/sediment.

2.2.2.1 Surface Soil Sampling Procedures

With the approval of the Tennessee Department of Environment and Conservation (TDEC) and the U.S. Environmental Protection Agency (EPA), surface soil samples were collected from six locations (SS51A, SS51B, SS51C, SB51A, SB51B, and SB51C) at this site (shown in Figure 1). The locations of surface soil samples associated with borings are described under Section 2.2.2.2. The samples were collected adjacent to and above the concrete liner. Two samples were collected just below the lake where a closed pipe spills into the open, concrete-lined ditch. One

sample was collected at the southwestern-most part of the ditch system. The southwestern closed pipe appears to collect runoff from Third Street and spills into the open, concrete-lined ditch. The following details the locations of the surface soil samples:

- Sample SS51A was taken southeast of the Lake Danielson drainage ditch, just 27 feet south of the concrete headwall.
- Sample SS51B was taken from the drainage ditch that extends from the main drainage ditch to the east. The sample was taken 33 feet south of the eastern side of the concrete headwall.
- Sample SS51C was taken east of Third Street and north of N Street in a drainage ditch west of the golf course drainage ditch. The sample was taken 10 feet northeast of the easternmost corner of the concrete headwall at the northern end of the drainage ditch.

Once the grass layer was removed, the soil was removed from the ground using a standard stainless-steel hand auger. VOC samples were collected immediately from the top 6 inches of soil before being mixed. Part of the VOC sample was placed into a sealable plastic bag and allowed to equilibrate. The head space in the plastic bag was measured for VOCs using a hand-held photoionization detector (PID), and the results were used to determine which sample location was selected for Level 3 COPC or TCL/TAL analyses. The soil was transferred into a stainless-steel bowl using stainless-steel trowels, mixed, and then was placed into the appropriate sample jars.

2.2.2.2 Subsurface Soil Sampling Procedures

With the approval of the TDEC and EPA, subsurface soil samples were collected from three locations (SB51A, SB51B, and SB51C) at this site. Samples at each location were collected at three depths: zero to 1 foot, 5 to 7 feet, and 8 to 10 feet. The samples were collected adjacent to the concrete liner. Two samples were collected at the southern end of the ditch system and one sample was collected toward the northern end of the drainage ditch. The following details the location of each sample:

- Sample SB51A was located 23 feet north of N Street and 5 feet south of the golf course drainage ditch.
- Sample SB51B was located north of N Street and west of 2nd Street just 5 feet south of the southeastern corner of a nearby concrete ditch.
- Sample SB51C was taken southwest of the Lake Danielson drainage ditch. The sample was taken 30 feet south of the Kart Bridge and 2.5 feet west of the drainage ditch.

Samples were collected using a 2-inch-diameter, stainless-steel push sampler. VOC soil samples were collected directly from the continuous sampler using stainless-steel spoons. Part of the VOC sample was placed into a sealable plastic bag and allowed to equilibrate. The head space in the plastic bag was measured for VOCs using a hand-held PID, and the results were used to determine which interval within each boring was selected for Level 3 COPC or TCL/TAL analyses. The remaining soil was placed into a stainless-steel bowl, mixed, and then transferred into the appropriate sample jars.

2.2.2.3 Surface Water/Sediment Sampling Procedures

After a rainfall event of at least 0.2 inch following a 72-hour dry spell, three stormwater samples were collected at the locations shown in Figure 1. All surface water samples were collected within four hours of the end of the rainfall event. These samples were collected with the approval of the TDEC and EPA.

Surface water samples were collected from three locations (SW51A, SW51B, and SW51C) at the southern part of the ditch system. Each sample was collected from the center of the channel at mid-depth. Samples SW51A, SW51B, and SW51C were taken west of the intersection of 2nd Street and N Street. Sample SW51A was taken in the main north-south ditch; Sample SW51B was taken east of Sample SW51C was taken west of the main ditch, in an east-west flowing tributary.

Sediment samples were collected from three locations (SE51A, SE51B, and SE51C) in the southern part of the ditch system. Sample SE51A was taken in the main ditch, adjacent to Sample SW51A. Sample SE51B was taken west of 2nd Street and north of N Street in a ditch located at the southeastern corner of the golf course just 3 feet upstream of a metal grate. Sample SE51C was taken from a tributary ditch west of the main ditch, adjacent to Sample SW51C.

The Geoprobe™ was used to penetrate the concrete lining and to sample the soil just below the concrete lining. This method of sampling was performed to evaluate the soil that had been exposed to runoff before the construction of the concrete lining. The concrete lining was penetrated at the bottom of the ditch and near the center.

All sampling tools were decontaminated before being used at each sample location according to the procedures specified in the *Generic Quality Assurance Project Plan* (CH2M HILL, 1995) for the RI/FS currently being conducted at the DDMT.

2.2.3 Analytical Procedures

The samples were sent to CH2M HILL's Analytical Services in Montgomery, Alabama for analyses. Three surface soil samples, nine subsurface soil samples, and three sediment samples were analyzed for VOCs, SVOCs, pesticides, polycyclic aromatic hydrocarbons (PAHs), metals, and TCL/TAL. Three surface water samples were analyzed for VOCs, SVOCs, pesticides, total metals, and soluble metals. Samples received at the laboratory were analyzed in accordance with the procedures outlined in the *Generic Quality Assurance Project Plan* (CH2M HILL, 1995) for the RI/FS currently being conducted at DDMT.

A split sample for the United States Corps of Engineers (COE) was collected from the 8- to 10-foot interval of Sample SB51B. This one subsurface soil sample was sent to the COE's Atlanta, Georgia laboratory for analysis of VOCs, SVOCs, PAHs, and metals.

A data quality evaluation (DQE) was performed to assess the effect of the overall analytical process on the usability of the data CH2M HILL collected in 1997. The DQE established that the detection of acetone and bis(2-ethylhexyl)phthalate can be attributed to field sampling and laboratory contamination rather than to environmental conditions at the site. Also, low concentrations of dioxins and furans can be attributed to background or instrument noise and are not indicative of environmental conditions. With the exception of the qualifications listed above, the DQE concluded that data can be used in the project decision-making process.

3.0 Interpretation of Sampling Results

3.1 Presentation of Results

The following sections present results of the Screening Sites Sampling Program for Screening Site 51. Data are presented by media for surface soil, subsurface soil, surface water, and sediment. Data are compared with appropriate screening criteria in five summary tables: Tables 51-A, 51-B, 51-C, 51-D, and 51-E. Data from the 1997 CH2M HILL investigation are presented along with historical data from the *Remedial Investigations at DDMT, Final Report* (Law Environmental, 1990). If a value from a sampling location exceeds one of the comparison criteria, that value and the comparison criterion are shown in **bold** on the summary table.

COPCs are those parameters that exceed both background values and the screening criteria. Where concentrations exceed the selected background value, a comparison is made with the observed range of background values as reviewed and established by the BRAC Cleanup Team (BCT).

There are no COPCs identified for Screening Site 51 with the exception of dieldrin and benzo(a)pyrene. These two chemicals have been identified at several other screening sites across the DDMT. These chemicals have been identified by the BCT as sitewide COPCs and will be evaluated on a sitewide basis. Section 3.1.1 presents the media-specific discussion of the detected chemicals.

3.1.1 Surface Soil

Results of the surface soil analyses with values above detection limits are shown in Tables 51-A and 51-B.

3.1.1.1 BCT Screening Criteria

Table 51-A summarizes constituents for which the BCT has selected a screening criteria. Arsenic and benzo(a)pyrene were detected at concentrations exceeding the BCT criteria.

Arsenic was found in Sample SB51A at a concentration of 20.1 mg/kg, which is nearly identical to the background value of 20 mg/kg. However, arsenic was elevated (41 mg/kg) in one of the samples (Sample SS14) collected during the earlier RIs (Law Environmental, 1990). The other five surface soil samples were below the background level. The more recent samples show that arsenic concentrations in surface soil at Screening Site 51 are typical of background values. The significance of these detected arsenic concentrations will be further evaluated.

Benzo(a)pyrene was found in Sample SB51A at 0.24 mg/kg, which exceeds the BCT screening value of 0.088 mg/kg. The BCT selected the risk-based concentration (RBC) for residential soil ingestion as the screening criteria. The background concentration of 0.96 mg/kg was based on benzo(a)pyrene detection in 9 of 22 background samples at concentrations ranging from 0.044 to 0.96 mg/kg. Although benzo(a) pyrene exceeds the residential RBC, it is within the range found sitewide at DDMT primarily due to railroad operations and will be addressed in an upcoming risk evaluation.

3.1.1.2 Other Screening Criteria

Table 51-B compares the remaining constituents with the soil ingestion screening criteria for both residential and industrial exposure scenarios. Dieldrin is the only remaining constituent that was found at concentrations exceeding the screening criteria. Dieldrin was found at concentrations ranging from 0.021 to 0.32 mg/kg, and four of six sample concentrations exceeded the screening criteria of 0.04 mg/kg (Residential RBC for Soil Ingestion). Dieldrin is found sitewide at DDMT and will be addressed as a statewide issue.

3.1.2 Subsurface Soils

Table 51-C summarizes subsurface soil sampling data. Chromium and lead were found at concentrations exceeding the background or groundwater protection criteria.

Chromium and lead were found in all six samples at concentrations that are generally within the background range. Chromium was found at concentrations ranging from 10.5 to 49.1 mg/kg. Only the highest detected value, 49.1 mg/kg in Sample SB51C (8- to 10-foot depth) exceeded the background value of 26 mg/kg.

Lead was found at concentrations ranging from 9.6 to 32.9 mg/kg. The two highest values, 32.9 mg/kg (Sample SB51A at 9 to 11 feet) and 24.7 mg/kg (Sample SB51C at 8 to 10 feet) exceeded the background value of 24 mg/kg. These values are slightly above groundwater protection criteria; however, they are within the range of background sample results, which ranged from 1.7 to 291 mg/kg.

3.1.3 Surface Water

Table 51-D summarizes surface water sampling data. Samples from the CH2M HILL Screening Sites Sampling Program show arsenic and lead exceeding the screening criteria.

Arsenic was found in Sample SW51C at 0.006 milligrams per liter (mg/L), which exceeds the ambient water quality criteria for human health of 0.000018 mg/L. However, the background value for arsenic is 0.018 mg/L, and the detected value at Sample SW51C does not exceed background.

The *Remedial Investigations at DDMT, Final Report* (Law Environmental, 1990) found arsenic in Sample SW6 (Lake Danielson) at 0.048 mg/L. The Law study found that arsenic in other surface water samples at various locations in this vicinity ranged from 0.030 to 0.047 mg/L. Therefore, arsenic concentrations appear to have decreased substantially from samples collected in 1989 to the more recent samples taken in 1997.

Lead was found in Samples SW51A, SW51B, and SW51C at concentrations of 0.0022, 0.0168, and 0.0594 mg/L, respectively. The two higher values exceed the ambient water quality criteria for aquatic organisms of 0.032 mg/L. The highest value, 0.0594 mg/L, slightly exceeds the State of Tennessee criteria of 0.05 mg/L.

The background study found lead in 8 of 28 surface water samples with concentrations ranging from 0.0055 to 0.0167 mg/L. One of the surface water samples from Screening Site 51 exceeded the range found in the background samples. However, this could be associated with the suspended particulates in the surface water samples.

A comparison of total and dissolved analyses shows that dissolved arsenic and lead concentrations are approximately half of the total values. This indicates that a portion of the metals concentrations in surface water samples can be attributed to suspended sediment.

Dieldrin was detected in Samples SW51A and SW51C at concentrations of 0.00022 and 0.0001 mg/L. Dieldrin exists in surface soils sitewide at DDMT and is found at low concentrations in surface water runoff, as shown by these results. The aquatic organism protection-based dieldrin surface water criteria do not apply to this site. However, for conservative evaluation purposes, they are compared to the EPA Region IV surface water screening value of 0.0019 mg/L, which is not exceeded. Therefore, surface water dieldrin is below the screening criteria. Also, due to low solubility potential of dieldrin, observed concentration is suspected to be from suspended particulates.

3.1.4 Sediment

Table 51-E summarizes the sediment sampling data. Note that sediment samples were taken from below the concrete ditch liner by augering through the concrete to collect a sample of underlying soil. This was done to evaluate the potential effects of historical operations at DDMT before the concrete lining was installed.

Arsenic and DDD were found at concentrations similar to background values, but exceeding the National Oceanic and Atmospheric Administration (NOAA) sediment criteria. However, the sediment criteria comparison is conservative, and sediments are not considered an issue at this site.

3.2 Vertical and Lateral Extent

Six soil (multiple depths from sample locations indicated with SB); three sediment samples and three surface water samples were collected from this ditch and its inlets. The upgradient location of the main ditch is Lake Danielson. Five sediment and surface water samples were collected from Lake Danielson (see Figure 1). The drainage ditch that is part of Screening Site 51 joins the drainage down stream originating from Screening Site 52. Thus, Sample SS52A represents the downgradient samples for this site.

The samples from the ditch were collected from biased locations to detect any possible contamination; thus, they were placed at the ditch confluence. This approach was intended to represent worst-case contamination detection. If these samples were free of significant contamination, no further evaluations were warranted for a site.

Many of the constituents found at Screening Site 51 are at concentrations similar to background levels. Although arsenic was detected is several of the site samples, the concentration distribution is similar to else where within DDMT and the background. Because arsenic has low RBC value, it is indicated as a COPC. However, there is no localized elevation associated with arsenic, and no trends of distribution are apparent. Arsenic will be evaluated as part of the sitewide metals population comparison to evaluate the statistical differences between site and the background samples.

Dieldrin is found in surface soil throughout the DDMT Main Installation and will be addressed on a facility-wide basis as part of an upcoming risk evaluation. Low concentrations of dieldrin

also were found in surface water at Screening Site 51. Dieldrin was not detected in subsurface soil or in sediment samples collected beneath the concrete ditch liner.

Benzo(a)pyrene was found in surface soil in Sample SB51 at 0.24 mg/kg, which exceeds the screening criteria at this single location for Screening Site 51. Benzo(a)pyrene was detected at concentrations upstream and downstream of Sample SB51 at concentrations below the screening criteria. Benzo(a)pyrene was not found in surface water, sediment, or subsurface soils at Screening Site 51. Benzo(a) pyrene is found sporadically throughout the DDMT Main Installation and in the background samples. The PAHs at the site are suspected to be because of railroad operations and will be addressed in an upcoming sitewide evaluation.

Metals, including chromium and lead, found in subsurface soils are similar to background levels. Elevated metals concentrations were not found in surface soil samples, and the higher concentrations found at the 8- to 10-foot depth may be due to changes in soil types that occur with depth. Therefore, downward migration of metal soil constituents has not been considered important for this site.

3.3 Potential Migration Pathways

Dieldrin is present at DDMT in surface and subsurface soils. Because this compound is only minutely soluble in water, its most likely migration pathway at this site is via erosion as suspended soil particles in the surface water, where it potentially would be available to aquatic organisms. Dieldrin in the subsurface soils should be relatively immobile and should not affect groundwater quality.

Benzo(a)anthracene, benzo(a)pyrene, benzo(k)fluoranthene, benzo(b)fluoranthene, and indeno(1,2,3-c,d)pyrene, a group of related long-chain PAHs, have similar chemical and physical characteristics and tend to migrate and behave similarly in the environment. Generally, these compounds have low vapor pressures, are only marginally soluble in water, and have a high affinity for soils. These compounds have been detected at concentrations above screening values for surface soils at DDMT. They would be expected to migrate as adsorbed components of the soils and potentially would be available to aquatic organisms in turbid surface water or to bottom feeders in areas with contaminated sediments. That none of these compounds were detected in sediments indicates that this is not a major source of contaminant migration for these compounds at this site. These compounds do not bioaccumulate significantly because of their rapid metabolism and excretion by most aquatic organisms. The downstream samples from the Screening Site 51 ditch and screening confluence do not indicate a presence of PAHs. This indicates that surface runoff is not a significant migration pathway at this site.

Based on the sampling results, there do not appear to be significant risks associated with Screening Site 51 and potential migration pathways do not require further evaluation except for dieldrin and PAH compounds, which will be evaluated as a sitewide issue.

3.4 Additional Data Needs

Presence of upstream and downstream sampling data adequately characterizes the nature of this site; therefore, no additional data needs are identified for Screening Site 51, and No Further

Action is proposed (BCT Meetings, 1997). There are no additional data needs unless additional data are needed to support the risk evaluation for dieldrin or PAH compounds.

4.0 Interpretation of Screening Criteria Comparisons

4.1 Methodology

The Preliminary Risk Evaluation (PRE) was performed in accordance with the *Guidance on Preliminary Risk Evaluations for the Purpose of Reaching a Finding of Suitability to Lease (FOSL)* (EPA Region IV, 1994). A discussion of the PRE methodology is provided as Appendix A to this document.

4.2 Screening Site 51 Risk

Carcinogenic and noncarcinogenic risks for Screening Site 51 are presented in Table 4-7 of the draft PRE (USAESC, 1998). Detailed chemical-specific estimates are presented in Appendix A of the PRE.

Based on industrial worker exposure estimates, the sample-specific carcinogenic PRE risk ratio was estimated to be a one-in-a-million risk level across the site for all samples. Residential exposure-based levels were slightly above one-in-a-million risk levels in one of the samples because of the presence of arsenic at 20.1 mg/kg (as compared to a background level of 20 mg/kg.) Thus, there are no significant risks at Screening Site 51.

The noncarcinogenic PRE ratios were well below a value of 1.0 for industrial worker exposures. A residential exposure indicated the ratio at a value of 1.0, primarily from low-level metals.

No human health risks are expected from this site.

5.0 Summary and Recommendations

5.1 Summary

There do not appear to be significant risks associated with Screening Site 51 and No Further Action is proposed. There are no additional data needs unless additional data are needed to support the risk evaluation for dieldrin.

Dieldrin and benzo(a)pyrene were found in surface soil at Screening Site 51. These constituents exist sitewide at DDMT and will be addressed in an upcoming risk evaluation. Metal values found in surface soil and subsurface soil are similar to background values. Arsenic from the site will be compared with background using population comparison methods. Based on an evaluation of the screening sites results, no further site-specific evaluation is needed at Screening Site 51.

5.2 Recommendations

No further field assessment is proposed for Screening Site 51, unless additional data are needed for dieldrin and PAH risk evaluation. Additional risk evaluation for arsenic is necessary to evaluate the slight elevation of arsenic concentrations relative to residential criteria; however, no further action or additional data are anticipated for arsenic.

Screening Site 52–Golf Course Pond Outlet Ditch

1.0 Introduction

The chart below presents the location and status information for this screening site.

Parcel	Building Number	RI/FS[1] OU	Site Number	CERCLA[2] Status
3	SE Golf Course	3	52	Screening

[1]RI/FS = Remedial Investigation/Feasibility Study
[2]CERCLA = Comprehensive Environmental Response, Compensating and Liability Act

Screening Site 52 is a 3-foot-wide concrete channel, approximately 700 feet long, that runs south from the Golf Course Pond to the installation's boundary (Figure 2). It is normally dry, receiving intermittent flow during periods of heavy precipitation.

2.0 Study Area Investigation

2.1 Previous Investigations

According to the *Remedial Investigations at DDMT, Final Report* (Law Environmental, 1990), two surface soil samples (SS12 and SS13) and four surface water samples (SW4, SW5, SW10, and SW11) were collected at Screening Site 52 in 1989. In addition, according to the *Defense Distribution Depot Memphis, Tennessee Sediment Sampling Program; Sediment Sampling Analysis Report* (EDRW, Inc., 1996), one sediment sample (SD16) was collected in Screening Site 53 during the 1995 Sediment Sampling Program. Historical data from Screening Site 51 are summarized below by media. COPCs at historical sites are shown in Figure 2.

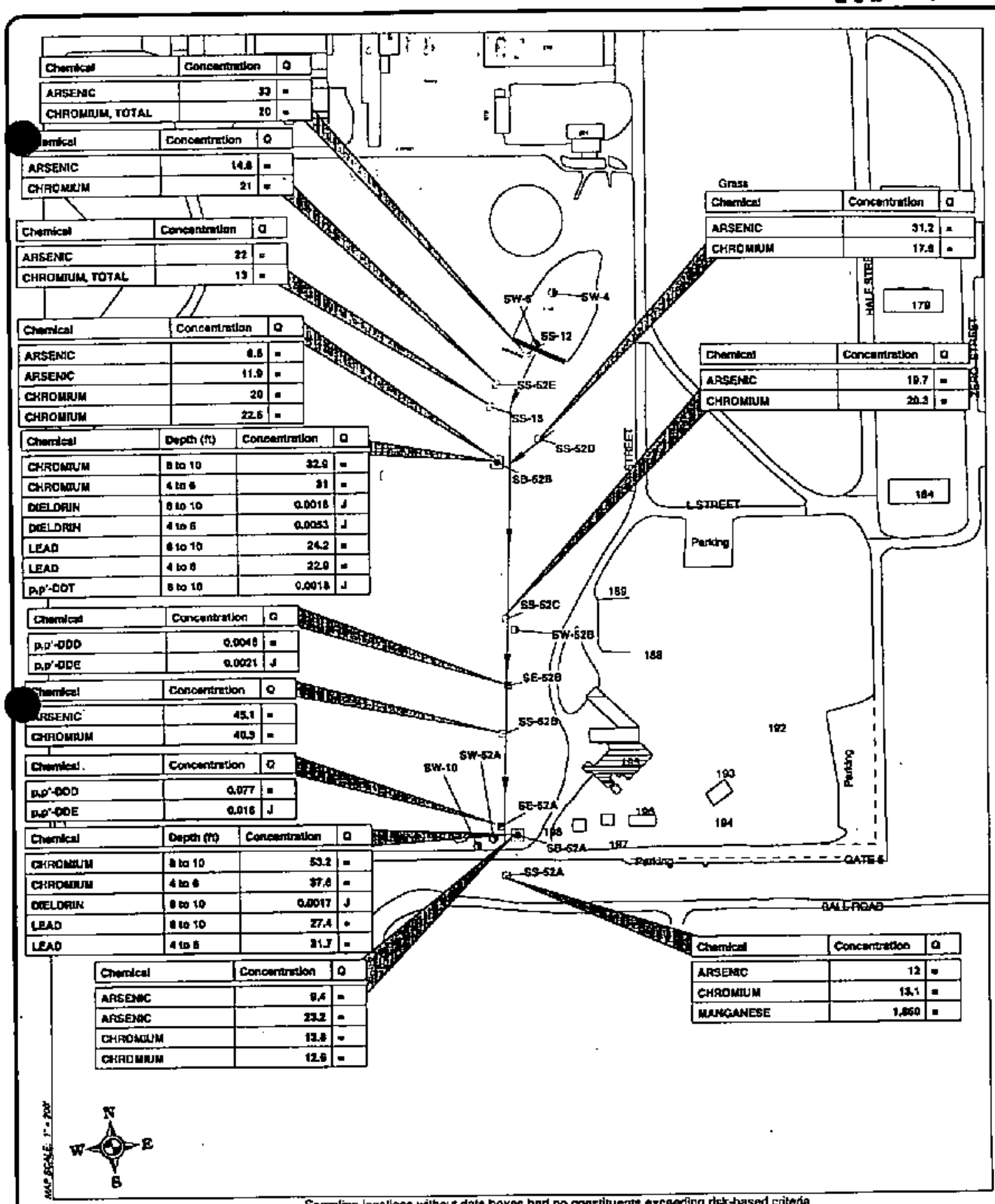
2.1.1 Surface Soil

Methylene chloride, acetone, and toluene were the only VOCs detected in both surface soil samples. All of these data except two (toluene at 17 mg/kg in Sample SS12 and acetone at 38 mg/kg in Sample SS13) were either estimated at a value less than the sample quantitation limit or the detected compound was found in the method blank. No SVOCs were detected at concentrations greater than the sample quantitation limits.

Historical use of organochlorine pesticides dieldrin, DDE, and DDT were detected at concentrations of 260, 870, and 2,000 mg/kg, respectively, in Sample SS12 and at concentrations of 830, 290, and 340, respectively, in Sample SS13. Several inorganic compounds common in soil also were detected in Samples SS12 and SS13. The concentrations of these compounds will be compared to established background concentrations and critical values in Section 3.1.

2.1.2 Surface Water

Acetone was detected in all of the surface water samples; however, none of the detected concentrations were greater than the sample quantitation limit. Several SVOCs were detected in



Sampling locations without data boxes had no constituents exceeding risk-based criteria

LEGEND

- Surface Soil Sampling Location (mg/kg)
- Soil Boring Sampling Location (mg/kg)
- Surface Water Sampling Location (mg/L)
- Sediment Sampling Location (mg/kg)

(Q) Qualifier Definitions
= - indicates unqualified detection
J - indicates estimated value above detection limit, but below reporting limit

Figure 2
Site 52, Golf Course Pond Outlet Ditch
Constituents Exceeding Risk-Based Criteria
Defense Distribution Depot Memphis, TN

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the surface water, but, as with the VOCs, no concentrations were detected at greater than the sample quantitation limit.

No pesticides were detected in surface water samples at Screening Site 52. Several inorganic compounds common in soil also were detected in surface water. The concentrations of these compounds will be compared to established background concentrations and critical values in Section 3.1.

2.1.3 Sediment

Methylene chloride was the only VOC detected in sediment at Screening Site 52; however, the datum was below the sample quantitation limit and has been qualified as possibly being the result of sample contamination at the laboratory. Several SVOCs also were detected in the sediment sample, but no concentrations were detected at greater than the sample quantitation limit. Although several pesticide concentrations were estimated at levels below sample quantitation limits, only DDD (present at 130 mg/kg) was detected at a quantifiable concentration. Several inorganic compounds common in soil also were detected in sediment. The concentrations of these compounds will be compared to established background concentrations and critical values in Section 3.1.

2.2 Screening Site Sampling Program

2.2.1 Sampling Strategy

The sampling strategy was developed to evaluate whether releases have occurred to surface soils, subsurface soils, sediment, and surface water. Samples were analyzed for SVOCs, VOCs, pesticides, and metals. At least one sample from each media for each site was analyzed for TCL/TAL constituents in accordance with the *Screening Sites Field Sampling Plan* (CH2M HILL, 1995).

2.2.2 Sampling Procedures

Sections 2.2.2.1 through 2.2.2.3 describe the sampling procedures and laboratory analyses performed for surface soils, subsurface soils, and surface water/sediment.

2.2.2.1 Surface Soil Sampling Procedures

With the approval of the TDEC and EPA, surface soil samples were collected at seven locations (SS52A, SS52B, SS52C, SS52D, SS52E, SB52A, and SB52B) at this site (shown in Figure 2). Locations of surface soil samples associated with borings are provided in Section 2.2.2.2. The samples were collected adjacent to and above the concrete liner. The sample locations span the length of the ditch system. Surface Soil Sample SS52A was taken south of the southern end of the golf course drainage ditch just outside of the fence. Sample SS52B was taken 1 foot west of the western side of the golf course drainage ditch and 96 feet south of Kart Bridge. Sample SS52C was taken 1 foot west of the western side of the golf course drainage ditch, but 63 feet north of the bridge. Sample SS52D was taken 1 foot east of the northeastern end of the golf course drainage ditch and 12 feet from the mouth of the ditch. Sample SS52E was taken 1 foot east of the northeastern end of the golf course drainage ditch and 21 feet from the mouth of the ditch.

The soil was removed from the ground using a standard stainless-steel hand auger. VOC samples were immediately collected from the top six inches of soil before being mixed. A portion of the VOC sample was placed into a sealable plastic bag and allowed to equilibrate. The head space in the plastic bag was measured for VOCs using a hand-held PID, and the results were used to evaluate which sample location was selected for Level 3 COPC or TCL/TAL analyses. Stainless-steel trowels were used to transfer the soil into a stainless-steel bowl for mixing. The soil was then placed into the appropriate sample jars.

2.2.2.2 Subsurface Soil Sampling Procedures

With the approval of the TDEC and EPA, subsurface soil samples were collected from two locations (SB52A and SB52B) at this site. Samples at each location were collected at three depths: zero to 2 feet, 4 to 6 feet, and 8 to 10 feet. The samples were collected adjacent to the concrete liner. Sample SB52A was located on the eastern side of the golf course drainage ditch north of N Street, 47 feet north of the concrete headwall located at the south end of the golf course drainage ditch, and 3 feet east of the drainage ditch. SB52B was located on the western side of the golf course drainage ditch, 4 feet west and 11 feet south of the northwestern corner of the north end headwall.

Samples were collected using a 2-inch-diameter, stainless-steel push sampler. VOC soil samples were collected directly from the continuous sampler using stainless-steel spoons. A portion of the VOC sample was placed into a sealable plastic bag and allowed to equilibrate. The head space in the plastic bag was measured for VOCs using a hand-held PID, and the results were used to evaluate which interval within each boring was selected for Level 3 COPC or TCL/TAL analyses. The remaining soil was placed into a stainless-steel bowl, mixed, and then transferred into the appropriate sample jars.

All sampling tools were decontaminated before being used at each sample location according to the procedures specified in the *Generic Quality Assurance Project Plan* (CH2M HILL, 1995) for the RI/FS currently being conducted at DDMT.

2.2.2.3 Surface Water/Sediment Sampling Procedures

After a rainfall event of at least 0.2 inch following a 72-hour dry spell, two stormwater samples were collected at the locations shown in Figure 2. All surface water samples were collected within four hours of the end of the rainfall event. These samples were collected with the approval of the TDEC and EPA.

Surface water samples were collected from two locations: SW52A and SW52B. SW52A was collected from the southern end of the drainage ditch. SW52B was collected approximately 300 feet north of SW52A. Each sample was collected from the center of the channel at mid-depth.

Sediment samples were collected from two locations (SE52A and SE52B) in the same general vicinity as the water samples. Sample SW52A was taken west of the intersection of 1st Street and N Street, just south of the golf course drainage ditch.

Sample SW52B was taken west of Building 188 and 1st Street, just east of the golf course drainage ditch. The Geoprobe™ was used to penetrate the concrete lining and to sample the soil just below the concrete lining. This method of sampling was performed to evaluate the soil that had been exposed to runoff before the construction of the concrete lining. The concrete lining was penetrated at the bottom of the ditch and near the center.

2.2.3 Analytical Procedures

The samples were sent to CH2M HILL's Analytical Services in Montgomery, Alabama, for analyses. Five surface soil, six subsurface soil, and two sediment samples were analyzed for pesticides, PAHs, metals, and TCL/TAL. Two surface water samples were analyzed for pesticides, PAHs, total metals, and soluble metals. Samples received at the laboratory were analyzed in accordance with the procedures outlined in the *Generic Quality Assurance Project Plan* (CH2M HILL, 1995) for the RI/FS currently being conducted at DDMT.

A COE split sample was collected at SE52A. This one sediment sample was sent to the COE's Atlanta, Georgia, laboratory for analysis of pesticides, PAHs, and metals.

A DQE was performed to assess the effect of the overall analytical process on the usability of the data CH2M HILL collected in 1997. The DQE established that the detection of acetone and bis(2-ethylhexyl)phthalate can be attributed to field sampling and laboratory contamination rather than to environmental conditions at the site. Also, low concentrations of dioxins and furans can be attributed to background or instrument noise and are not indicative of environmental conditions. With the exception of the qualifications listed above, the DQE concluded that data can be used in the project decision-making process.

3.0 Interpretation of Sampling Results

3.1 Presentation of Results

The following sections present the results of the Screening Sites Sampling Program for Screening Site 52, Golf Course Pond Outfall Ditch. Data are presented by media for surface soil, subsurface soil, surface water, and sediment. Data are compared with appropriate screening criteria in five summary tables: Tables 52-A, 52-B, 52-C, 52-D, and 52-E. Data from the 1997 CH2M HILL investigation are presented along with historical data from the *Remedial Investigations at DDMT, Final Report* (Law Environmental, 1990). If a value from a sampling location exceeds one of the comparison criteria, that value and the comparison criterion are shown in **bold** on the summary table.

COPCs are those parameters that exceed both background values and the screening criteria. Where concentrations exceed the selected background value, a comparison is made with the observed range of background values as reviewed and established by the BCT.

COPCs identified for Screening Site 52 include dieldrin and benzo(a)pyrene, which have been identified by the BCT as sitewide COPCs and will be evaluated on a sitewide basis. Arsenic, chromium, and manganese exceed background and screening criteria in surface soils.

3.1.1 Surface Soil

Results of the surface soil analyses with values above detection limits are shown in Tables 52-A and 52-B.

3.1.1.1 BCT Screening Criteria

Table 52-A summarizes constituents for which the BCT has selected a screening criteria. Arsenic, benzo(a)pyrene, chromium, and manganese were detected at concentrations exceeding the BCT criteria.

Arsenic was found in Sample SB52A at a concentration of 23.2 mg/kg, which is nearly identical to the background value of 20 mg/kg. Arsenic levels in Samples SS52D and SS52B were 31.2 and 45.1 mg/kg, respectively, which exceed the background value. The other six surface soil samples were below the background level. Arsenic was found in all 22 background samples ranging in concentrations from 4.2 to 27.7 mg/kg. In the *Remedial Investigations at DDMT, Final Report* (Law Environmental, 1990), arsenic was found in Samples SS-12 and SS-13 at 33 and 22 mg/kg, respectively. These results indicate that arsenic concentrations at several locations slightly exceed the background range.

Benzo(a)pyrene was found in Sample SB52B at 0.26 mg/kg, which exceeds the BCT screening value of 0.088 mg/kg. The BCT selected the RBC for residential soil ingestion as the screening criteria. The background concentration of 0.96 mg/kg based on benzo(a)pyrene detections in 9 of 22 background samples at concentrations ranging from 0.044 to 0.96 mg/kg. Although benzo(a) pyrene exceeds the residential RBC, it is within the range of concentrations found in the background samples. Benzo(a)pyrene, found sitewide at DDMT because of railroad operations, will be addressed in an upcoming risk evaluation.

Chromium was found in nine surface soil samples at concentrations ranging from 12.6 to 40.3 mg/kg. The highest concentration, 40.3 mg/kg, slightly exceeds the BCT screening value of 39 mg/kg, which is based on the RBC for residential soil ingestion. Most of the data are similar to background values, and a slight exceedance of the residential RBC is not considered to be a significant risk to human health.

Manganese was found in Sample SS52A at 1,860 mg/kg, which exceeds the BCT screening value of 1,300 mg/kg. Manganese was found in all 22 background samples at concentrations ranging from 330 to 1,080 mg/kg.

3.1.1.2 Other Screening Criteria

Table 52-B summarizes of the remaining constituents compared with the soil ingestion screening criteria for both residential and industrial exposure scenarios. Dieldrin is the only remaining constituent that was found at concentrations exceeding the screening criteria. Dieldrin was found at concentrations ranging from 0.0013 to 0.75 mg/kg, and 2 of 7 sample concentrations exceeded the screening criteria of 0.04 mg/kg (residential RBC for soil ingestion). The highest concentration, 0.75 mg/kg, exceeds the industrial RBC of 0.36 mg/kg. Dieldrin, found sitewide at DDMT, will be addressed in an upcoming risk evaluation.

3.1.2 Subsurface Soils

Table 52-C summarizes subsurface soil sampling data. Dieldrin, chromium, and lead were found at concentrations exceeding the background or groundwater protection criteria.

Dieldrin was found in Sample SB52B at a 4- to 6-foot depth at an estimated concentration of 0.0053 mg/kg. This is below the background concentration of 0.37 mg/kg, but exceeds the groundwater protection criteria of 0.004 mg/kg.

Chromium and lead were found in all four samples at concentrations that may represent naturally occurring soils. Chromium was found at concentrations ranging from 31 to 53.2 mg/kg. Only the highest detected value, 53.2 mg/kg in Sample SB52B at an 8- to 10-foot depth, exceeded the groundwater protection criteria of 38 mg/kg. Sample SB51C from Screening Site 51 also showed an increased chromium concentration at the 8- to 10-foot depth. Therefore, the increased chromium concentration at the 8- to 10-foot depth is believed to be due to the naturally occurring variability of chromium with changes in soil type.

Lead was found at concentrations ranging from 22.9 to 32.7 mg/kg in the four subsurface samples. Three of the values exceed the background value of 24 mg/kg. These values, however, are within the range of background sample results, which ranged from 1.7 to 291 mg/kg.

3.1.3 Surface Water

Table 52-D summarizes surface water sampling data. Samples from the CH2M HILL screening sites investigation show that arsenic exceeds the screening criteria.

Arsenic was found in Samples SW52A and SW52B at 0.0027 and 0.0041 mg/L, respectively, which exceeds the ambient water quality criteria for human health of 0.000018 mg/L. However, the background value for arsenic is 0.018 mg/L, and the detected values do not exceed background.

3.1.4 Sediment

Table 52-E summarizes the sediment sampling data. Note that sediment samples were taken from below the concrete ditch liner by augering through the concrete to collect a sample of underlying soil. The purpose of this was to evaluate the potential effects of historical operations at DDMT before the concrete lining was installed.

Arsenic was found at concentrations similar to background values but exceeding the NOAA sediment criteria. These concentrations are not considered to be significant because the detected concentrations were less than the background value.

Pesticides including DDD, DDE, and DDT were found at concentrations exceeding background and NOAA sediment criteria. Pesticide concentrations for DDD and DDE for Sample SE52A were 0.077 and 0.016 (estimated) mg/kg, respectively. Concentrations for Sample SE52B were less than the background value. Background values for DDD and DDE in sediment were 0.0061 and 0.0072 mg/kg, respectively.

3.2 Vertical and Lateral Extent

Soil, sediment, and surface water samples were collected from this drainage ditch. Sampling locations were biased to detect any possible releases at the site. No organic chemical contamination was observed in site samples except for the low levels of historical routine application pesticides and naturally occurring metals. The observed metals—arsenic, chromium, lead, and manganese— are slightly above the background value but are similar to the distribution in background concentrations. Also, no distribution trends or localized elevated concentrations were observed. Thus variation in these naturally occurring elements' concentration may be attributed to the natural geological mineral variability in these media.

Based on the data collected so far, it appears that there are no COPCs that persist uniformly across several media that are attributed to Screening Site 52. Both sediment samples collected from the drainage ditch had low levels of DDT and DDE. No dieldrin was observed in these samples. These pesticides appear to be from historical facility maintenance applications, based on low levels and no localized elevations.

Dieldrin is found in surface soil, subsurface soil, sediment, and surface water and will be addressed on a facilitywide basis as part of an upcoming risk evaluation.

Benzo(a)pyrene was found in surface soil in Sample SB52B at 0.26 mg/kg, which exceeds the screening criteria at this single location for Screening Site 52. Benzo(a)pyrene was detected at concentrations upstream and downstream of Sample SB52B at concentrations below the screening criteria. Benzo(a)pyrene was not found in surface water, sediment, or subsurface soils at Screening Site 52. Benzo(a)pyrene and other PAHs were found sitewide at DDMT and are suspected to be because of railroad operations; they will be addressed in an upcoming risk evaluation.

Arsenic levels in Samples SS52D and SS52B were 31.2 and 45.1 mg/kg, respectively, which exceeds the background value. Arsenic was found in every surface soil sample and in the background samples. The maximum value detected from sampling across all screening sites on the Main Installation was in Sample SS52B at 45.1 mg/kg.

Arsenic values exceeding the background value of 20 mg/kg in surface soil may be due to the natural variability of arsenic with changing soil. Arsenic also is found in subsurface soils, sediment, and surface water at concentrations below background levels.

Metals, including chromium and lead, found in subsurface soils at concentrations that exceed background are considered to be representative of the naturally occurring variability of metals with changing soil type. Elevated metals concentrations were not found in surface soil samples, and the higher concentrations found at the 8- to 10-foot depth at Screening Sites 51 and 52 may be due to changes in soil types that occur with depth.

3.3 Potential Migration Pathways

Potential migration pathways applicable at Screening Site 52 include surface soil transport by wind-blown dust and surface water runoff and sediment transport during rainfall events. Migration to groundwater is not considered a pathway of interest because the detected COPCs are not very soluble or mobile and groundwater at the site is very deep (greater than 40 feet).

Arsenic exists at several sites on DDMT in surface soils at concentrations above screening levels. Arsenic's mobility and toxicity are tied to its complex geochemistry and its ability to readily form soluble complexes. Arsenic may also readily be adsorbed onto clays, oxides, or humic organic material and may migrate as suspended soil in surface water or as a sediment. Arsenic can exist in four common oxidation states; these control its solubility. It readily transports through aquatic environments as a dissolved salt or as a complex with an organic compound.

Dieldrin exists at DDMT in surface and subsurface soils. Because this compound is only minutely soluble in water, its most likely migration pathway at this site is via erosion as suspended soil particles in the surface water, where it potentially would be available to aquatic

organisms. Dieldrin in the subsurface soils should be relatively immobile and should not affect groundwater quality. It can bind to organic carbon content of the sediment and has a tendency to accumulate over time. However, since the ditch has only intermittent flow, accumulation does not appear to be occurring, from lack of higher sediment concentrations.

Benzo(a)anthracene, benzo(a)pyrene, benzo(k)fluoranthene, benzo(b)fluoranthene, and indeno(1,2,3-c,d)pyrene, a group of related long-chain PAHs, have similar chemical and physical characteristics, and tend to migrate and behave similarly in the environment. Generally, these compounds have low vapor pressures, are only marginally soluble in water, and have a high affinity for soils. These compounds have been detected at concentrations above screening values for surface soils at DDMT. They would be expected to migrate as adsorbed components of the soils and potentially would be available to aquatic organisms in turbid surface water or to bottom feeders in areas with contaminated sediments. That none of these compounds was detected in sediments indicates this is not a major source of contaminant migration for these compounds at this site. These compounds do not bioaccumulate significantly because of their rapid metabolism and excretion by most aquatic organisms.

Dieldrin and PAH compounds will be evaluated as a sitewide issue in an upcoming risk evaluation.

3.4 Additional Data Needs

Potential risks associated with metals found at low concentrations—including arsenic, chromium, and manganese--require further comparison of the background population with the data collected from Screening Sites 51 and 52. Available data are considered sufficient to perform this analysis, and no additional data collection is required.

There are no additional data needs unless additional data are needed to support the risk evaluation for dieldrin or PAH compounds.

4.0 Interpretation of Screening Criteria Comparisons

4.1 Methodology

The PRE was performed in accordance with the *Guidance on Preliminary Risk Evaluations for the Purpose of Reaching a Finding of Suitability to Lease (FOSL)* (EPA Region IV, 1994). A discussion of the PRE methodology is provided as Appendix A to this document.

4.2 Screening Site 52 Risk

Carcinogenic and noncarcinogenic risks for Screening Site 52 are presented in Table 4-8 of the draft PRE (USAESC, 1998). Detailed chemical-specific estimates are presented in Appendix A of the PRE.

The PRE risk ratio estimates indicate that industrial worker-based risk estimates are above one-in-a-million risk levels, due to the presence of arsenic, dieldrin, and DDE/DDT. The highest risk is associated with arsenic, which is detected at two times the background level. Dieldrin also presents a risk ratio slightly above a level of one-in-a-million.

The systemic toxicity-based PRE ratios exceeded a value of 1.0 because of the presence of manganese and chromium. Further assessment is recommended for Screening Site 52.

5.0 Summary and Recommendations

5.1 Summary

Arsenic, benzo(a)pyrene, chromium, and manganese were detected at concentrations exceeding the BCT criteria. Metals found at low concentrations, including arsenic, chromium, and manganese, require further comparison of the background population with the data collected from Screening Sites 51 and 52.

Dieldrin and benzo(a)pyrene were found in surface soil at Screening Site 52. These constituents exist sitewide at DDMT and will be addressed in an upcoming risk evaluation.

Based on an evaluation of the Screening Sites Sampling Program results, additional analysis is needed to compare the population of background data with results from Screening Sites 51 and 52. If the population of data from these two sites is shown to be similar to background, no further action will be necessary for the site.

5.2 Recommendations

Background data population needs to be compared with data collected from Screening Sites 51 and 52 to see if the data sets are similar (within acceptable confidence limits) for arsenic, chromium, and manganese in surface soil. If the data sets are not similar, further evaluation will be needed to evaluate the risks associated with arsenic and manganese in surface soils.

Screening Site 69–Flamethrower Liquid Fuel Application

1.0 Introduction

The chart below presents the location and status information for this screening site.

Parcel	Building Number	RI/FS[1] OU	Site Number	CERCLA[2] Status
3	NE Golf Course Area	3	69	Screening

[1]RI/FS = Remedial Investigation/Feasibility Study
[2]CERCLA = Comprehensive Environmental Response, Compensating and Liability Act

Like other tables, Screening Site 69 primarily was used to test flamethrower fuels. Flamethrowers were tested using diesel fuel. Fire fighting techniques also were practiced at this site after surface ignition of the fuel. The site currently is used as a golf course (Figure 3). It is located on the eastern side of the installation, approximately 100 feet east of Lake Danielson. The sample locations were selected based on past knowledge of the locations where flame throwing activities were conducted.

2.0 Study Area Investigation

2.1 Previous Investigations

No historical sampling data exist specifically for this site.

2.2 Screening Site Sampling Program

2.2.1 Sampling Strategy

The sampling strategy was developed to evaluate whether releases have occurred to surface soils and subsurface soils. Two biased soil borings were used to evaluate whether COPCs exist at this site. Samples were collected at the surface (zero to 1 foot) and at approximately 5-foot and 10-foot depths. Four additional surface soil samples were collected. A boring depth of 10 feet was selected because the site was used for the surface ignition of diesel fuel, and surface and shallow soil contamination is probable.

Ten samples (two borings with three samples per boring and four surface soil samples) were collected and analyzed for PAH compounds. At least one sample from each media was analyzed for TCL/TAL constituents in accordance with the *Screening Sites Field Sampling Plan* (CH2M HILL, 1995).

2.2.2 Sampling Procedures

Sections 2.2.2.1 and 2.2.2.2 describe the sampling procedures and laboratory analyses performed for surface soils and subsurface soils.

2.2.2.1 Surface Soil Sampling Procedures

With the approval of the TDEC and EPA, surface soil samples (SS69A, SS69B, SS69C, SS69D, SB69A, and SB69B) were collected from six locations at this site (shown in Figure 3). The locations of the surface soils samples associated with the borings are described in Section 2.2.2.2.

Sample SS69B was taken southwest of Building 271 just 30 feet south of K Street and 45 feet southeast of the pine trees. SS69D also was taken southwest of Building 271 but 66 feet south of K Street and 72 feet southeast of the pine trees. Sample SS69A was taken west of Building 271 and 81 feet south of the golf ball screen. Sample SS69C was taken west of Building 271 and 36 feet south of J Street Café.

The soil was removed from the ground using a standard stainless-steel hand auger. Part of the soil sample was placed into a sealable plastic bag and allowed to equilibrate. The head space in the plastic bag was measured for VOCs using a hand-held PID, and the results were used to evaluate which sample location was selected for Level 3 TCL/TAL analyses. Stainless-steel trowels were used to transfer the soil into a stainless-steel bowl for mixing. The soil was then placed into the appropriate sample jars. All sampling tools were decontaminated before being used at each sample location according to the procedures specified in the *Generic Quality Assurance Project Plan* (CH2M HILL, 1995) for the RI/FS currently being conducted at DDMT.

2.2.2.2 Subsurface Soil Sampling Procedures

With the approval of the TDEC and EPA, subsurface soil samples were collected at two locations (SB69A and SB69B) at this site. Each sample was collected at three depths: 0 to 1 foot, 4 to 6 feet, and 8 to 10 feet. Boring SB69A was located south of K Street just 69 feet south of the golf fence. The sample was taken between the second and third poles on the golf fence starting from the east end. Boring SB69B was located southeast of the golf fence just 50 feet south of the third tree, directly east of the fence line.

Samples were collected using a 2-inch-diameter, stainless-steel push sampler. Part of the soil sample was placed into a sealable plastic bag and allowed to equilibrate. The head space in the plastic bag was measured for VOCs using a hand-held PID. The remaining soil was placed into a stainless-steel bowl, mixed, and then transferred into the appropriate sample jars.

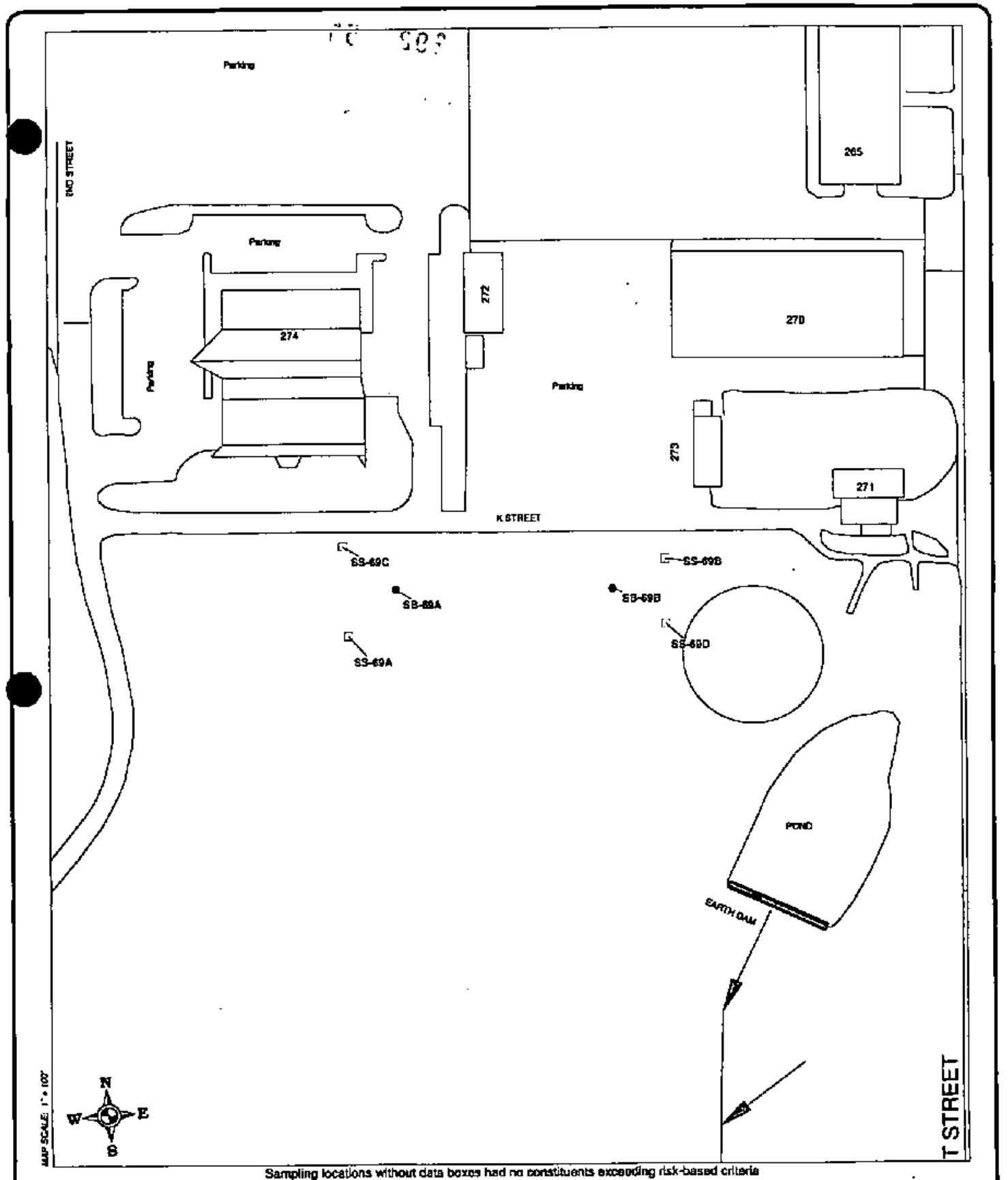
All sampling tools were decontaminated before being used at each sample location according to the procedures outlined in the *Generic Quality Assurance Project Plan* (CH2M HILL, 1995).

2.2.3 Analytical Procedures

Four surface and six subsurface soil samples were sent to CH2M HILL's Analytical Services in Montgomery, Alabama for PAH and TCL/TAL analyses. Samples received at the laboratory were analyzed in accordance with the procedures outlined in the *Generic Quality Assurance Project Plan* (CH2M HILL, 1995).

COE split samples were collected at SS69B and SS69C. These two surface soil samples were sent to the COE's Atlanta, Georgia laboratory for analysis of PAHs.

A DQE was performed to assess the effect of the overall analytical process on the usability of the data CH2M HILL collected in 1997. The DQE established that the detection of acetone and bis(2-ethylhexyl)phthalate can be attributed to field sampling and laboratory contamination



Sampling locations without data boxes had no constituents exceeding risk-based criteria

LEGEND

- Surface Soil Sampling Location (mg/kg)
- Soil Boring Sampling Location (mg/kg)

Figure 3
Site 69, Flame-Thrower Liquid Fuel Application
Constituents Exceeding Risk-Based Criteria
Defense Distribution Depot Memphis, TN

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rather than to environmental conditions at the site. Also, low concentrations of dioxins and furans can be attributed to background or instrument noise and are not indicative of environmental conditions. With the exception of the qualifications listed above, the DQE concluded that data can be used in the project decision-making process.

3.0 Interpretation of Sampling Results

3.1 Presentation of Results

The following sections present the results of the screening sites investigation for Screening Site 69. Data are presented by media for surface soil and subsurface soil and compared with the appropriate screening criteria in three summary tables: Tables 69-A, 69-B, and 69-C. Data from the 1997 CH2M HILL investigation are presented along with historical data from the *Remedial Investigations at DDMT, Final Report* (Law Environmental, 1990). If a value from a sampling location exceeds one of the comparison criteria, that value and the comparison criterion are shown in bold on the summary table.

COPCs are those parameters that exceed both background values and the screening criteria. Where concentrations exceed the selected background value, a comparison is made with the observed range of background values as reviewed and established by the BCT.

There are no COPCs identified for Screening Site 69 with the exception of dieldrin and benzo(a)pyrene which have been detected at concentrations similar to those found elsewhere at DDMT. These COPCs have been identified by the BCT as sitewide COPCs and will be evaluated on a sitewide basis.

3.1.1 Surface Soil

Results of the surface soil analyses with values above detection limits are shown in Tables 69-A and 69-B.

3.1.1.1 BCT Screening Criteria

Table 69-A summarizes constituents for which the BCT has selected a screening criteria.

Benzo(a)pyrene was found in Sample SB69B at 0.12 mg/kg, which exceeds the BCT screening value of 0.088 mg/kg. The BCT selected the RBC for residential soil ingestion as the screening criteria; however, this is below a background value of 0.96 mg/kg. The background concentration is based on benzo(a)pyrene detections in 9 of 22 background samples at concentrations ranging from 0.044 to 0.96 mg/kg. Although benzo(a) pyrene exceeds the residential RBC, it is within the range of concentrations found in the background samples. Benzo(a)pyrene is found sitewide at DDMT and is thought to be from railroad operations; it will be addressed in an upcoming risk evaluation. There do not appear to be PAHs associated with site operations from lack of localized elevations.

3.1.1.2 Other Screening Criteria

Table 69-B summarizes the remaining constituents compared with the soil ingestion screening criteria for both residential and industrial exposure scenarios. Dieldrin is the only remaining constituent that was found at concentrations exceeding the screening criteria. Dieldrin was

found at a concentration of 0.042 mg/kg, which exceeds the residential RBC for soil ingestion but is below the background value of 0.086 mg/kg.

3.1.2 Subsurface Soils

Table 69-C summarizes subsurface soil sampling data. PAH compounds were found at concentrations below the screening criteria in subsurface soils.

3.2 Vertical and Lateral Extent

Because the Screening Site Sampling Program was designed only to show the presence or absence of contamination, a complete characterization of vertical and lateral extent could not be conducted. Based on the limited data collected so far, there are no COPCs at Screening Site 69. Many of the constituents that were found are at concentrations similar to background levels and below screening criteria.

Dieldrin and benzo(a)pyrene are found in surface soil and will be addressed on a facilitywide basis as part of an upcoming risk evaluation.

3.3 Migration Pathways

There are no COPCs at Screening Site 69 except for dieldrin and benzo(a)pyrene, which were detected elsewhere DDTM and will be addressed on a sitewide basis. Therefore, there is no need to further evaluate potential migration pathways at this site. The following is a general discussion of physical properties and migration characteristics for PAH compounds and dieldrin.

Benzo(a)anthracene, benzo(a)pyrene, benzo(k)fluoranthene, benzo(b)fluoranthene, and indeno(1,2,3-c,d)pyrene, a group of related long-chain PAHs, have similar chemical and physical characteristics and tend to migrate and behave similarly in the environment. Generally, these compounds have low vapor pressures, are only marginally soluble in water, and have a high affinity for soils. These compounds have been detected at concentrations above screening values for surface soils at DDMT. They would be expected to migrate as adsorbed components of the soils and potentially would be available to aquatic organisms in turbid surface water or to bottom feeders in areas with contaminated sediments. That none of these compounds was detected in sediments indicates that this is not a major source of contaminant migration for these compounds at this site. These compounds do not bioaccumulate significantly because of their rapid metabolism and excretion by most aquatic organisms.

Dieldrin exists at DDMT in surface and subsurface soils. Because this compound is only minutely soluble in water, the most likely potential migration pathway of dieldrin at this site is via erosion as suspended soil particles in the surface water, where it potentially would be available to aquatic organisms. Dieldrin in the subsurface soils should be relatively immobile and should not affect groundwater quality.

3.4 Additional Data Needs

There do not appear to be significant risks associated with Screening Site 69 and No Further Action is proposed. There are no additional data needs unless additional data are needed to support the risk evaluation for dieldrin or PAH compounds.

4.0 Interpretation of Screening Criteria Comparisons

Because of the absence of any contaminant levels above background, no risks or systemic toxicity ratios were estimated (USAESC, 1998). Therefore, No Further Action is recommended at this site.

5.0 Summary and Recommendations

5.1 Summary

There do not appear to be significant risks associated with Screening Site 69 and No Further Action is proposed. There are no additional data needs unless additional data are needed to support the risk evaluation for dieldrin and benzo(a)pyrene.

Dieldrin and benzo(a)pyrene were found in surface soil at Screening Site 69. These constituents exist sitewide at DDMT and will be addressed in an upcoming risk evaluation. Based on an evaluation of the Screening Sites Sampling Program results, no further evaluation is needed at Screening Site 69.

5.2 Recommendations

No further assessment is proposed for Screening Site 69.

Table 51-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 51
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
CH2M HILL	ACENAPHTHENE	SB51B	0.066	=	NA	470	Residential RBC	MG/KG
CH2M HILL	ALUMINUM	SS51C	8940	=	24000	24000	Bkgd	MG/KG
CH2M HILL	ANTHRACENE	SB51B	0.066	=	.096	2300	Residential RBC	MG/KG
CH2M HILL	ARSENIC	SB51A	20.1	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SB51B	14.5	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SB51C	17.1	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SS51A	1.7	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SS51B	17.4	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SS51C	15.7	=	20	20	Bckg	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	SB51A	0.25	=	.71	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	SB51B	0.059	J	.71	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	SS51C	0.054	J	.71	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(a)PYRENE	SB51A	0.24	=	.96	0.088	Residential RBC	MG/KG
CH2M HILL	BENZO(a)PYRENE	SS51C	0.057	J	.96	0.088	Residential RBC	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	SB51A	0.31	=	.78	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	SS51C	0.052	J	.78	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(g,h,i)PERYLENE	SB51A	0.25	=	.82	230	Residential RBC	MG/KG
CH2M HILL	BENZO(g,h,i)PERYLENE	SS51C	0.05	J	.82	230	Residential RBC	MG/KG
CH2M HILL	BENZO(k)FLUORANTHENE	SB51A	0.35	=	.78	8.8	Residential RBC	MG/KG
CH2M HILL	BENZO(k)FLUORANTHENE	SS51C	0.048	J	.78	8.8	Residential RBC	MG/KG
CH2M HILL	BERYLLIUM	SS51B	1.1	=	1.1	1.1	Bckg	MG/KG
CH2M HILL	BERYLLIUM	SS51C	0.27	J	1.1	1.1	Bckg	MG/KG
CH2M HILL	CARBAZOLE	SB51A	0.15	J	.067	32	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB51A	25.8	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB51B	21.8	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB51C	27.6	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS51A	7.6	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS51B	29.4	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS51C	11.3	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHRYSENE	SB51A	0.26	=	.94	88	Residential RBC	MG/KG
CH2M HILL	CHRYSENE	SB51B	0.059	J	.94	88	Residential RBC	MG/KG

Table 51-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 51
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
CH2M HILL	CHRYSENE	SS51C	0.074	J	.94	88	Residential RBC	MG/KG
CH2M HILL	FLUORANTHENE	SB51A	0.45	=	1.6	310	Residential RBC	MG/KG
CH2M HILL	FLUORANTHENE	SB51B	0.1	=	1.6	310	Residential RBC	MG/KG
CH2M HILL	FLUORANTHENE	SS51B	0.077	=	1.6	310	Residential RBC	MG/KG
CH2M HILL	FLUORANTHENE	SS51C	0.14	J	1.6	310	Residential RBC	MG/KG
CH2M HILL	FLUORENE	SB51B	0.078	=	NA	310	Residential RBC	MG/KG
CH2M HILL	INDENO(1,2,3-c,d)PYRENE	SB51A	0.19	=	.7	0.88	Residential RBC	MG/KG
CH2M HILL	IRON	SS51C	16000	J	37000	37000	Bckg	MG/KG
CH2M HILL	LEAD	SB51A	63.2	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SB51B	62.2	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SB51C	41.5	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SS51A	2.8	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SS51B	138	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SS51C	22.1	=	30	400	CERCLA	MG/KG
CH2M HILL	MANGANESE	SS51C	604	=	1300	1300	Bckg	MG/KG
CH2M HILL	PHENANTHRENE	SB51A	0.23	=	.61	2300	Residential RBC	MG/KG
CH2M HILL	PHENANTHRENE	SB51B	0.12	=	.61	2300	Residential RBC	MG/KG
CH2M HILL	PHENANTHRENE	SS51C	0.066	J	.61	2300	Residential RBC	MG/KG
CH2M HILL	PYRENE	SB51A	0.21	=	1.5	230	Residential RBC	MG/KG
CH2M HILL	PYRENE	SB51B	0.08	=	1.5	230	Residential RBC	MG/KG
CH2M HILL	PYRENE	SS51C	0.12	J	1.5	230	Residential RBC	MG/KG
CH2M HILL	ZINC	SB51A	146	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SB51B	95.8	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SB51C	127	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SS51A	10.8	J	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SS51B	142	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SS51C	58.1	J	130	23000	Residential RBC	MG/KG
LAW	ANTHRACENE	SS14	0.28	J	.096	2300	Residential RBC	MG/KG
LAW	ANTIMONY	SS14	5	=	7	7	Bckg	MG/KG
LAW	ARSENIC	SS14	41	=	20	20	Bckg	MG/KG
LAW	BENZO(a)ANTHRACENE	SS14	0.92	J	.71	0.88	Residential RBC	MG/KG

Table 51-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 51
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
LAW	BENZO(a)PYRENE	SS14	**0.93**	J	.96	**0.088**	Residential RBC	MG/KG
LAW	BENZO(b)FLUORANTHENE	SS14	**1.1**	J	.78	**0.88**	Residential RBC	MG/KG
LAW	BENZO(g,h,i)PERYLENE	SS14	0.78	J	.82	230	Residential RBC	MG/KG
LAW	BENZO(k)FLUORANTHENE	SS14	**1.1**	J	.78	**8.8**	Residential RBC	MG/KG
LAW	CHROMIUM, TOTAL	SS14	**16**	=	24.8	**39**	Residential RBC	MG/KG
LAW	CHRYSENE	SS14	**1.2**	J	.94	**88**	Residential RBC	MG/KG
LAW	FLUORANTHENE	SS14	**2.7**	=	1.6	**310**	Residential RBC	MG/KG
LAW	INDENO(1,2,3-c,d)PYRENE	SS14	**0.7**	J	.7	**0.88**	Residential RBC	MG/KG
LAW	LEAD	SS14	**80**	=	30	**400**	CERCLA	MG/KG
LAW	PHENANTHRENE	SS14	**1.6**	J	.61	**2300**	Residential RBC	MG/KG
LAW	PYRENE	SS14	**1.7**	J	1.5	**230**	Residential RBC	MG/KG
LAW	ZINC	SS14	**82.3**	=	130	**23000**	Residential RBC	MG/KG

Notes:
1. Detected values are obtained from the *Draft Parcel 3 Report-Screening Sites Sampling Program for Defense Depot* Memphis, TN, CH2M HILL, 1997, and the *Remedial Investigation at DDMT Final Report*, Law Environmental, August 1990.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. Based on values selected by the BRAC Cleanup Team in the August 1997 BCT meeting minutes, Memphis, Tennessee.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
J - indicates estimated value above the detection limit but below the reporting limit.
= - indicates unqualified detection.
BCT - BRAC Cleanup Team

Table 51-B
Summary of Detected Compounds in Surface Soils
Compared to Non-BCT Screening Levels for Site 51
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	Risk-Based Concentrations Soil Ingestion[4]		Units
						Residential	Industrial	
CH2M HILL	ACETONE	SB51A	0.006	J	NA	780	20000	MG/KG
CH2M HILL	ACETONE	SB51C	0.007	J	NA	780	20000	MG/KG
CH2M HILL	ACETONE	SS51B	0.004	J	NA	780	20000	MG/KG
CH2M HILL	BARIUM	SS51C	106	=	234	550	14000	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB51A	0.15	J	NA	46	410	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB51C	0.23	J	NA	46	410	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SS51B	0.078	J	NA	46	410	MG/KG
CH2M HILL	BROMOMETHANE	SB51B	0.002	J	NA	11	290	MG/KG
CH2M HILL	CADMIUM	SB51A	1.3	=	1.4	3.9	100	MG/KG
CH2M HILL	CADMIUM	SS51C	0.47	J	1.4	3.9	100	MG/KG
CH2M HILL	CALCIUM	SS51C	1920	=	5840	NA	NA	MG/KG
CH2M HILL	COBALT	SS51C	8.2	=	18.3	470	12000	MG/KG
CH2M HILL	COPPER	SB51A	28.9	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SB51B	28.2	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SB51C	32.6	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SS51A	3.3	J	33	310	8200	MG/KG
CH2M HILL	COPPER	SS51B	37.2	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SS51C	16	J	33	310	8200	MG/KG
CH2M HILL	DIELDRIN	SB51A	0.025	J	.086	.04	.36	MG/KG
CH2M HILL	DIELDRIN	SB51B	0.048	=	.086	.04	.36	MG/KG
CH2M HILL	DIELDRIN	SB51C	0.063	J	.086	.04	.36	MG/KG
CH2M HILL	DIELDRIN	SS51A	0.021	=	.086	.04	.36	MG/KG
CH2M HILL	DIELDRIN	SS51B	0.32	=	.086	.04	.36	MG/KG
CH2M HILL	DIELDRIN	SS51C	0.14	=	.086	.04	.36	MG/KG
CH2M HILL	MAGNESIUM	SS51C	1710	=	4600	NA	NA	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SB51A	0.002	J	NA	85	760	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SS51B	0.003	J	NA	85	760	MG/KG
CH2M HILL	NICKEL	SB51A	29.9	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SB51B	27.8	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SB51C	57.6	=	30	160	4100	MG/KG

Table 51-B
Summary of Detected Compounds in Surface Soils
Compared to Non-BCT Screening Levels for Site 51
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	Risk-Based Concentrations Soil Ingestion[4]		Units
						Residential	Industrial	
CH2M HILL	NICKEL	SS51A	3.9	J	30	160	4100	MG/KG
CH2M HILL	NICKEL	SS51B	34.9	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SS51C	13.9	J	30	160	4100	MG/KG
CH2M HILL	p,p'-DDE	SB51A	0.044	=	.16	1.9	17	MG/KG
CH2M HILL	p,p'-DDE	SB51B	0.08	=	.16	1.9	17	MG/KG
CH2M HILL	p,p'-DDE	SB51C	0.038	J	.16	1.9	17	MG/KG
CH2M HILL	p,p'-DDE	SS51A	0.022	=	.16	1.9	17	MG/KG
CH2M HILL	p,p'-DDE	SS51B	0.1	=	.16	1.9	17	MG/KG
CH2M HILL	p,p'-DDE	SS51C	0.039	J	.16	1.9	17	MG/KG
CH2M HILL	p,p'-DDT	SB51A	0.044	=	.074	1.9	17	MG/KG
CH2M HILL	p,p'-DDT	SB51B	0.09	=	.074	1.9	17	MG/KG
CH2M HILL	p,p'-DDT	SB51C	0.56	=	.074	1.9	17	MG/KG
CH2M HILL	p,p'-DDT	SS51A	0.043	=	.074	1.9	17	MG/KG
CH2M HILL	p,p'-DDT	SS51B	0.077	J	.074	1.9	17	MG/KG
CH2M HILL	PENTACHLOROPHENOL	SS51B	0.054	J	NA	5.3	48	MG/KG
CH2M HILL	POTASSIUM	SS51C	1090	=	1820	NA	NA	MG/KG
CH2M HILL	SELENIUM	SS51B	2.1	=	.81	39	1000	MG/KG
CH2M HILL	SODIUM	SS51C	218	J	NA	NA	NA	MG/KG
CH2M HILL	TETRACHLOROETHYLENE(PCE)	SS51B	0.003	J	NA	NA	NA	MG/KG
CH2M HILL	VANADIUM	SS51C	21.1	=	48.4	55	1400	MG/KG
LAW	ACETONE	SS14	0.024	=	NA	780	20000	MG/KG
LAW	BARIUM	SS14	117	=	234	550	14000	MG/KG
LAW	bis(2-ETHYLHEXYL) PHTHALATE	SS14	2.7	=	NA	46	410	MG/KG
LAW	CHLOROFORM	SS14	0.002	J	NA	100	940	MG/KG
LAW	COPPER	SS14	26	=	33	310	8200	MG/KG
LAW	DIELDRIN	SS14	2.9	=	.086	.04	.36	MG/KG
LAW	MERCURY	SS14	0.8	=	.43	2.3	61	MG/KG
LAW	METHYLENE CHLORIDE	SS14	0.015	=	NA	85	760	MG/KG
LAW	N-NITROSODIPHENYLAMINE	SS14	0.34	J	NA	130	1200	MG/KG
LAW	NICKEL	SS14	12	=	30	160	4100	MG/KG

Table 51-B
Summary of Detected Compounds in Surface Soils
Compared to Non-BCT Screening Levels for Site 51
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	Risk-Based Concentrations Soil Ingestion[4]		Units
						Residential	Industrial	
LAW	TOLUENE	SS14	0.006	J	.012	1600	41000	MG/KG
LAW	Total Polynuclear Aromatic Hydrocarbons	SS14	13.01	=	NA	NA	NA	MG/KG

Notes:
1. Detected values are obtained from the *Draft Parcel 3 Report-Screening Sites Sampling Program for Defense Depot Memphis, TN*, CH2M HILL, 1997, and the *Remedial Investigation at DDMT Final Report*, Law Environmental, August 1990.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. Risk-Based Concentrations are obtained from the *EPA Region III Risk-based Concentrations Table*, R.L. Smith, April, 1997.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
= - indicates unqualified detection.
J - indicates estimated value above the detection limit but below the reporting limit.

Table 51-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 51
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	ACETONE	SB51A	9 to 11	0.03	=	NA	16	MG/KG
CH2M HILL	ACETONE	SB51B	9 to 12	0.074	=	NA	16	MG/KG
CH2M HILL	ACETONE	SB51C	8 to 10	0.006	J	NA	16	MG/KG
CH2M HILL	ARSENIC	SB51A	5 to 7	4.8	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB51A	9 to 11	24.7	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB51B	6 to 8	7.7	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB51B	9 to 12	9	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB51C	5 to 6	15.4	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB51C	8 to 10	19.5	=	17	29	MG/KG
CH2M HILL	BERYLLIUM	SB51A	5 to 7	0.27	J	1.2	63	MG/KG
CH2M HILL	BERYLLIUM	SB51A	9 to 11	1.4	=	1.2	63	MG/KG
CH2M HILL	BERYLLIUM	SB51C	5 to 6	1	=	1.2	63	MG/KG
CH2M HILL	BERYLLIUM	SB51C	8 to 10	1.4	=	1.2	63	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB51A	9 to 11	0.23	J	NA	3600	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB51B	6 to 8	0.079	J	NA	3600	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB51C	5 to 6	1.6	=	NA	3600	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB51C	8 to 10	0.19	J	NA	3600	MG/KG
CH2M HILL	BROMOMETHANE	SB51B	6 to 8	0.002	J	NA	.2	MG/KG
CH2M HILL	BROMOMETHANE	SB51B	9 to 12	0.001	J	NA	.2	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB51A	5 to 7	10.5	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB51A	9 to 11	32.7	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB51B	6 to 8	17.1	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB51B	9 to 12	17.2	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB51C	5 to 6	25.6	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB51C	8 to 10	49.1	=	26	38	MG/KG
CH2M HILL	COPPER	SB51A	5 to 7	11.2	J	33	NA	MG/KG
CH2M HILL	COPPER	SB51A	9 to 11	28	=	33	NA	MG/KG
CH2M HILL	COPPER	SB51B	6 to 8	18.9	=	33	NA	MG/KG
CH2M HILL	COPPER	SB51B	9 to 12	18	=	33	NA	MG/KG
CH2M HILL	COPPER	SB51C	5 to 6	23.4	=	33	NA	MG/KG
CH2M HILL	COPPER	SB51C	8 to 10	30.1	=	33	NA	MG/KG
CH2M HILL	LEAD	SB51A	5 to 7	9.6	=	24	1.5	MG/KG

Table 51-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 51
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	LEAD	SB51A	9 to 11	**32.9**	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB51B	6 to 8	**17.5**	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB51B	9 to 12	**15.9**	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB51C	5 to 6	**19.8**	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB51C	8 to 10	**24.7**	=	24	1.5	MG/KG
CH2M HILL	METHYL ETHYL KETONE (2-BUTANONE)	SB51A	9 to 11	0.003	J	NA	NA	MG/KG
CH2M HILL	NICKEL	SB51A	5 to 7	11.9	J	37	130	MG/KG
CH2M HILL	NICKEL	SB51A	9 to 11	32.2	=	37	130	MG/KG
CH2M HILL	NICKEL	SB51B	6 to 8	24.4	=	37	130	MG/KG
CH2M HILL	NICKEL	SB51B	9 to 12	20.4	=	37	130	MG/KG
CH2M HILL	NICKEL	SB51C	5 to 6	23.4	=	37	130	MG/KG
CH2M HILL	NICKEL	SB51C	8 to 10	31.2	=	37	130	MG/KG
CH2M HILL	SELENIUM	SB51A	9 to 11	**1.6**	=	.64	5	MG/KG
CH2M HILL	ZINC	SB51A	5 to 7	36.9	J	110	12000	MG/KG
CH2M HILL	ZINC	SB51A	9 to 11	109	=	110	12000	MG/KG
CH2M HILL	ZINC	SB51B	6 to 8	66.6	=	110	12000	MG/KG
CH2M HILL	ZINC	SB51B	9 to 12	59.3	=	110	12000	MG/KG
CH2M HILL	ZINC	SB51C	5 to 6	80	=	110	12000	MG/KG
CH2M HILL	ZINC	SB51C	8 to 10	99.5	=	110	12000	MG/KG

Notes:
1. Detected values are obtained from the *Draft Parcel 3 Report-Screening Sites Sampling Program for Defense Depot* Memphis, TN, CH2M HILL, 1997.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. RBC-GWP values are obtained from the *EPA Region III Risk-based Concentrations Table*, R. L. Smith, April, 1997.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
= - indicates unqualified detection
J - indicates estimated value above the detection limit but below the reporting limit.
RBC-GWP - Risk-Based Concentrations - Groundwater Protection

Table 51-D
Summary of Detected Compounds in Surface Water
Compared to Screening Levels for Site 51
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	TN State[4]	AWQC-HH[5]	AWQC-AO[6]	Units
CH2M HILL	ARSENIC	SW51C	0.006	J	.018	.05	.000018	.19	MG/L
CH2M HILL	Arsenic, Dissolved	SW51C	0.0036	J	.012	.05	.000018	.19	MG/L
CH2M HILL	DIELDRIN	SW51A	0.00022	=	NA	NA	NA	NA	MG/L
CH2M HILL	DIELDRIN	SW51C	0.0001	=	NA	NA	NA	NA	MG/L
CH2M HILL	LEAD	SW51A	0.0022	J	.019	.05	NA	.0032	MG/L
CH2M HILL	LEAD	SW51B	0.0168	=	.019	.05	NA	.0032	MG/L
CH2M HILL	LEAD	SW51C	0.0594	=	.019	.05	NA	.0032	MG/L
CH2M HILL	Lead, Dissolved	SW51B	0.0064	=	.023	.05	NA	.0032	MG/L
CH2M HILL	Lead, Dissolved	SW51C	0.0313	=	.023	.05	NA	.0032	MG/L
CH2M HILL	NICKEL	SW51A	0.0061	J	.023	.0134	.61	.16	MG/L
CH2M HILL	NICKEL	SW51C	0.007	J	.023	.0134	.61	.16	MG/L
CH2M HILL	ZINC	SW51A	0.0648	J	.29	5	NA	.11	MG/L
CH2M HILL	ZINC	SW51B	0.063	J	.29	5	NA	.11	MG/L
CH2M HILL	ZINC	SW51C	0.0908	J	.29	5	NA	.11	MG/L
CH2M HILL	Zinc, Dissolved	SW51A	0.0432	=	.41	5	NA	.11	MG/L
CH2M HILL	Zinc, Dissolved	SW51B	0.045	=	.41	5	NA	.11	MG/L
CH2M HILL	Zinc, Dissolved	SW51C	0.0763	=	.41	5	NA	.11	MG/L
LAW	ACETONE	SW12	0.004	J	NA	NA	NA	NA	MG/L
LAW	ACETONE	SW3	0.003	J	NA	NA	NA	NA	MG/L
LAW	ACETONE	SW7	0.002	J	NA	NA	NA	NA	MG/L
LAW	ACETONE	SW8	0.002	J	NA	NA	NA	NA	MG/L
LAW	ACETONE	SW9	0.018	=	NA	NA	NA	NA	MG/L
LAW	ARSENIC	SW12	0.03	=	.018	.05	.000018	.19	MG/L
LAW	ARSENIC	SW6	0.048	=	.018	.05	.000018	.19	MG/L
LAW	ARSENIC	SW7	0.041	=	.018	.05	.000018	.19	MG/L
LAW	ARSENIC	SW8	0.037	=	.018	.05	.000018	.19	MG/L
LAW	ARSENIC	SW9	0.047	=	.018	.05	.000018	.19	MG/L
LAW	BARIUM	SW12	0.098	=	.13	1	NA	NA	MG/L
LAW	BARIUM	SW13	0.06	=	.13	1	NA	NA	MG/L
LAW	BARIUM	SW3	0.015	=	.13	1	NA	NA	MG/L
LAW	BARIUM	SW6	0.017	=	.13	1	NA	NA	MG/L

Table 51-D
Summary of Detected Compounds in Surface Water
Compared to Screening Levels for Site 51
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	TN State[4]	AWQC-HH[5]	AWQC-AO[6]	Units
LAW	BARIUM	SW7	0.015	=	.13	1	NA	NA	MG/L
LAW	BARIUM	SW8	0.015	=	.13	1	NA	NA	MG/L
LAW	BARIUM	SW9	0.06	=	.13	1	NA	NA	MG/L
LAW	BENZOIC ACID	SW12	0.006	J	NA	NA	NA	NA	MG/L
LAW	BENZOIC ACID	SW13	0.005	J	NA	NA	NA	NA	MG/L
LAW	bis(2-ETHYLHEXYL) PHTHALATE	SW12	0.003	J	NA	15	.0018	NA	MG/L
LAW	bis(2-ETHYLHEXYL) PHTHALATE	SW13	0.006	J	NA	15	.0018	NA	MG/L
LAW	bis(2-ETHYLHEXYL) PHTHALATE	SW3	0.003	J	NA	15	.0018	NA	MG/L
LAW	bis(2-ETHYLHEXYL) PHTHALATE	SW7	0.002	J	NA	15	.0018	NA	MG/L
LAW	bis(2-ETHYLHEXYL) PHTHALATE	SW8	0.003	J	NA	15	.0018	NA	MG/L
LAW	bis(2-ETHYLHEXYL) PHTHALATE	SW9	0.012	J	NA	15	.0018	NA	MG/L
LAW	CADMIUM	SW12	0.019	=	NA	.01	NA	.0011	MG/L
LAW	CADMIUM	SW9	0.005	=	NA	.01	NA	.0011	MG/L
LAW	CHROMIUM, TOTAL	SW12	0.02	=	.036	.05	NA	.011	MG/L
LAW	COPPER	SW12	0.02	=	.075	1	NA	.012	MG/L
LAW	COPPER	SW3	0.027	=	.075	1	NA	.012	MG/L
LAW	COPPER	SW6	0.024	=	.075	1	NA	.012	MG/L
LAW	COPPER	SW7	0.02	=	.075	1	NA	.012	MG/L
LAW	COPPER	SW8	0.019	=	.075	1	NA	.012	MG/L
LAW	COPPER	SW9	0.068	=	.075	1	NA	.012	MG/L
LAW	DDE	SW12	0.00065	=	NA	NA	NA	NA	MG/L
LAW	DDE	SW6	0.00021	=	NA	NA	NA	NA	MG/L
LAW	DDT	SW12	0.0022	=	NA	NA	NA	NA	MG/L
LAW	DDT	SW9	0.00016	=	NA	NA	NA	NA	MG/L
LAW	LEAD	SW12	0.1	=	.019	.05	NA	.0032	MG/L
LAW	LEAD	SW9	0.295	=	.019	.05	NA	.0032	MG/L
LAW	METHYLENE CHLORIDE	SW3	0.001	J	NA	1.5	.0047	1.93	MG/L
LAW	METHYLENE CHLORIDE	SW7	0.002	J	NA	1.5	.0047	1.93	MG/L
LAW	METHYLENE CHLORIDE	SW8	0.001	J	NA	1.5	.0047	1.93	MG/L
LAW	METHYLENE CHLORIDE	SW9	0.001	J	NA	1.5	.0047	1.93	MG/L
LAW	N-NITROSODIPHENYLAMINE	SW12	0.007	J	NA	.000049	.005	.0585	MG/L

Table 51-D
Summary of Detected Compounds in Surface Water
Compared to Screening Levels for Site 51
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	TN State[4]	AWQC-HH[5]	AWQC-AO[6]	Units
LAW	N-NITROSODIPHENYLAMINE	SW7	0.003	J	NA	.000049	.005	.0585	MG/L
LAW	SILVER	SW9	0.013	=	NA	.05	NA	.000012	MG/L
LAW	ZINC	SW12	0.15	=	.29	5	NA	.11	MG/L
LAW	ZINC	SW13	0.054	=	.29	5	NA	.11	MG/L
LAW	ZINC	SW3	0.068	=	.29	5	NA	.11	MG/L
LAW	ZINC	SW6	0.041	=	.29	5	NA	.11	MG/L
LAW	ZINC	SW7	0.032	=	.29	5	NA	.11	MG/L
LAW	ZINC	SW8	0.037	=	.29	5	NA	.11	MG/L
LAW	ZINC	SW9	0.4	=	.29	5	NA	.11	MG/L

Notes:
1. Detected values are obtained from the *Draft Parcel 3 Report-Screening Sites Sampling Program for Defense Depot Memphis, TN,* CH2M HILL, 1997, and the *Remedial Investigation at DDMT Final Report*, Law Environmental, August 1990.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. Tennessee State values are from Table 3-8 of the *Generic Remedial Investigation/Feasibility Study Work Plan*, CH2M HILL, August 1995.
5. Federal Ambient Water Quality Criteria for the Protection of Human Health for the Ingestion of Organisms and Water (AWQC-HH) values are from Table 3-8 of the *Generic Remedial Investigation/Feasibility Study Work Plan*, CH2M HILL, August 1995.
6. Federal Ambient Water Quality Criteria, Chronic for the Protection of Freshwater Aquatic Life (AWQC-AO) values are from Table 3-8 of the *Generic Remedial Investigation/Feasibility Study Work Plan*, CH2M HILL, August 1995.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
= - indicates unqualified detection.
J - indicates estimated value above the detection limit but below the reporting limit.

Table 51-E
Summary of Detected Compounds in Sediment
Compared to Screening Levels for Site 51
Screening Sites Sampling Program
Defense Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	PRG-Sed	NOAA-Sed	Units
CH2M HILL	ARSENIC	SE51A	6.7	=	12	8	3.3	MG/KG
CH2M HILL	ARSENIC	SE51B	6.7	=	12	8	3.3	MG/KG
CH2M HILL	ARSENIC	SE51C	13.8	=	12	8	3.3	MG/KG
CH2M HILL	BERYLLIUM	SE51A	0.32	J	1.3	NA	NA	MG/KG
CH2M HILL	BERYLLIUM	SE51B	0.43	J	1.3	NA	NA	MG/KG
CH2M HILL	BERYLLIUM	SE51C	0.25	J	1.3	NA	NA	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SE51A	9.8	=	20	33	80	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SE51B	17.6	=	20	33	80	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SE51C	11.4	=	20	33	80	MG/KG
CH2M HILL	COPPER	SE51A	8.8	J	58	28	70	MG/KG
CH2M HILL	COPPER	SE51B	16.5	J	58	28	70	MG/KG
CH2M HILL	COPPER	SE51C	13.6	J	58	28	70	MG/KG
CH2M HILL	LEAD	SE51A	9.9	=	35.2	21	35	MG/KG
CH2M HILL	LEAD	SE51B	10.8	=	35.2	21	35	MG/KG
CH2M HILL	LEAD	SE51C	10.3	=	35.2	21	35	MG/KG
CH2M HILL	METHYL ETHYL KETONE (2-	SE51C	0.006	J	.01	NA	NA	MG/KG
CH2M HILL	NICKEL	SE51A	11.7	J	30	NA	30	MG/KG
CH2M HILL	NICKEL	SE51B	14.5	J	30	NA	30	MG/KG
CH2M HILL	NICKEL	SE51C	12.6	J	30	NA	30	MG/KG
CH2M HILL	p,p'-DDD	SE51B	0.0044	=	.0061	NA	.002	MG/KG
CH2M HILL	ZINC	SE51A	39	J	797	68	120	MG/KG
CH2M HILL	ZINC	SE51B	42.7	J	797	68	120	MG/KG

Table 51-E
Summary of Detected Compounds in Sediment
Compared to Screening Levels for Site 51
Screening Sites Sampling Program
Defense Depot Memphis, Tennessee

Data	Parameter[2]	StationID	Detected	Project	Background	PRG-Sed	NOAA-Sed	Units
CH2M HILL	ZINC	SE51C	46.2	J	797	68	120	MG/KG

Notes:

1. Detected values are obtained from the *Draft Parcel 3 Report-Screening Sites Sampling Program for Defense Depot Memphis, TN*, CH2M HILL, 1997.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum* , CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. Sediment Preliminary Remediation Goal (PRG) values are from Table 3-10 of the *Generic Remedial Investigation/Feasibility Study Work Plan* , CH2M HILL, August 1995.
5. National Oceanic and Atmospheric Administration (NOAA) values are from Table 3-10 of the *Generic Remedial Investigation/Feasibility Study Work Plan* , CH2M HILL, August 1995.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.

NA - indicates screening level values are not available for comparison.

= - indicates unqualified detection

J - indicates estimated value above the detection limit but below the reporting limit.

Table 52-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 52
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
CH2M HILL	ALUMINUM	SS52A	10900	=	24000	24000	Bkgd	MG/KG
CH2M HILL	ARSENIC	SB52A	23.2	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SB52A	9.4	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SB52B	11.9	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SB52B	8.6	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SS52A	12	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SS52B	45.1	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SS52C	19.7	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SS52D	31.2	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SS52E	14.8	=	20	20	Bckg	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	SS52B	0.24	=	.71	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	SS52C	0.09	=	.71	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	SS52D	0.069	=	.71	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(a)PYRENE	SS52B	0.26	=	.96	0.088	Residential RBC	MG/KG
CH2M HILL	BENZO(a)PYRENE	SS52C	0.058	J	.96	0.088	Residential RBC	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	SS52B	0.24	=	.78	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	SS52C	0.078	=	.78	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(g,h,i)PERYLENE	SS52B	0.21	=	.82	230	Residential RBC	MG/KG
CH2M HILL	BENZO(k)FLUORANTHENE	SS52B	0.2	=	.78	8.8	Residential RBC	MG/KG
CH2M HILL	BENZO(k)FLUORANTHENE	SS52C	0.064	=	.78	8.8	Residential RBC	MG/KG
CH2M HILL	BERYLLIUM	SB52A	0.29	J	1.1	1.1	Bckg	MG/KG
CH2M HILL	BERYLLIUM	SB52A	0.39	J	1.1	1.1	Bckg	MG/KG
CH2M HILL	BERYLLIUM	SS52A	0.39	J	1.1	1.1	Bckg	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB52A	12.6	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB52A	13.8	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB52B	22.5	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB52B	20	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS52A	13.1	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS52B	40.3	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS52C	20.3	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS52D	17.5	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS52E	21	=	24.8	39	Residential RBC	MG/KG

Table 52-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 52
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
CH2M HILL	CHRYSENE	SS52A	0.046	J	.94	88	Residential RBC	MG/KG
CH2M HILL	CHRYSENE	SS52B	0.26	=	.94	88	Residential RBC	MG/KG
CH2M HILL	CHRYSENE	SS52C	0.066	=	.94	88	Residential RBC	MG/KG
CH2M HILL	CHRYSENE	SS52D	0.057	J	.94	88	Residential RBC	MG/KG
CH2M HILL	FLUORANTHENE	SS52B	0.42	=	1.6	310	Residential RBC	MG/KG
CH2M HILL	FLUORANTHENE	SS52C	0.094	=	1.6	310	Residential RBC	MG/KG
CH2M HILL	FLUORANTHENE	SS52D	0.08	=	1.6	310	Residential RBC	MG/KG
CH2M HILL	IRON	SS52A	15400	J	37000	37000	Bckg	MG/KG
CH2M HILL	LEAD	SB52A	24.4	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SB52A	16.8	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SB52B	17.9	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SB52B	23.8	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SS52A	18.5	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SS52B	150	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SS52C	32.2	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SS52D	33.8	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SS52E	29.9	=	30	400	CERCLA	MG/KG
CH2M HILL	MANGANESE	SS52A	1860	=	1300	1300	Bckg	MG/KG
CH2M HILL	PHENANTHRENE	SS52B	0.22	=	.61	2300	Residential RBC	MG/KG
CH2M HILL	PHENANTHRENE	SS52C	0.075	=	.61	2300	Residential RBC	MG/KG
CH2M HILL	PHENANTHRENE	SS52D	0.065	=	.61	2300	Residential RBC	MG/KG
CH2M HILL	PYRENE	SS52A	0.055	J	1.5	230	Residential RBC	MG/KG
CH2M HILL	PYRENE	SS52B	0.33	=	1.5	230	Residential RBC	MG/KG
CH2M HILL	PYRENE	SS52C	0.084	=	1.5	230	Residential RBC	MG/KG
CH2M HILL	PYRENE	SS52D	0.061	=	1.5	230	Residential RBC	MG/KG
CH2M HILL	ZINC	SB52A	58	J	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SB52A	65.6	J	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SB52B	75.7	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SB52B	66.2	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SS52A	75	J	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SS52B	426	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SS52C	85.3	=	130	23000	Residential RBC	MG/KG

Table 52-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 52
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
CH2M HILL	ZINC	SS52D	71.1	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SS52E	91.3	=	130	23000	Residential RBC	MG/KG
LAW	ARSENIC	SS12	33	=	20	**20**	Bckg	MG/KG
LAW	ARSENIC	SS13	22	=	20	**20**	Bckg	MG/KG
LAW	BENZO(a)ANTHRACENE	SS13	0.27	J	.71	0.88	Residential RBC	MG/KG
LAW	BENZO(a)PYRENE	SS13	0.34	J	.96	**0.088**	Residential RBC	MG/KG
LAW	BENZO(b)FLUORANTHENE	SS13	0.42	J	.78	0.88	Residential RBC	MG/KG
LAW	BENZO(k)FLUORANTHENE	SS13	0.34	J	.78	8.8	Residential RBC	MG/KG
LAW	CHROMIUM, TOTAL	SS12	20	=	24.8	39	Residential RBC	MG/KG
LAW	CHROMIUM, TOTAL	SS13	13	=	24.8	39	Residential RBC	MG/KG
LAW	CHRYSENE	SS13	0.39	J	.94	88	Residential RBC	MG/KG
LAW	FLUORANTHENE	SS12	0.33	J	1.6	310	Residential RBC	MG/KG
LAW	FLUORANTHENE	SS13	0.63	J	1.6	310	Residential RBC	MG/KG
LAW	LEAD	SS12	80	=	30	400	CERCLA	MG/KG
LAW	LEAD	SS13	50	=	30	400	CERCLA	MG/KG
LAW	PHENANTHRENE	SS13	0.31	J	.61	2300	Residential RBC	MG/KG
LAW	PYRENE	SS12	0.23	J	1.5	230	Residential RBC	MG/KG
LAW	PYRENE	SS13	0.56	J	1.5	230	Residential RBC	MG/KG
LAW	ZINC	SS12	81.2	=	130	23000	Residential RBC	MG/KG
LAW	ZINC	SS13	89.3	=	130	23000	Residential RBC	MG/KG

Notes:

1. Detected values are obtained from the *Draft Parcel 3 Report-Screening Sites Sampling Program for Defense Depot* Memphis, TN, CH2M HILL, 1997, and the *Remedial Investigation at DDMT Final Report*, Law Environmental, August 1990.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. Based on values selected by the BRAC Cleanup Team in the August 1997 BCT meeting minutes, Memphis, Tennessee.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
J - indicates estimated value above the detection limit but below the reporting limit.
= - indicates unqualified detection

Table 52-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 52
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
BCT - BRAC Cleanup Team								

Table 52-B
Summary of Detected Compounds in Surface Soils
Compared to Non-BCT Screening Levels for Site 52
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	Risk-Based Concentrations Soil Ingestion[4]		Units
						Residential	Industrial	
CH2M HILL	BARIUM	SS52A	152	=	234	550	14000	MG/KG
CH2M HILL	CALCIUM	SS52A	3190	=	5840	NA	NA	MG/KG
CH2M HILL	COBALT	SS52A	12.6	=	18.3	470	12000	MG/KG
CH2M HILL	COPPER	SB52A	12	J	33	310	8200	MG/KG
CH2M HILL	COPPER	SB52A	15.4	J	33	310	8200	MG/KG
CH2M HILL	COPPER	SB52B	19.4	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SB52B	16.6	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SS52A	13.8	J	33	310	8200	MG/KG
CH2M HILL	COPPER	SS52B	30.5	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SS52C	21.3	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SS52D	19.3	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SS52E	28.3	=	33	310	8200	MG/KG
CH2M HILL	DIELDRIN	SB52A	0.29	J	.086	.04	.36	MG/KG
CH2M HILL	DIELDRIN	SB52A	0.022	=	.086	.04	.36	MG/KG
CH2M HILL	DIELDRIN	SB52B	0.0013	J	.086	.04	.36	MG/KG
CH2M HILL	DIELDRIN	SS52A	0.038	J	.086	.04	.36	MG/KG
CH2M HILL	DIELDRIN	SS52B	0.75	J	.086	.04	.36	MG/KG
CH2M HILL	DIELDRIN	SS52C	0.033	=	.086	.04	.36	MG/KG
CH2M HILL	DIELDRIN	SS52D	0.021	=	.086	.04	.36	MG/KG
CH2M HILL	MAGNESIUM	SS52A	1650	=	4600	NA	NA	MG/KG
CH2M HILL	NICKEL	SB52A	12.9	J	30	160	4100	MG/KG
CH2M HILL	NICKEL	SB52A	19	J	30	160	4100	MG/KG
CH2M HILL	NICKEL	SB52B	24.1	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SB52B	26.5	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SS52A	14.8	J	30	160	4100	MG/KG
CH2M HILL	NICKEL	SS52B	31.8	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SS52C	25.3	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SS52D	26.3	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SS52E	24.9	=	30	160	4100	MG/KG
CH2M HILL	p,p'-DDE	SB52A	0.43	J	.16	1.9	17	MG/KG

Table 52-B
Summary of Detected Compounds in Surface Soils
Compared to Non-BCT Screening Levels for Site 52
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	Risk-Based Concentrations Soil Ingestion[4]		Units
						Residential	Industrial	
CH2M HILL	p,p'-DDE	SB52A	0.0084	=	.16	1.9	17	MG/KG
CH2M HILL	p,p'-DDE	SB52B	0.0043	J	.16	1.9	17	MG/KG
CH2M HILL	p,p'-DDE	SS52A	0.025	J	.16	1.9	17	MG/KG
CH2M HILL	p,p'-DDE	SS52C	0.03	=	.16	1.9	17	MG/KG
CH2M HILL	p,p'-DDE	SS52D	0.0064	J	.16	1.9	17	MG/KG
CH2M HILL	p,p'-DDE	SS52E	0.039	=	.16	1.9	17	MG/KG
CH2M HILL	p,p'-DDT	SB52A	0.24	J	.074	1.9	17	MG/KG
CH2M HILL	p,p'-DDT	SB52A	0.024	=	.074	1.9	17	MG/KG
CH2M HILL	p,p'-DDT	SB52B	0.0052	J	.074	1.9	17	MG/KG
CH2M HILL	p,p'-DDT	SB52B	0.021	=	.074	1.9	17	MG/KG
CH2M HILL	p,p'-DDT	SS52A	0.21	=	.074	1.9	17	MG/KG
CH2M HILL	p,p'-DDT	SS52B	6.7	=	.074	1.9	17	MG/KG
CH2M HILL	p,p'-DDT	SS52C	0.073	=	.074	1.9	17	MG/KG
CH2M HILL	p,p'-DDT	SS52D	0.0069	J	.074	1.9	17	MG/KG
CH2M HILL	p,p'-DDT	SS52E	0.042	=	.074	1.9	17	MG/KG
CH2M HILL	POTASSIUM	SS52A	901	=	1820	NA	NA	MG/KG
CH2M HILL	SELENIUM	SS52A	0.58	J	.81	39	1000	MG/KG
CH2M HILL	VANADIUM	SS52A	24.8	=	48.4	55	1400	MG/KG
LAW	ACETONE	SS12	0.009	J	NA	780	20000	MG/KG
LAW	ACETONE	SS13	0.038	=	NA	780	20000	MG/KG
LAW	BARIUM	SS12	95.8	=	234	550	14000	MG/KG
LAW	BARIUM	SS13	118	=	234	550	14000	MG/KG
LAW	bis(2-ETHYLHEXYL) PHTHALATE	SS12	1.5	J	NA	46	410	MG/KG
LAW	bis(2-ETHYLHEXYL) PHTHALATE	SS13	2.2	J	NA	46	410	MG/KG
LAW	COPPER	SS12	34	=	33	310	8200	MG/KG
LAW	COPPER	SS13	21	=	33	310	8200	MG/KG
LAW	DDE	SS12	2	=	.16	1.9	17	MG/KG
LAW	DDE	SS13	0.34	=	.16	1.9	17	MG/KG
LAW	DDT	SS12	0.87	=	.074	1.9	17	MG/KG
LAW	DDT	SS13	0.29	=	.074	1.9	17	MG/KG

Table 52-B
Summary of Detected Compounds in Surface Soils
Compared to Non-BCT Screening Levels for Site 52
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	Risk-Based Concentrations Soil Ingestion[4]		Units
						Residential	Industrial	
LAW	DIELDRIN	SS12	0.76	=	.086	.04	.36	MG/KG
LAW	DIELDRIN	SS13	0.83	=	.086	.04	.36	MG/KG
LAW	MERCURY	SS12	0.15	=	.43	2.3	61	MG/KG
LAW	MERCURY	SS13	0.1	=	.43	2.3	61	MG/KG
LAW	METHYLENE CHLORIDE	SS12	0.014	=	NA	85	760	MG/KG
LAW	METHYLENE CHLORIDE	SS13	0.021	=	NA	85	760	MG/KG
LAW	N-NITROSODIPHENYLAMINE	SS12	0.26	J	NA	130	1200	MG/KG
LAW	N-NITROSODIPHENYLAMINE	SS13	0.28	J	NA	130	1200	MG/KG
LAW	NICKEL	SS12	13	=	30	160	4100	MG/KG
LAW	NICKEL	SS13	12	=	30	160	4100	MG/KG
LAW	TOLUENE	SS12	0.017	=	.012	1600	41000	MG/KG
LAW	TOLUENE	SS13	0.009	J	.012	1600	41000	MG/KG
LAW	Total Polynuclear Aromatic Hydrocarbons	SS12	0.56	=	NA	NA	NA	MG/KG
LAW	Total Polynuclear Aromatic Hydrocarbons	SS13	3.26	=	NA	NA	NA	MG/KG

Notes:
1. Detected values are obtained from the *Draft Parcel 3 Report-Screening Sites Sampling Program for Defense Depot Memphis, TN*, CH2M HILL, 1997, and the *Remedial Investigation at DDMT Final Report*, Law Environmental, August 1990.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. Risk-Based Concentrations are obtained from the *EPA Region III Risk-based Concentrations Table*, R.L. Smith, April, 1997.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
= - indicates unqualified detection.
J - indicates estimated value above the detection limit but below the reporting limit.

Table 52-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 52
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	ARSENIC	SB52A	4 to 6	17.2	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB52A	8 to 10	19	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB52B	4 to 6	17.9	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB52B	8 to 10	7.7	=	17	29	MG/KG
CH2M HILL	BERYLLIUM	SB52A	8 to 10	1.3	=	1.2	63	MG/KG
CH2M HILL	CADMIUM	SB52B	4 to 6	1.5	=	1.4	8	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB52A	4 to 6	37.6	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB52A	8 to 10	53.2	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB52B	4 to 6	31	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB52B	8 to 10	32.9	=	26	38	MG/KG
CH2M HILL	COPPER	SB52A	4 to 6	36.1	=	33	NA	MG/KG
CH2M HILL	COPPER	SB52A	8 to 10	31	=	33	NA	MG/KG
CH2M HILL	COPPER	SB52B	4 to 6	22.8	=	33	NA	MG/KG
CH2M HILL	COPPER	SB52B	8 to 10	18.8	=	33	NA	MG/KG
CH2M HILL	DIELDRIN	SB52A	8 to 10	0.0017	J	.37	.004	MG/KG
CH2M HILL	DIELDRIN	SB52B	4 to 6	0.0053	J	.37	.004	MG/KG
CH2M HILL	DIELDRIN	SB52B	8 to 10	0.0018	J	.37	.004	MG/KG
CH2M HILL	LEAD	SB52A	4 to 6	31.7	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB52A	8 to 10	27.4	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB52B	4 to 6	22.9	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB52B	8 to 10	24.2	=	24	1.5	MG/KG
CH2M HILL	NICKEL	SB52A	4 to 6	40.2	=	37	130	MG/KG
CH2M HILL	NICKEL	SB52A	8 to 10	35.2	=	37	130	MG/KG
CH2M HILL	NICKEL	SB52B	4 to 6	25.1	=	37	130	MG/KG
CH2M HILL	NICKEL	SB52B	8 to 10	23.4	=	37	130	MG/KG
CH2M HILL	p,p'-DDT	SB52B	8 to 10	0.0018	J	.0072	32	MG/KG
CH2M HILL	ZINC	SB52A	4 to 6	133	=	110	12000	MG/KG
CH2M HILL	ZINC	SB52A	8 to 10	110	=	110	12000	MG/KG
CH2M HILL	ZINC	SB52B	4 to 6	82.5	=	110	12000	MG/KG

Table 52-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 52
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	ZINC	SB52B	8 to 10	60.8	=	110	12000	MG/KG

Notes:
1. Detected values are obtained from the *Draft Parcel 3 Report-Screening Sites Sampling Program for Defense Depot Memphis, TN*, CH2M HILL, 1997.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. RBC-GWP values are obtained from the *EPA Region III Risk-based Concentrations Table*, R. L. Smith, April, 1997.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
= - indicates unqualified detection
J - indicates estimated value above the detection limit but below the reporting limit.
RBC-GWP - Risk-Based Concentrations - Groundwater Protection

Table 52-D
Summary of Detected Compounds in Surface Water
Compared to Screening Levels for Site 52
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	TN State[4]	AWQC-HH[5]	AWQC-AO[6]	Units
CH2M HILL	ARSENIC	SW52A	0.0027	J	.018	.05	.000018	.19	MG/L
CH2M HILL	ARSENIC	SW52B	0.0041	J	.018	.05	.000018	.19	MG/L
CH2M HILL	Arsenic, Dissolved	SW52A	0.0043	J	.012	.05	.000018	.19	MG/L
CH2M HILL	Arsenic, Dissolved	SW52B	0.0033	J	.012	.05	.000018	.19	MG/L
CH2M HILL	COPPER	SW52A	0.0046	J	.075	1	NA	.012	MG/L
CH2M HILL	DIELDRIN	SW52A	0.000066	J	NA	NA	NA	NA	MG/L
CH2M HILL	LEAD	SW52A	0.003	J	.019	.05	NA	.0032	MG/L
CH2M HILL	LEAD	SW52B	0.0023	J	.019	.05	NA	.0032	MG/L
CH2M HILL	ZINC	SW52A	0.0196	J	.29	5	NA	.11	MG/L
CH2M HILL	ZINC	SW52B	0.0305	J	.29	5	NA	.11	MG/L
CH2M HILL	Zinc, Dissolved	SW52A	0.0271	=	.41	5	NA	.11	MG/L
LAW	ACETONE	SW10	0.001	J	NA	NA	NA	NA	MG/L
LAW	ACETONE	SW11	0.004	J	NA	NA	NA	NA	MG/L
LAW	ACETONE	SW4	0.002	J	NA	NA	NA	NA	MG/L
LAW	ACETONE	SW5	0.002	J	NA	NA	NA	NA	MG/L
LAW	BARIUM	SW10	0.026	=	.13	1	NA	NA	MG/L
LAW	BARIUM	SW11	0.055	=	.13	1	NA	NA	MG/L
LAW	BARIUM	SW4	0.014	=	.13	1	NA	NA	MG/L
LAW	BARIUM	SW5	0.014	=	.13	1	NA	NA	MG/L
LAW	BENZYL BUTYL PHTHALATE	SW11	0.003	J	NA	NA	NA	.022	MG/L
LAW	bis(2-ETHYLHEXYL)	SW10	0.007	J	NA	15	.0018	NA	MG/L
LAW	bis(2-ETHYLHEXYL)	SW11	0.003	J	NA	15	.0018	NA	MG/L
LAW	bis(2-ETHYLHEXYL)	SW4	0.003	J	NA	15	.0018	NA	MG/L
LAW	bis(2-ETHYLHEXYL)	SW5	0.005	J	NA	15	.0018	NA	MG/L
LAW	COPPER	SW10	0.025	=	.075	1	NA	.012	MG/L
LAW	COPPER	SW11	0.03	=	.075	1	NA	.012	MG/L
LAW	COPPER	SW4	0.046	=	.075	1	NA	.012	MG/L
LAW	COPPER	SW5	0.03	=	.075	1	NA	.012	MG/L
LAW	DDE	SW10	0.00014	=	NA	NA	NA	NA	MG/L
LAW	DDE	SW11	0.00088	=	NA	NA	NA	NA	MG/L
LAW	DDT	SW10	0.00027	=	NA	NA	NA	NA	MG/L
LAW	DDT	SW11	0.0019	=	NA	NA	NA	NA	MG/L
LAW	DI-n-BUTYL PHTHALATE	SW10	0.003	J	NA	NA	2.7	.0094	MG/L
LAW	DI-n-OCTYLPHTHALATE	SW10	0.003	J	NA	NA	NA	NA	MG/L
LAW	FLUORANTHENE	SW11	0.002	J	NA	NA	.3	.0398	MG/L
LAW	LEAD	SW11	0.05	=	.019	.05	NA	.0032	MG/L

Table 52-D
Summary of Detected Compounds in Surface Water
Compared to Screening Levels for Site 52
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	TN State[4]	AWQC-HH[5]	AWQC-AO[6]	Units
LAW	N-NITROSODIPHENYLAMINE	SW10	**0.002**	J	NA	.000049	.005	.0585	MG/L
LAW	N-NITROSODIPHENYLAMINE	SW5	**0.003**	J	NA	.000049	.005	.0585	MG/L
LAW	PYRENE	SW10	0.003	J	NA	NA	.96	NA	MG/L
LAW	PYRENE	SW11	0.003	J	NA	NA	.96	NA	MG/L
LAW	Total Xylenes	SW11	0.001	J	.001	2.2	NA	NA	MG/L
LAW	ZINC	SW10	0.081	=	.29	5	NA	.11	MG/L
LAW	ZINC	SW11	0.11	=	.29	5	NA	.11	MG/L
LAW	ZINC	SW4	0.022	=	.29	5	NA	.11	MG/L
LAW	ZINC	SW5	0.022	=	.29	5	NA	.11	MG/L
LAW	DI-n-OCTYLPHTHALATE	SW10	0.003	J	NA	NA	NA	NA	MG/L
LAW	FLUORANTHENE	SW11	0.002	J	NA	NA	.3	.0398	MG/L
LAW	LEAD	SW11	**0.05**	=	.019	.05	NA	**.0032**	MG/L
LAW	N-NITROSODIPHENYLAMINE	SW10	**0.002**	J	NA	.000049	.005	.0585	MG/L
LAW	N-NITROSODIPHENYLAMINE	SW5	**0.003**	J	NA	.000049	.005	.0585	MG/L
LAW	PYRENE	SW10	0.003	J	NA	NA	.96	NA	MG/L
LAW	PYRENE	SW11	0.003	J	NA	NA	.96	NA	MG/L
LAW	Total Xylenes	SW11	0.001	J	.001	2.2	NA	NA	MG/L
LAW	ZINC	SW10	0.081	=	.29	5	NA	.11	MG/L
LAW	ZINC	SW11	0.11	=	.29	5	NA	.11	MG/L
LAW	ZINC	SW4	0.022	=	.29	5	NA	.11	MG/L
LAW	ZINC	SW5	0.022	=	.29	5	NA	.11	MG/L

Notes:

1. Detected values are obtained from the *Draft Parcel 3 Report-Screening Sites Sampling Program for Defense Depot Memphis, TN*, CH2M HILL, 1997, and the *Remedial Investigation at DDMT Final Report*, Law Environmental, August 1990.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. Tennessee State values are from Table 3-8 of the *Generic Remedial Investigation/Feasibility Study Work Plan*, CH2M HILL, August 1995.
5. Federal Ambient Water Quality Criteria for the Protection of Human Health for the Ingestion of Organisms and Water (AWQC-HH) values are from Table 3-8 of the *Generic Remedial Investigation/Feasibility Study Work Plan*, CH2M HILL, August 1995.
6. Federal Ambient Water Quality Criteria, Chronic for the Protection of Freshwater Aquatic Life (AWQC-AO) values are from Table 3-8 of the *Generic Remedial Investigation/Feasibility Study Work Plan*, CH2M HILL, August 1995.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
= - indicates unqualified detection.
J - indicates estimated value above the detection limit but below the reporting limit.

Table 52-E
Summary of Detected Compounds in Sediment
Compared to Screening Levels for Site 52
Screening Sites Sampling Program
Defense Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	PRG-Sed[4]	NOAA-Sed[5]	Units
CH2M HILL	ALDRIN	SE52A	0.01	J	NA	NA	NA	MG/KG
CH2M HILL	ARSENIC	SE52A	10.1	=	12	8	3.3	MG/KG
CH2M HILL	ARSENIC	SE52B	9.8	=	12	8	3.3	MG/KG
CH2M HILL	BERYLLIUM	SE52A	0.29	J	1.3	NA	NA	MG/KG
CH2M HILL	BERYLLIUM	SE52B	0.57	J	1.3	NA	NA	MG/KG
CH2M HILL	CADMIUM	SE52B	0.52	J	29	1	5	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SE52A	11.2	=	20	33	80	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SE52B	14.7	=	20	33	80	MG/KG
CH2M HILL	COPPER	SE52A	12.8	J	58	28	70	MG/KG
CH2M HILL	COPPER	SE52B	11.6	J	58	28	70	MG/KG
CH2M HILL	DIELDRIN	SE52A	0.024	=	.011	NA	NA	MG/KG
CH2M HILL	DIELDRIN	SE52B	0.0028	J	.011	NA	NA	MG/KG
CH2M HILL	LEAD	SE52A	10.4	=	35.2	21	35	MG/KG
CH2M HILL	LEAD	SE52B	15.5	=	35.2	21	35	MG/KG
CH2M HILL	NICKEL	SE52A	11.9	J	30	NA	30	MG/KG
CH2M HILL	NICKEL	SE52B	11.1	J	30	NA	30	MG/KG
CH2M HILL	p,p'-DDD	SE52A	0.077	=	.0061	NA	.002	MG/KG
CH2M HILL	p,p'-DDD	SE52B	0.0046	=	.0061	NA	.002	MG/KG
CH2M HILL	p,p'-DDE	SE52A	0.016	J	.0072	.0017	.002	MG/KG
CH2M HILL	p,p'-DDE	SE52B	0.0021	J	.0072	.0017	.002	MG/KG
CH2M HILL	p,p'-DDT	SE52A	0.025	=	NA	NA	.001	MG/KG
CH2M HILL	p,p'-DDT	SE52B	0.0037	J	NA	NA	.001	MG/KG
CH2M HILL	SELENIUM	SE52B	0.98	=	1.7	NA	NA	MG/KG
CH2M HILL	SILVER	SE52B	0.28	J	1.8	.5	1	MG/KG
CH2M HILL	ZINC	SE52A	40.1	J	797	68	120	MG/KG

Table 52-E
Summary of Detected Compounds in Sediment
Compared to Screening Levels for Site 52
Screening Sites Sampling Program
Defense Depot Memphis, Tennessee

Data	Parameter[2]	StationID	Detected	Project	Background	PRG-Sed[4]	NOAA-Sed[5]	Units
CH2M HILL	ZINC	SE52B	38.1	J	797	68	120	MG/KG

Notes:

1. Detected values are obtained from the *Draft Parcel 3 Report-Screening Sites Sampling Program for Defense Depot Memphis, TN*, CH2M HILL, 1997.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum* , CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. Sediment Preliminary Remediation Goal (PRG) values are from Table 3-10 of the *Generic Remedial Investigation/Feasibility Study Work Plan* , CH2M HILL, August 1995.
5. National Oceanic and Atmospheric Administration (NOAA) values are from Table 3-10 of the *Generic Remedial Investigation/Feasibility Study Work Plan* , CH2M HILL, August 1995.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
= - indicates unqualified detection
J - indicates estimated value above the detection limit but below the reporting limit.

Table 69-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 69
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
CH2M HILL	ALUMINUM	SS69A	11500	=	24000	24000	Bkgd	MG/KG
CH2M HILL	ARSENIC	SS69A	13.5	J	20	20	Bckg	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	SB69B	0.14	=	.71	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	SS69B	0.1	=	.71	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	SS69D	0.081	=	.71	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(a)PYRENE	SB69B	0.12	=	.96	0.088	Residential RBC	MG/KG
CH2M HILL	BENZO(a)PYRENE	SS69B	0.086	=	.96	0.088	Residential RBC	MG/KG
CH2M HILL	BENZO(a)PYRENE	SS69D	0.054	J	.96	0.088	Residential RBC	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	SB69B	0.16	=	.78	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	SS69B	0.12	=	.78	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	SS69D	0.059	=	.78	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(g,h,i)PERYLENE	SS69B	0.086	=	.82	230	Residential RBC	MG/KG
CH2M HILL	BENZO(k)FLUORANTHENE	SB69B	0.1	=	.78	8.8	Residential RBC	MG/KG
CH2M HILL	BENZO(k)FLUORANTHENE	SS69B	0.071	=	.78	8.8	Residential RBC	MG/KG
CH2M HILL	BENZO(k)FLUORANTHENE	SS69D	0.05	J	.78	8.8	Residential RBC	MG/KG
CH2M HILL	BERYLLIUM	SS69A	0.45	J	1.1	1.1	Bckg	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS69A	12.6	J	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHRYSENE	SB69B	0.13	=	.94	88	Residential RBC	MG/KG
CH2M HILL	CHRYSENE	SS69D	0.069	=	.94	88	Residential RBC	MG/KG
CH2M HILL	FLUORANTHENE	SB69A	0.073	=	1.6	310	Residential RBC	MG/KG
CH2M HILL	FLUORANTHENE	SB69B	0.19	=	1.6	310	Residential RBC	MG/KG
CH2M HILL	FLUORANTHENE	SS69B	0.21	=	1.6	310	Residential RBC	MG/KG
CH2M HILL	FLUORANTHENE	SS69D	0.14	=	1.6	310	Residential RBC	MG/KG
CH2M HILL	INDENO(1,2,3-c,d)PYRENE	SS69B	0.092	=	.7	0.88	Residential RBC	MG/KG
CH2M HILL	IRON	SS69A	19700	=	37000	37000	Bckg	MG/KG
CH2M HILL	LEAD	SS69A	11.4	=	30	400	CERCLA	MG/KG
CH2M HILL	MANGANESE	SS69A	371	=	1300	1300	Bckg	MG/KG
CH2M HILL	PHENANTHRENE	SB69B	0.1	=	.61	2300	Residential RBC	MG/KG
CH2M HILL	PHENANTHRENE	SS69B	0.16	=	.61	2300	Residential RBC	MG/KG
CH2M HILL	PHENANTHRENE	SS69D	0.098	=	.61	2300	Residential RBC	MG/KG
CH2M HILL	PYRENE	SB69B	0.16	=	1.5	230	Residential RBC	MG/KG

Table 69-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 69
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
CH2M HILL	PYRENE	SS69B	0.16	=	1.5	230	Residential RBC	MG/KG
CH2M HILL	PYRENE	SS69D	0.12	=	1.5	230	Residential RBC	MG/KG
CH2M HILL	ZINC	SS69A	57.8	=	130	23000	Residential RBC	MG/KG

Notes:
1. Detected values are obtained from the *Draft Parcel 3 Report-Screening Sites Sampling Program for Defense Depot* Memphis, TN, CH2M HILL, 1997.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. Based on values selected by the BRAC Cleanup Team in the August 1997 BCT meeting minutes, Memphis, Tennessee.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
J - indicates estimated value above the detection limit but below the reporting limit.
= - indicates unqualified detection
BCT - BRAC Cleanup Team

Table 69-B
Summary of Detected Compounds in Surface Soils
Compared to Non-BCT Screening Levels for Site 69
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	Risk-Based Concentrations Soil Ingestion[4]		Units
						Residential	Industrial	
CH2M HILL	BARIUM	SS69A	114	=	234	550	14000	MG/KG
CH2M HILL	CALCIUM	SS69A	1700	=	5840	NA	NA	MG/KG
CH2M HILL	COBALT	SS69A	7	=	18.3	470	12000	MG/KG
CH2M HILL	COPPER	SS69A	16.8	=	33	310	8200	MG/KG
CH2M HILL	DIELDRIN	SS69A	0.042	=	.086	.04	.36	MG/KG
CH2M HILL	MAGNESIUM	SS69A	2140	=	4600	NA	NA	MG/KG
CH2M HILL	NICKEL	SS69A	15.6	=	30	160	4100	MG/KG
CH2M HILL	POTASSIUM	SS69A	1190	=	1820	NA	NA	MG/KG
CH2M HILL	VANADIUM	SS69A	26.1	J	48.4	55	1400	MG/KG

Notes:
1. Detected values are obtained from the *Draft Parcel 3 Report-Screening Sites Sampling Program for Defense Depot Memphis, TN*, CH2M HILL, 1997.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. Risk-Based Concentrations are obtained from the *EPA Region III Risk-based Concentrations Table*, R.L. Smith, April, 1997.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
= - indicates unqualified detection.
J - indicates estimated value above the detection limit but below the reporting limit.

Table 69-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 69
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
No detections were found.								

Notes:
1. Detected values are obtained from the *Draft Parcel 3 Report-Screening Sites Sampling Program for Defense Depot Memphis, TN*, CH2M HILL, 1997.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. RBC-GWP values are obtained from the *EPA Region III Risk-based Concentrations Table*, R. L. Smith, April, 1997.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
= - indicates unqualified detection
J - indicates estimated value above the detection limit but below the reporting limit.
RBC-GWP - Risk-Based Concentrations - Groundwater Protection

TAB

Parcel 4

Parcel 4

Screening Sites Sampling Program

for

Defense Distribution Depot Memphis, Tennessee

March 1998

Prepared for

U.S. Army Engineering and Support Center, Huntsville

Prepared by

CH2M HILL

2567 Fairlane Drive

Montgomery, Alabama 36116

137449.RR.ZZ

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Parcel 4
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Parcel 4 is a 3,001-square-foot (ft^2) parcel in the southeastern/eastern corner of the Main Installation in Operable Unit (OU)-3 (shown in Figure 1). Parcel 4 consists of Buildings 251, 252, 253, 254, 256, 257, 260, 261, 263, 265, 270, 271, and 273.

The screening sites in this document have been identified by the Defense Distribution Depot Memphis, Tennessee (DDMT) through a review of existing documents, interviews with facility personnel, and knowledge of the facility's operations. Screening sites are locations at DDMT where there is a potential for materials to have been released to the environment from past operations. Screening sites in Parcel 4 include the following:

- Screening Site 66 – Petroleum, Oil, and Lubricants (POL) Building 253
- Screening Site 67 – Installation Gas Station, Building 257
- Screening Site 68 – POL Building 263

Sites where there is a confirmed presence of contaminants from past operations are addressed in the Remedial Investigation Sampling Program. Other facilities have been addressed in the Base Realignment and Closure (BRAC) Sampling Program. Results of these programs are addressed in separate reports.

The purpose of the Screening Sites Sampling Program is to identify whether past activities at each site have resulted in releases from the site that would require further investigation. The intent is not to fully delineate the nature and extent of soil or groundwater contamination attributable to past operations, but to conduct technically based screening analyses sufficient to identify the likelihood of contamination.

The purpose of this letter report is to evaluate the results of the Screening Sites Sampling Program and the sampling from previous investigations and to recommend No Further Action or further investigation at screening sites in this parcel. The remainder of this report presents the results of past investigations; Screening Sites Sampling Program strategy, procedures, and results; and recommendations for each site.

Surface soils, subsurface soils, surface water, and sediments were investigated as part of the Screening Sites Sampling Program. Surface soil samples (any sample whose lowest depth is 2 feet or less) were taken both as independent samples and as the upper interval of a soil boring profile. Thus, surface soil samples taken as part of a soil boring may have an "SB" designation and initially are discussed under Subsurface Soil Sampling Procedure (Section 2.2.2.2). However, the results from that upper interval are presented in the surface soil tables and discussions in Section 3.0

Screening Site 66–Petroleum, Oil, and Lubricants (POL) Building 253

1.0 Introduction

The chart below presents the location and status information for this screening site.

Parcel	Building Number	RI/FS[1] OU	Site Number	CERCLA[2] Status
4	253	3	66	Screening

[1]Remedial Investigation/ Feasibility Study
[2]CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act.

This building, measuring approximately 50 by 125 feet, is located in the facility engineering maintenance yard. Operations at Building 253 (Figure 1) consisted mainly of motor pool services (minor maintenance, oil changes, steam cleaning, cold-solvent degreasing, washing, and lubrication). Additionally, a 5,000-gallon underground storage tank (UST) containing No. 4 fuel oil was located at this site.

2.0 Study Area Investigation

2.1 Previous Investigations

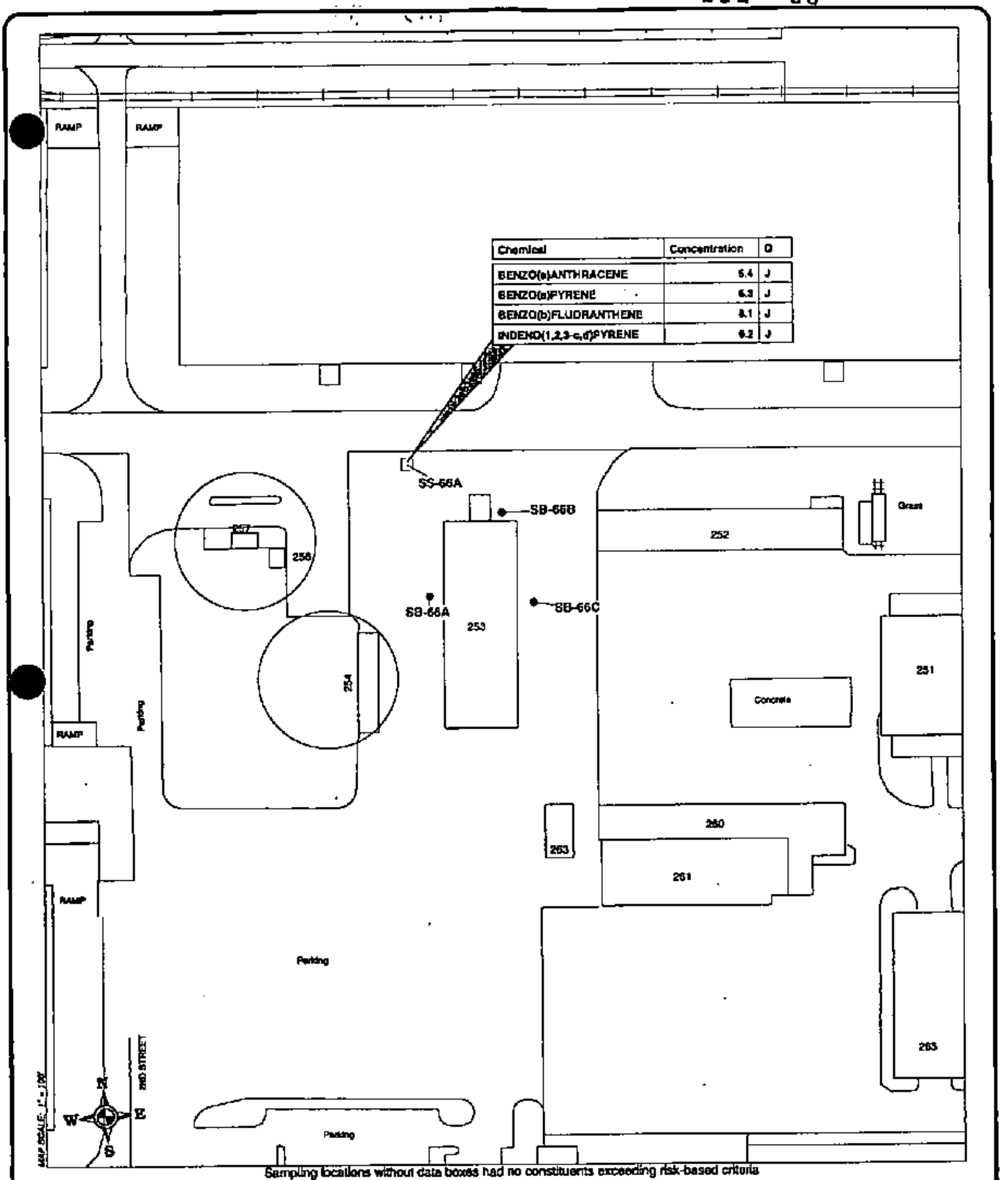
No previous investigations have been performed at this site.

2.2 Screening Site Sampling Program

2.2.1 Sampling Strategy

The sampling strategy was developed to evaluate whether releases have occurred to surface soils and subsurface soils. Three biased soil borings were used to evaluate whether potential contaminants exist at the site. Samples were collected at depths of zero to 12 inches and at approximately 5-foot, 10-foot, 20-foot, and 40-foot depths. A boring depth of 40 feet was selected because of releases that may have occurred from the UST located at the site. Extensive surface soil sampling was not conducted because the area mostly is covered by asphalt pavement.

At least one sample for each media was analyzed for target compound list/target analyte list (TCL/TAL) constituents in accordance with the *Screening Sites Field Sampling Plan* (CH2M HILL, 1995). Surface soil sample SS66A and subsurface soil sample SB66A (3- to 5-foot depth) were analyzed for TCL/TAL parameters at Screening Site 66. The following sections present the sampling procedures and laboratory analyses performed for surface and subsurface soils.



Sampling locations without data boxes had no constituents exceeding risk-based criteria

LEGEND

Surface Soil Sampling Location (mg/kg)

Soil Boring Sampling Location (mg/kg)

(Q) Qualifier Definitions

= - indicates unqualified detection

J - indicates estimated value above detection limit, but below reporting limit

Figure 1

Site 66, Petroleum, Oil, & Lubricants (POL) Bldg 253

Constituents Exceeding Risk-Based Criteria

Defense Distribution Depot Memphis, TN

CH2MHILL

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2.2.2 Sampling Procedures

Sections 2.2.2.1 and 2.2.2.2 describe the sampling procedures and laboratory analyses performed for surface soil and subsurface soil.

2.2.2.1 Surface Soil Sampling Procedures

Sample SS66A originally was located at a drainage outfall in the area north of Building 253 (CH2M HILL, 1995). Based on a visual inspection, no drainage outfall was located. To attain a sample representative of the motor pool activities, Sample SS66A was collected in the nearest stormwater drain northwest of Building 253 (shown in Figure 1). The sample was collected directly from the drain into the appropriate sample jars.

2.2.2.2 Subsurface Soil Sampling Procedures

With the approval of the Tennessee Department of Environment and Conservation (TDEC) and the United States Environmental Protection Agency (EPA), two background samples from Sample SB66D were collected at two depths below the asphalt surrounding the site: zero to 1 foot and 5 feet. Sample SB66D was taken 120 feet east of the eastern side of Building 253 and 35 feet south of the southern side of Building 252.

Three additional soil borings (SB66A, SB66B, and SB66C) had subsurface soil samples collected to evaluate potential contamination at the site. These samples were collected at depths of zero to 1 foot, 3 to 5 feet, and 8 to 10 feet. The following details the sample locations:

- Sample SB66A was located 55 feet south of the west-most northwestern corner of Building 253 and 10 feet west of the second door located on the west side of Building 253.
- Sample SB66B was located 8 feet east of the extended northeastern side of Building 253 and 6 feet north of the northern side of Building 253 that is not extended.
- Sample SB66C was taken 10 feet east of the eastern side of Building 253 starting at the third door from the north.

These samples were collected using a 2-inch-diameter, stainless-steel push sampler. Samples were collected at intervals of 18 to 20 feet and 38 to 40 feet using a 1-inch-diameter, stainless-steel push sampler. Volatile organic compound (VOC) soil samples were collected directly from the continuous sampler using stainless-steel spoons. Part of the VOC sample was placed into a sealable plastic bag and allowed to equilibrate. The head space in the plastic bag was measured for VOCs using a hand-held photoionization detector (PID), and the results were used to determine which interval within each boring was selected for Level 3 contaminant of potential concern (COPC) or TCL/TAL analyses. The remaining soil was placed into a stainless-steel bowl, mixed, and then transferred into the appropriate sample jars.

All sampling tools were decontaminated before being used at each sample location. Decontamination procedures were followed according to the *Generic Quality Assurance Project Plan* (CH2M HILL, 1995) for the RI/FS currently being conducted at DDMT.

2.2.3 Analytical Procedures

One surface and 19 subsurface soil samples were sent to CH2M HILL's Analytical Services in Montgomery, Alabama for VOC, semivolatile organic compound (SVOC), and TCL/TAL

analyses. Samples received at the laboratory were analyzed in accordance with the procedures outlined in the *Generic Quality Assurance Project Plan* (CH2M HILL, 1995).

A data quality evaluation (DQE) was performed to assess the effect of the overall analytical process on the usability of the data CH2M HILL collected in 1997. The DQE established that the detection of acetone and bis(2-ethylhexyl)phthalate can be attributed to field sampling and laboratory contamination rather than to environmental conditions at the site. Also, low concentrations of dioxins and furans can be attributed to background or instrument noise and are not indicative of environmental conditions. With the exception of the qualifications listed above, the DQE concluded that the data can be used in the project decision-making process.

3.0 Interpretation of Sampling Results

3.1 Presentation of Results

The following sections present results of the Screening Sites Sampling Program for Screening Site 66. The data are presented by media by comparing with the appropriate screening criteria in three summary tables: Tables 66-A, 66-B, and 66-C. Data from the 1997 CH2M HILL investigation are presented along with historical data from the *Remedial Investigations at DDMT, Final Report* (Law Environmental, 1990). If a value from a sampling location exceeds one of the comparison criteria, that value and the comparison criterion are shown in bold on the summary table.

COPCs are those parameters that exceed both background values and the screening criteria. Where concentrations exceed the selected background value, a comparison is made with the observed range of background values as reviewed and established by the BRAC Cleanup Team (BCT).

There are no COPCs identified for Screening Site 66 with the exception of polycyclic aromatic hydrocarbon (PAH) compounds in surface soil. The PAHs have been identified by the BCT as sitewide COPCs and will be evaluated on a sitewide basis.

3.1.1 Surface Soil

Results of the surface soil analyses with values above detection limits are shown in Tables 66-A and 66-B.

3.1.1.1 BCT Screening Criteria

Table 66-A summarizes constituents for which the BCT has selected a screening criteria. PAH compounds including benzo(a)anthracene, benzo(a)pyrene, benzo(b)perylene, and indeno(1,2,3-c,d)pyrene exceed both background and the BCT screening criteria (residential risk-based concentration [RBC] for soil ingestion) at one location, Sample SB66A. PAH compounds are found sitewide at DDMT in most part due to railroad operations.

3.1.1.2 Other Screening Criteria

Table 66-B compares the remaining constituents with the soil ingestion screening criteria for both residential and industrial exposure scenarios. There are no constituents that exceed background or screening criteria.

3.1.2 Subsurface Soils

Table 66-C summarizes subsurface soil sampling data. There are no constituents that exceed background and screening criteria. Lead was found at 10.5 milligrams per kilogram (mg/kg), which exceeds the groundwater protection criteria but is below the background value of 24 mg/kg.

3.2 Vertical and Lateral Extent

Three soil borings were sampled around Building 253 at biased locations with either physical staining or near main site operations, intending to detect any possible site contamination. Further sampling was not to occur if these worst case representative samples are free of site-related contamination. Of the three samples collected from north, east, and west side of the Building 253, only one sample had PAHs. Based in the limited data collected so far, there are no site-specific COPCs at Screening Site 66. Many of the other constituents that were found are at concentrations similar to background levels and below screening criteria.

PAH compounds are found in surface soil and will be addressed on a facilitywide basis as part of an upcoming risk evaluation.

3.3 Potential Migration Pathways

There are no significant migration pathways of concern for this site, due to lack of site-specific contamination.

3.4 Additional Data Needs

There are no additional data needs unless additional data are needed to support the risk evaluation for PAH compounds.

4.0 Interpretation of Screening Criteria Comparisons

4.1 Methodology

The Preliminary Risk Evaluation (PRE) was performed in accordance with the *Guidance on Preliminary Risk Evaluations for the Purpose of Reaching a Finding of Suitability to Lease (FOSL)* (EPA Region IV, 1994). A discussion of the PRE methodology is provided as Appendix A to this document.

4.2 Screening Site 66 Risk

Carcinogenic risks for Screening Site 66 are presented in Table 4-10 of the draft PRE (USAESC, 1998). Detailed chemical-specific estimates are presented in Appendix A of the PRE.

Carcinogenic risk ratios from individual chemicals within Sample SS66A are below a value of one-in-a-million for an industrial worker. However, the total risk from all of the chemicals

(mostly PAHs) is slightly above a one-in-a-million risk level for both a resident and an industrial worker.

The noncarcinogenic (systemic) toxicity ratio is below a value of 1.0.

The only COPCs are PAHs in one of the surface soils samples. There are no systemic toxicity concerns at this site. Therefore, No Further Action is recommended at this site.

5.0 Summary and Recommendations

5.1 Summary

There do not appear to be significant risks associated with Screening Site 66, and No Further Action is proposed. There are no additional data needs unless additional data are needed to support the risk evaluation for PAHs.

PAHs were found in surface soil at Screening Site 66. These constituents exist sitewide at DDMT and will be addressed in an upcoming risk evaluation. Based on an evaluation of the screening sites results, no further evaluation is needed at Screening Site 66.

5.2 Recommendations

No further assessment is proposed for Screening Site 66.

Screening Site 67–Installation Gas Station, Building 257

1.0 Introduction

The chart below presents the location and status information for this screening site.

Parcel	Building Number	RI/FS[1] OU	Site Number	CERCLA[2] Status
4	257	3	67	Screening

[1]RI/FS = Remedial Investigation/Feasibility Study
[2]CERCLA = Comprehensive Environmental Response, Compensation and Liability Act

Since 1942, fuel dispensing and storage have been ongoing at Screening Site 67. The original steel USTs were removed in 1984 (two tanks) and in 1989 (one tank) and were replaced with fiberglass tanks in 1985. All tanks stored gasoline (leaded and unleaded).

Building 257 is east of Building 359 at the intersection of G and 2nd Streets (Figure 2).

2.0 Study Area Investigation

2.1 Previous Investigations

According to the *Remedial Investigation at DDMT, Final Report* (Law Environmental, 1990), one surface soil sample (SS25) taken west of Building 257 indicated the presence of PAHs, dieldrin, and metals (see Table B-7 and Figure 4-17 in the *Screening Sites Field Sampling Plan*, CH2M HILL, September 1995).

These sample locations were chosen based on previous sampling results and fuel dispensing activities conducted at vehicle fueling areas and UST filling areas within the site.

2.2 Screening Site Sampling Program

2.2.1 Sampling Strategy

The sampling strategy was developed to evaluate whether releases have occurred to surface soils and subsurface soils. Two biased soil borings were used to evaluate whether potential contaminants exist at the site. Samples were collected at the surface (zero to 12 inches) and at 5-foot, 10-foot, 20-foot, and 40-foot depths (approximate). Two additional surface soil samples were collected; their locations were chosen based on fuel-dispensing activities conducted at the site (i.e., vehicle fueling areas, UST filling areas, and the past sample location that revealed the presence of contamination). A boring depth of 40 feet was selected because of possible releases from USTs present at the site.

Twelve samples (two borings, with five samples per boring and two surface soil samples) were collected and analyzed for PAH compounds. At least one sample for each media (Sample SS67B and SB67A at the 8- to 10-foot depth) was analyzed for TCL/TAL constituents in accordance with the *Screening Sites Field Sampling Plan* (CH2M HILL, 1995).

2.2.2 Sampling Procedures

Sections 2.2.2.1 and 2.2.2.2 describe the sampling procedures and laboratory analyses performed for surface and subsurface soil.

2.2.2.1 Surface Soil Sampling Procedures

With the approval of the TDEC and the EPA, two surface soil samples (SS67A and SS67B) were collected at this site (shown in Figure 2). Samples SS67A and SS67B were taken east of Building 359. Sample SS67A was taken 5 feet west of the aboveground storage tank (AST) dike and 12 feet south of the nearby curb. Sample SS67B was taken west of the drain located west of the ASTs.

The soil was removed from the ground using a standard stainless-steel hand auger. VOC samples were immediately collected from the top six inches of soil before being mixed. Part of the VOC sample was placed into a sealable plastic bag and allowed to equilibrate. The head space in the plastic bag was measured for VOCs using a hand-held PID, and the results were used to determine which sample location was selected for Level 3 COPCs or TCL/TAL analyses. Stainless-steel trowels were used to transfer the soil into a stainless-steel bowl for mixing. The soil was then placed into the appropriate sample jars. All sampling tools were decontaminated before being used at each sample location according to the procedures specified in the *Generic Quality Assurance Project Plan* (CH2M HILL, 1995), for the RI/FS currently being conducted at DDMT.

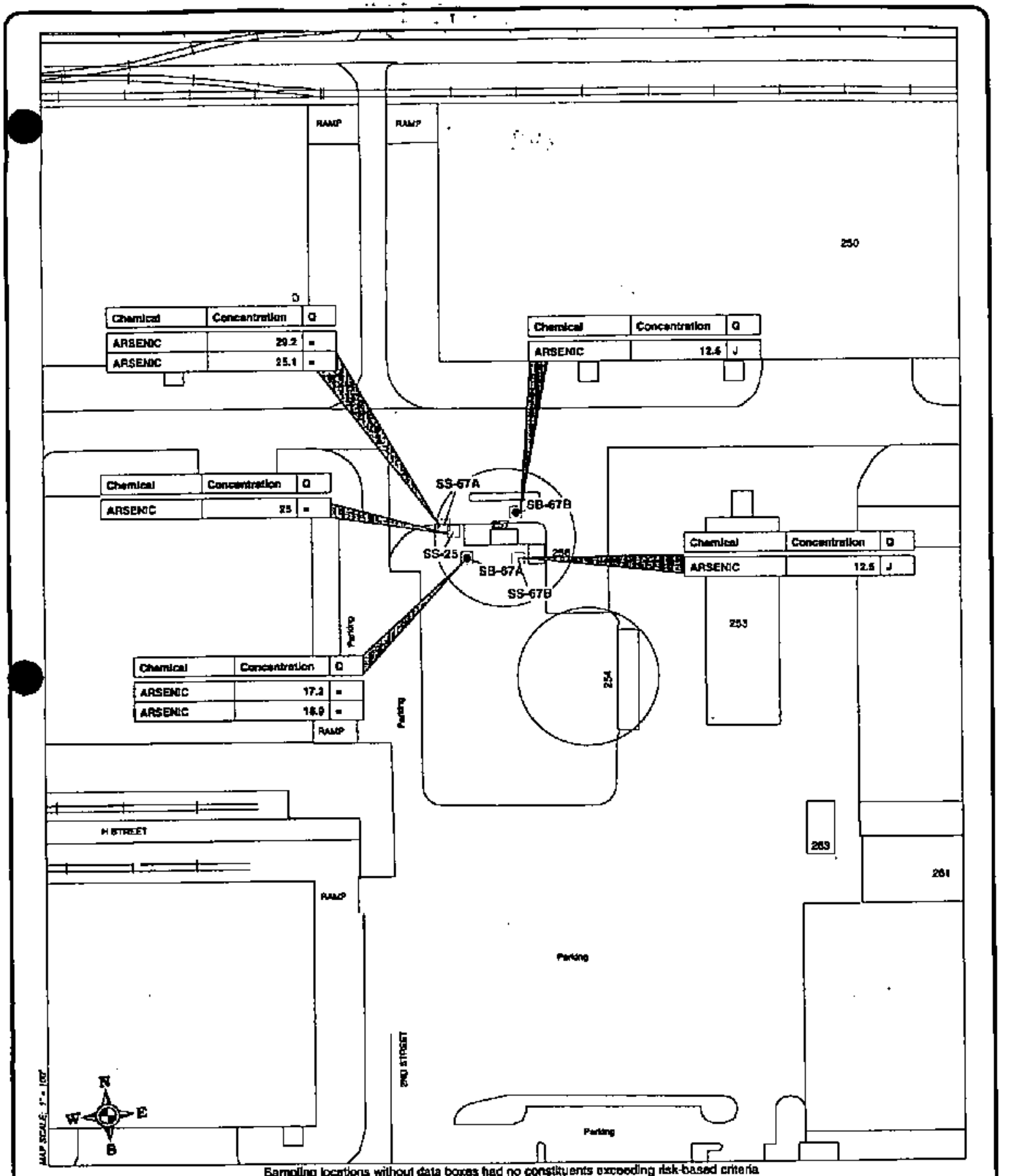
2.2.2.2 Subsurface Soil Sampling Procedures

With the approval of the TDEC and the EPA, two subsurface samples were collected (SB67A and SB67B). At both locations, samples were collected at three depths: zero to 1 foot, 3 to 5 feet, and 8 to 10 feet. The following describes the location of both samples:

- Sample SB67A was located in a grassy area southwest of Building 252 and 11 feet directly south of two oil tanks. The sample was taken 12 feet west of the eastern end of the oil tank containment and 22 feet east from the western end of the oil tank containment.
- Sample SB67B was located between the Station Building and the truck unloading island. The sample was taken 15 feet west and 4 feet south of the southeastern corner of the truck unloading island and 15 feet north of the Station Building.

The samples were taken using a 2-inch-diameter, stainless-steel push sampler. Samples were collected at intervals of 18 to 20 feet and 38 to 40 feet using a 1-inch-diameter, stainless-steel push sampler. VOC soil samples were collected directly from the continuous sampler using stainless-steel spoons. Part of the VOC sample was placed into a sealable plastic bag and allowed to equilibrate. The head space in the plastic bag was measured for VOCs using a hand-held PID, and the results were used to determine which interval within each boring was selected for Level 3 COPCs or TCL/TAL analyses. The remaining soil was placed into a stainless-steel bowl, mixed, and then transferred into the appropriate sample jars.

All sampling tools were decontaminated before being used at each sample location according to the procedures specified in the *Generic Quality Assurance Project Plan* (CH2M HILL, 1995).



Sampling locations without data boxes had no constituents exceeding risk-based criteria

LEGEND

Surface Soil Sampling Location (mg/kg)

Soil Boring Sampling Location (mg/kg)

(Q) Qualifier Definitions

= - Indicates unqualified detection

J - Indicates estimated value above detection limit, but below reporting limit

Figure 2
Site 67, Installation Gas Station, Bldg 257
Constituents Exceeding Risk-Based Criteria
Defense Distribution Depot Memphis, TN

CH2MHILL

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2.2.3 Analytical Procedures

Two surface and ten subsurface soil samples were sent to CH2M HILL's Analytical Services in Montgomery, Alabama for VOC, metal, and TCL/TAL analyses. Samples received at the laboratory were analyzed in accordance with the procedures outlined in the *Generic Quality Assurance Project Plan* (CH2M HILL, 1995).

A DQE was performed to assess the effect of the overall analytical process on the usability of the data CH2M HILL collected in 1997. The DQE established that the detection of acetone and bis(2-ethylhexyl)phthalate can be attributed to field sampling and laboratory contamination rather than to environmental conditions at the site. Also, low concentrations of dioxins and furans can be attributed to background or instrument noise and are not indicative of environmental conditions. With the exception of the qualifications listed above, the DQE concluded that data can be used in the project decision-making process.

3.0 Interpretation of Sampling Results

3.1 Presentation of Results

The following sections present the results of the Screening Sites Sampling Program for Screening Site 67. Data are presented by media for surface soil and subsurface soil. Data are compared with appropriate screening criteria in three summary tables: Tables 67-A, 67-B, and 67-C. Data from the 1997 CH2M HILL investigation are presented along with historical data from the *Remedial Investigations at DDMT, Final Report* (Law Environmental, 1990). If a value from a sampling location exceeds one of the comparison criteria, that value and the comparison criterion are shown in bold on the summary table.

COPCs are those parameters that exceed both background values and the screening criteria. Where concentrations exceed the selected background value, a comparison is made with the observed range of background values as reviewed and established by the BCT.

3.1.1 Surface Soil

Results of the surface soil analyses with values above detection limits are shown in Tables 67-A and 67-B.

3.1.1.1 BCT Screening Criteria

Table 67-A summarizes constituents for which the BCT has selected a screening criteria. Arsenic was found in Sample SS67A at a concentration of 29.2 mg/kg, which exceeds the background value of 20 mg/kg. All other detected constituents were at concentrations below the BCT criteria.

3.1.1.2 Other Screening Criteria

Table 67-B compares the remaining constituents with the soil ingestion screening criteria for both residential and industrial exposure scenarios. Dieldrin is the only remaining constituent that was found at concentrations exceeding the screening criteria. Dieldrin was found at a

concentration of 0.056 mg/kg in Sample SS67B, which exceeds the screening criteria of 0.04 mg/kg (residential RBC for soil ingestion) but is below the background level of 0.086 mg/kg. Dieldrin, found sitewide at DDMT, will be addressed in an upcoming risk evaluation.

3.1.2 Subsurface Soils

Table 67-C summarizes of subsurface soil sampling data. Benzene and total xylenes were found in Samples from SB67A (detailed below):

Boring	Depth (feet)	Benzene Concentration (mg/kg)	Total Xylenes (mg/kg)
SB67A	4 to 6	0.17	0.4
SB67A	8 to 10	0.39	0.22
SB67A	18 to 20	0.082	0.002
SB67A	38 to 40	ND	ND

These concentrations exceed the groundwater protection standards and are evidence of a possible release of gasoline at Site 67. Observed benzene concentrations in the subsurface soils exceed the GWP criterion of 0.03 mg/kg. However, the deepest sample from this soil boring is free of BTEX, indicating they have not migrated to groundwater. Lead was found at concentrations ranging between 4 to 19.3 mg/kg exceeds the groundwater protection criteria but is below the background value of 24 mg/kg.

3.2 Vertical and Lateral Extent

Because the Screening Site Sampling Program was designed only to show the presence or absence of contamination, a complete characterization of vertical and lateral extent could not be conducted.

Benzene and total xylenes were found in Sample SB67A at a 20-foot depth, which indicates that a gasoline release may have occurred in this area either from the tanks or fuel piping. The constituents were not reported in the 38- to 40-foot depth sample from Sample SB67A. These constituents were not found in surface soil samples or in samples from Sample SB67B.

Arsenic in Sample SS67A was reported at 25.1 and 29.2 mg/kg (duplicate analysis), which exceeds the background value. Arsenic was also detected at surface soil sampling station SS25 at 25 mg/kg by Law Environmental. Arsenic was found in every surface soil sample and in the background samples. The maximum value detected from sampling across all screening sites on the Main Installation was in Sample SS52B at 45.1 mg/kg. Arsenic concentrations for Sample SS67A are in the upper range (approximately the 95th percentile) of all screening site samples (157 samples). Arsenic is not present in subsurface soils at concentrations above screening criteria, and concentrations are similar to background.

Dieldrin was found at a concentration of 0.056 mg/kg in Sample SS67B, which exceeds the screening criteria of 0.04 mg/kg (residential RBC for soil ingestion). Dieldrin is found sitewide at DDMT and will be addressed in an upcoming risk evaluation.

3.3 Potential Migration Pathways

The following paragraphs provide a general discussion of the potential migration pathways for several constituents found at Screening Site 67.

Dieldrin exists at DDMT in surface and subsurface soils. Because this compound is only minutely soluble in water, its most likely potential migration pathway at this site is via erosion as suspended soil particles in the surface water, where it potentially would bioaccumulate in aquatic organisms, if it reaches pond or rivers with aquatic life. Dieldrin in the subsurface soils should be relatively immobile and should not affect groundwater quality.

Benzene was detected in subsurface soil at concentrations exceeding groundwater protection-based screening levels. Benzene is readily soluble in water and readily mobilized via infiltrating precipitation from subsurface soils and can be mobilized to the groundwater in significant amounts. The deepest sample from the soil boring (SB67A) did not indicate the presence of petroleum hydrocarbons. However, based on the location of the leak, BTEX could be reaching the area groundwater. Subsurface soils containing a significant mass of benzene may be significant secondary sources of large groundwater plumes.

If present as a nonaqueous phase liquid, benzene may migrate downward to the top of the water table even without infiltrating water to enhance the mobility. Benzene is volatile in addition to being readily soluble, and may migrate as a vapor through the vadose zone. In well-oxygenated groundwater systems, such as that at DDMT, benzene naturally will degrade through biological activity eventually. The distance to downgradient receptors is critical to assessing risk from benzene in this migration pathway.

3.4 Additional Data Needs

Additional data are needed to evaluate the extent of the potential gasoline release at Screening Site 67. Additional subsurface soil sampling with analyses of benzene, ethyl benzene, toluene, and total xylenes (BETX) is recommended. Groundwater monitoring downgradient from this site may be needed if constituents are found in soil samples at the 40-foot depth.

Potential risks associated with metals found at low concentrations, including arsenic, require further comparison of the background population with the site data. Available data are considered sufficient to perform this analysis, and additional data collection is not required.

4.0 Interpretation of Screening Criteria Comparisons

4.1 Methodology

The PRE was performed in accordance with the *Guidance on Preliminary Risk Evaluations for the Purpose of Reaching a Finding of Suitability to Lease (FOSL)* (EPA Region IV, 1994). A discussion of the PRE methodology is provided as Appendix A to this document.

4.2 Screening Site 67 Risk

Carcinogenic and noncarcinogenic risks for Screening Site 67 are presented in Table 4-11 of the draft PRE (USAESC, 1998). Detailed chemical-specific estimates are presented in Appendix A of the PRE.

Benzene and total xylene compounds found in subsurface soil samples from SB67A represent a potential threat to groundwater. These constituents were not found in surface soil, so there does not appear to be a direct exposure to workers at this site. However, the threat to groundwater requires further evaluation.

Carcinogenic chemicals identified at this site include arsenic, which exists at between 25 and 29.1 mg/kg compared to a background level of 20 mg/kg. The resulting risk ratio is a one-in-a-million level for a worker and a ten-in-a-million risk level for a resident.

The noncancer ratios from inorganic chemicals for this site are below a value of 1.0 for an industrial worker and slightly above 1.0 for a resident. No individual chemical exceeds the ratio of 1.0.

5.0 Summary and Recommendations

5.1 Summary

COPCs at Screening Site 67 include benzene and total xylenes in subsurface soils. These constituents indicate that a release of gasoline may have occurred at this site. The constituents were found in SB67A at depths up to 20 feet and were not found in the 40-foot sample or in surface soils or samples from SB67B.

Arsenic in Sample SS67A was reported at 25.1 and 29.2 mg/kg (duplicate analysis), which exceeds the background value. Arsenic was found in every surface soil sample and in the background samples. These concentrations represented a one-in-a-million level for a worker and a ten-in-a-million risk level for a resident.

Dieldrin was found at a concentration of 0.056 mg/kg in Sample SS67B, which exceeds the screening criteria of 0.04 mg/kg (residential RBC for soil ingestion). Dieldrin is found sitewide at DDMT and will be addressed in an upcoming risk evaluation.

5.2 Recommendations

Additional evaluation is needed at Site Screening 67 to characterize the extent of a potential gasoline release. Subsurface soil sampling is recommended. Groundwater monitoring also may be required.

Potential risks associated with arsenic require further comparison of the background population with the data collected.

Screening Site 68–POL Building 263

1.0 Introduction

The chart below presents the location and status information for this screening site.

Parcel	Building Number	RI/FS[1] OU	Site Number	CERCLA[2] Status
4	263	3	68	Screening

[1]RI/FS = Remedial Investigation/Feasibility Study
[2]CERCLA = Comprehensive Environmental Response, Compensation and Liability Act

Building 263, which is shown in Figure 3, has been used as an attendants' room for the dispensing of POL to vehicles since the 1940s. The site is located 500 feet southwest of Gate 1 and 900 feet north of the southern installation boundary. Building 263 measures approximately 20 feet by 40 feet and is surrounded on all sides by a large expanse of asphalt pavement.

The site historically has been used to store small containers of POLs. These materials are dispensed to the POL staff and are not used in the Building 263 area. Because materials were stored inside, the building is surrounded by asphalt pavement, and no releases are known to have occurred, there is little potential for contamination resulting from past practices at this site.

2.0 Study Area Investigation

2.1 Previous Investigations

No previous investigations have been performed specifically for this site.

2.2 Screening Site Sampling

2.2.1 Sampling Strategy

No surface soil samples were collected at this site because most of the surrounding area is paved. Subsurface soil samples were collected from two borings at depths of 5 to 6 feet and 9 to 10 feet.

2.2.2 Sampling Procedures

Sections 2.2.2.1 and 2.2.2.2 describe the sampling procedures and laboratory analyses performed for subsurface soil.

2.2.2.1 Surface Soil Sampling Procedures

No surface soil samples were collected at this site because most of the surrounding area is paved.

2.2.2.2 Subsurface Soil Sampling Procedures

With the approval of the TDEC and EPA, subsurface soil samples were collected from two locations (SB68A and SB68B) at this site (shown in Figure 3). Samples were collected at two depths at each location: 5 to 6 feet and 9 to 10 feet. Sample SB68A was located directly south of Building 263 off of the southeastern corner of the building. Sample SB68B was located 4 feet north and 14 feet west of the northeastern corner of Building 263. Samples were collected using a 2-inch-diameter, stainless-steel push sampler. Part of the sample was placed into a sealable plastic bag and allowed to equilibrate. The head space in the plastic bag was measured for VOCs using a hand-held PID. The remaining soil was placed into a stainless-steel bowl, mixed, and then transferred into the appropriate sample jars.

All sampling tools were decontaminated before being used at each sample location according to the procedures specified in the *Generic Quality Assurance Project Plan* (CH2MHILL, 1995), for the RI/FS currently being conducted at DDMT.

2.2.3 Analytical Procedures

Four subsurface soil samples were sent to CH2M HILL's Analytical Services in Montgomery, Alabama for PAH analyses. Samples received at the laboratory were analyzed in accordance with the procedures outlined in the *Generic Quality Assurance Project Plan* (CH2M HILL, 1995).

3.0 Interpretation of Sampling Results

3.1 Presentation of Results

There were no chemicals detected at Screening Site 68 above the background levels. Therefore no discussion of the extent of contamination or the migration pathways is applicable.

3.2 Vertical and Lateral Extent

There are no COPCs identified for Screening Site 68, and no further evaluation of vertical and lateral extent is needed.

3.3 Potential Migration Pathways

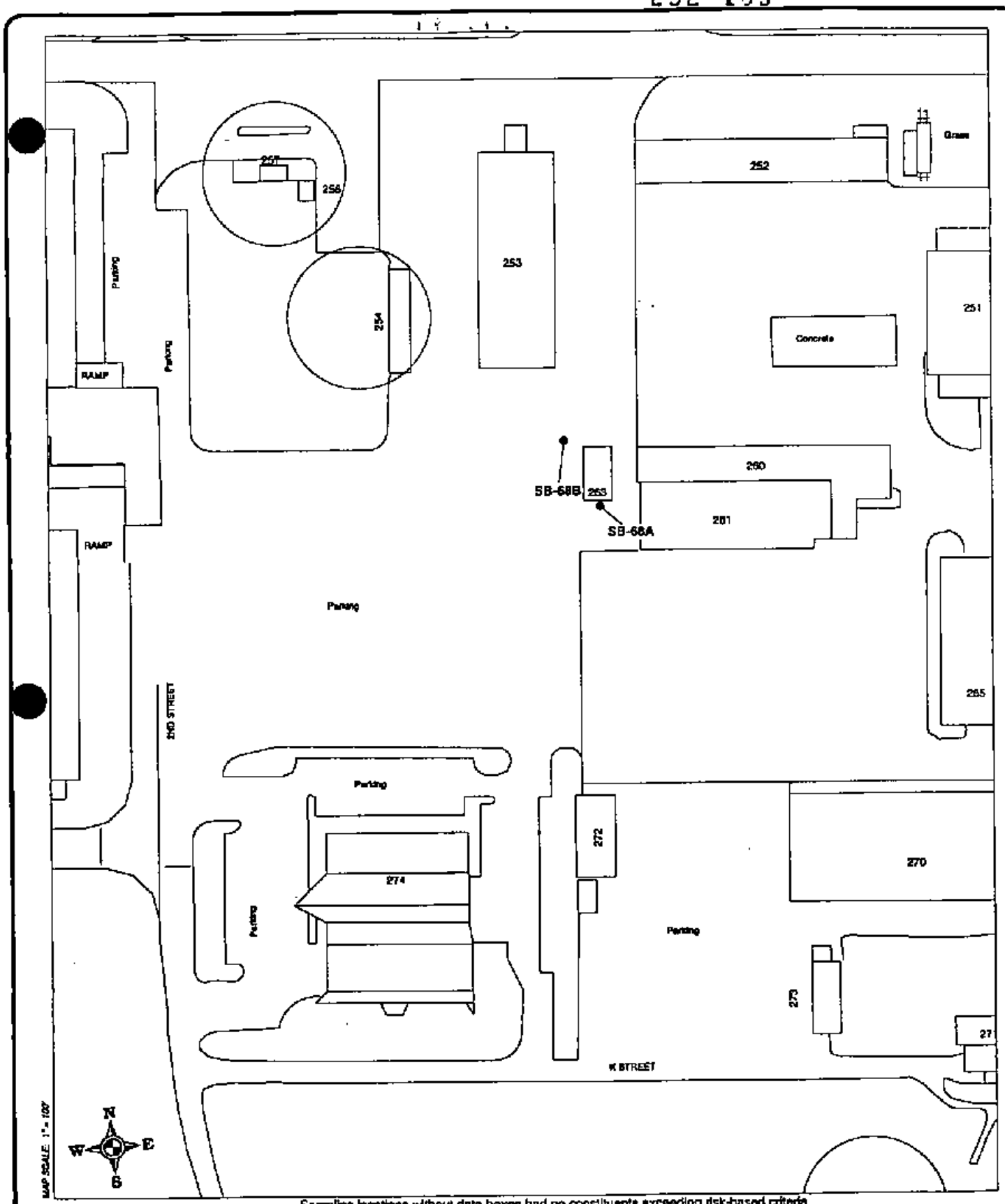
There are no COPCs identified for Screening Site 68, and no further evaluation of potential migration pathways is needed.

3.4 Additional Data Needs

There are no additional data needs for Screening Site 68.

4.0 Interpretation of Screening Criteria Comparisons

No surface soils were collected because most of the surrounding area is paved. No risks to human health from direct exposure are expected from this site.



Sampling locations without data boxes had no constituents exceeding risk-based criteria

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Soil Boring Sampling Location (mg/kg)

Figure 3
Site 68, POL Building 263
Constituents Exceeding Risk-Based Criteria
Defense Distribution Depot Memphis, TN

CH2MHILL

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5.0 Summary and Recommendations

Site is free any measurable contamination, and No Further Action is recommended for this site.

Table 66-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 66
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
CH2M HILL	ALUMINUM	SS66A	5120	=	24000	24000	Bkgd	MG/KG
CH2M HILL	ANTIMONY	SS66A	2.9	J	7	7	Bckg	MG/KG
CH2M HILL	ARSENIC	SS66A	3.6	J	20	20	Bckg	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	SS66A	5.4	J	.71	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(a)PYRENE	SS66A	6.3	J	.96	0.088	Residential RBC	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	SS66A	8.1	J	.78	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(g,h,i)PERYLENE	SS66A	6.8	J	.82	230	Residential RBC	MG/KG
CH2M HILL	BENZO(k)FLUORANTHENE	SS66A	7.4	J	.78	8.8	Residential RBC	MG/KG
CH2M HILL	BERYLLIUM	SS66A	0.23	J	1.1	1.1	Bckg	MG/KG
CH2M HILL	CARBAZOLE	SS66A	1.5	J	.067	32	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS66A	22.8	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHRYSENE	SS66A	9.2	J	.94	88	Residential RBC	MG/KG
CH2M HILL	FLUORANTHENE	SB66B	0.078	J	1.6	310	Residential RBC	MG/KG
CH2M HILL	FLUORANTHENE	SS66A	14	=	1.6	310	Residential RBC	MG/KG
CH2M HILL	INDENO(1,2,3-c,d)PYRENE	SS66A	6.2	J	.7	0.88	Residential RBC	MG/KG
CH2M HILL	IRON	SS66A	24700	=	37000	37000	Bckg	MG/KG
CH2M HILL	LEAD	SS66A	67.1	J	30	400	CERCLA	MG/KG
CH2M HILL	MANGANESE	SS66A	242	J	1300	1300	Bckg	MG/KG
CH2M HILL	PHENANTHRENE	SB66B	0.078	J	.61	2300	Residential RBC	MG/KG
CH2M HILL	PHENANTHRENE	SS66A	6	J	.61	2300	Residential RBC	MG/KG
CH2M HILL	PYRENE	SB66B	0.044	J	1.5	230	Residential RBC	MG/KG
CH2M HILL	PYRENE	SS66A	12	=	1.5	230	Residential RBC	MG/KG
CH2M HILL	ZINC	SS66A	541	J	130	23000	Residential RBC	MG/KG

Notes:
1. Detected values are obtained from the *Draft Parcel 4 Report-Screening Sites Sampling Program for Defense Depot* Memphis, TN, CH2M HILL, 1997.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. Based on values selected by the BRAC Cleanup Team in the August 1997 BCT meeting minutes, Memphis, Tennessee.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
J - indicates estimated value above the detection limit but below the reporting limit.
= - indicates unqualified detection
BCT - BRAC Cleanup Team

Table 66-B
Summary of Detected Compounds in Surface Soils
Compared to Non-BCT Screening Levels for Site 66
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	Risk-Based Concentrations Soil Ingestion[4]		Units
						Residential	Industrial	
CH2M HILL	BARIUM	SS66A	98.7	=	234	550	14000	MG/KG
CH2M HILL	CALCIUM	SS66A	33800	=	5840	NA	NA	MG/KG
CH2M HILL	CHLOROFORM	SB66A	0.005	J	NA	100	940	MG/KG
CH2M HILL	CHLOROFORM	SB66A	0.004	J	NA	100	940	MG/KG
CH2M HILL	COBALT	SS66A	17.1	=	18.3	470	12000	MG/KG
CH2M HILL	COPPER	SS66A	39.1	J	33	310	8200	MG/KG
CH2M HILL	DI-n-BUTYL PHTHALATE	SB66C	0.044	J	NA	780	20000	MG/KG
CH2M HILL	MAGNESIUM	SS66A	3630	=	4600	NA	NA	MG/KG
CH2M HILL	METHYL ETHYL KETONE (2-BUTANONE)	SS66A	0.016	J	.002	4700	100000	MG/KG
CH2M HILL	METHYL ISOBUTYL KETONE (4-METHYL-2-	SS66A	0.006	J	NA	NA	NA	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SB66A	0.004	J	NA	85	760	MG/KG
CH2M HILL	NICKEL	SS66A	16.2	=	30	160	4100	MG/KG
CH2M HILL	p,p'-DDD	SS66A	0.12	J	.0067	2.7	24	MG/KG
CH2M HILL	p,p'-DDE	SS66A	0.22	J	.16	1.9	17	MG/KG
CH2M HILL	p,p'-DDT	SS66A	0.57	J	.074	1.9	17	MG/KG
CH2M HILL	POTASSIUM	SS66A	401	J	1820	NA	NA	MG/KG
CH2M HILL	SODIUM	SS66A	152	J	NA	NA	NA	MG/KG
CH2M HILL	TETRACHLOROETHYLENE(PCE)	SS66A	0.004	J	NA	NA	NA	MG/KG
CH2M HILL	VANADIUM	SS66A	27.2	=	48.4	55	1400	MG/KG

Notes:
1. Detected values are obtained from the *Draft Parcel 4 Report-Screening Sites Sampling Program for Defense Depot Memphis, TN*, CH2M HILL, 1997.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. Risk-Based Concentrations are obtained from the *EPA Region III Risk-based Concentrations Table*, R.L. Smith, April, 1997.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
= - indicates unqualified detection.
J - indicates estimated value above the detection limit but below the reporting limit.

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Table 66-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 66
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	ACETONE	SB66C	18 to 20	0.004	J	NA	16	MG/KG
CH2M HILL	ACETONE	SB66C	38 to 40	0.006	J	NA	16	MG/KG
CH2M HILL	ALUMINUM	SB66A	3 to 5	11000	=	21829	NA	MG/KG
CH2M HILL	ARSENIC	SB66A	3 to 5	1.2	=	17	29	MG/KG
CH2M HILL	BARIUM	SB66A	3 to 5	154	=	300	1600	MG/KG
CH2M HILL	BERYLLIUM	SB66A	3 to 5	0.26	J	1.2	63	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB66B	18 to 20	0.047	J	NA	3600	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB66B	38 to 40	0.058	J	NA	3600	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB66B	8 to 10	0.046	J	NA	3600	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB66C	38 to 40	0.43	=	NA	3600	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB66C	8 to 10	5.3	=	NA	3600	MG/KG
CH2M HILL	CALCIUM	SB66A	3 to 5	1830	=	2400	NA	MG/KG
CH2M HILL	CARBON TETRACHLORIDE	SB66A	18 to 20	0.019	=	NA	.07	MG/KG
CH2M HILL	CARBON TETRACHLORIDE	SB66A	8 to 10	0.011	J	NA	.07	MG/KG
CH2M HILL	CHLOROFORM	SB66A	3 to 5	0.002	J	NA	.6	MG/KG
CH2M HILL	CHLOROFORM	SB66A	18 to 20	0.03	=	NA	.6	MG/KG
CH2M HILL	CHLOROFORM	SB66A	8 to 10	0.043	=	NA	.6	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB66A	3 to 5	14.3	=	26	38	MG/KG
CH2M HILL	COBALT	SB66A	3 to 5	5	J	20	NA	MG/KG
CH2M HILL	COPPER	SB66A	3 to 5	18.8	J	33	NA	MG/KG
CH2M HILL	DI-n-BUTYL PHTHALATE	SB66B	18 to 20	0.077	J	NA	2300	MG/KG
CH2M HILL	FLUORANTHENE	SB66A	3 to 5	0.061	J	.045	4300	MG/KG
CH2M HILL	IRON	SB66A	3 to 5	9190	J	38000	NA	MG/KG
CH2M HILL	LEAD	SB66A	3 to 5	10.5	=	24	1.5	MG/KG
CH2M HILL	MAGNESIUM	SB66A	3 to 5	2050	=	4900	NA	MG/KG
CH2M HILL	MANGANESE	SB66A	3 to 5	49.4	=	1500	NA	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SB66A	8 to 10	0.001	J	NA	.02	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SB66B	38 to 40	0.001	J	NA	.02	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SB66C	18 to 20	0.001	J	NA	.02	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SB66C	8 to 10	0.002	J	NA	.02	MG/KG

Table 66-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 66
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	NICKEL	SB66A	3 to 5	20.2	J	37	130	MG/KG
CH2M HILL	PHENANTHRENE	SB66A	3 to 5	0.052	J	NA	4300	MG/KG
CH2M HILL	POTASSIUM	SB66A	3 to 5	835	=	1800	NA	MG/KG
CH2M HILL	PYRENE	SB66A	3 to 5	0.066	J	.042	2800	MG/KG
CH2M HILL	VANADIUM	SB66A	3 to 5	16.5	=	51	6000	MG/KG
CH2M HILL	ZINC	SB66A	3 to 5	62.6	J	110	12000	MG/KG

Notes:
1. Detected values are obtained from the *Draft Parcel 4 Report-Screening Sites Sampling Program for Defense Depot Memphis, TN*, CH2M HILL, 1997.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. RBC-GWP values are obtained from the *EPA Region III Risk-based Concentrations Table*, R. L. Smith, April, 1997.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
= - indicates unqualified detection
J - indicates estimated value above the detection limit but below the reporting limit.
RBC-GWP - Risk-Based Concentrations - Groundwater Protection

Table 67-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 67
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
CH2M HILL	ALUMINUM	SS67B	12200	=	24000	24000	Bkgd	MG/KG
CH2M HILL	ARSENIC	SB67A	16.9	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SB67A	17.2	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SB67B	9.1	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SS67A	25.1	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SS67A	29.2	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SS67B	12.5	J	20	20	Bckg	MG/KG
CH2M HILL	BERYLLIUM	SB67B	0.35	J	1.1	1.1	Bckg	MG/KG
CH2M HILL	BERYLLIUM	SS67B	0.43	J	1.1	1.1	Bckg	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB67A	25.2	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB67A	22.3	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB67B	13	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS67A	27.7	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS67A	26	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS67B	15.7	J	24.8	39	Residential RBC	MG/KG
CH2M HILL	IRON	SS67B	20100	=	37000	37000	Bckg	MG/KG
CH2M HILL	LEAD	SB67A	20.5	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SB67A	19.2	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SB67B	11.9	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SS67A	38.4	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SS67A	48.5	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SS67B	51.9	=	30	400	CERCLA	MG/KG
CH2M HILL	MANGANESE	SS67B	601	=	1300	1300	Bckg	MG/KG
CH2M HILL	ZINC	SB67A	113	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SB67A	109	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SB67B	57.1	J	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SS67A	133	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SS67A	147	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SS67B	193	=	130	23000	Residential RBC	MG/KG
LAW	ANTIMONY	SS25	4	=	7	7	Bckg	MG/KG
LAW	ARSENIC	SS25	25	=	20	20	Bckg	MG/KG

Table 67-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 67
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
LAW	BENZO(a)ANTHRACENE	SS25	0.054	J	.71	0.88	Residential RBC	MG/KG
LAW	BENZO(a)PYRENE	SS25	0.053	J	.96	0.088	Residential RBC	MG/KG
LAW	BENZO(b)FLUORANTHENE	SS25	0.062	J	.78	0.88	Residential RBC	MG/KG
LAW	BENZO(g,h,i)PERYLENE	SS25	0.058	J	.82	230	Residential RBC	MG/KG
LAW	BENZO(k)FLUORANTHENE	SS25	0.093	J	.78	8.8	Residential RBC	MG/KG
LAW	CHROMIUM, TOTAL	SS25	14	=	24.8	39	Residential RBC	MG/KG
LAW	CHRYSENE	SS25	0.076	J	.94	88	Residential RBC	MG/KG
LAW	FLUORANTHENE	SS25	0.14	J	1.6	310	Residential RBC	MG/KG
LAW	INDENO(1,2,3-c,d)PYRENE	SS25	0.047	J	.7	0.88	Residential RBC	MG/KG
LAW	LEAD	SS25	16	=	30	400	CERCLA	MG/KG
LAW	PHENANTHRENE	SS25	0.076	J	.61	2300	Residential RBC	MG/KG
LAW	PYRENE	SS25	0.11	J	1.5	230	Residential RBC	MG/KG
LAW	ZINC	SS25	57.9	=	130	23000	Residential RBC	MG/KG

Notes:

1. Detected values are obtained from the *Draft Parcel 4 Report-Screening Sites Sampling Program for Defense Depot* Memphis, TN, CH2M HILL, 1997, and the *Remedial Investigation at DDMT Final Report*, Law Environmental, August 1990.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. Based on values selected by the BRAC Cleanup Team in the August 1997 BCT meeting minutes, Memphis, Tennessee.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
J - indicates estimated value above the detection limit but below the reporting limit.
= - indicates unqualified detection
BCT - BRAC Cleanup Team

Table 67-B
Summary of Detected Compounds in Surface Soils
Compared to Non-BCT Screening Levels for Site 67
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	Risk-Based Concentrations Soil Ingestion[4]		Units
						Residential	Industrial	
CH2M HILL	BARIUM	SS67B	163	=	234	550	14000	MG/KG
CH2M HILL	CADMIUM	SS67B	0.62	=	1.4	3.9	100	MG/KG
CH2M HILL	CALCIUM	SS67B	2100	=	5840	NA	NA	MG/KG
CH2M HILL	COBALT	SS67B	8.1	=	18.3	470	12000	MG/KG
CH2M HILL	COPPER	SB67A	33.1	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SB67A	33.7	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SB67B	17.6	J	33	310	8200	MG/KG
CH2M HILL	COPPER	SS67A	40.1	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SS67A	39.6	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SS67B	50.7	=	33	310	8200	MG/KG
CH2M HILL	DIELDRIN	SS67B	0.056	=	.086	.04	.36	MG/KG
CH2M HILL	MAGNESIUM	SS67B	2410	=	4600	NA	NA	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SS67A	0.005	J	NA	85	760	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SS67A	0.003	J	NA	85	760	MG/KG
CH2M HILL	NICKEL	SB67A	40	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SB67A	41.1	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SB67B	18.8	J	30	160	4100	MG/KG
CH2M HILL	NICKEL	SS67A	37.8	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SS67A	37.1	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SS67B	17.9	=	30	160	4100	MG/KG
CH2M HILL	p,p'-DDE	SS67B	0.01	J	.16	1.9	17	MG/KG
CH2M HILL	p,p'-DDT	SS67B	0.064	=	.074	1.9	17	MG/KG
CH2M HILL	POTASSIUM	SS67B	976	=	1820	NA	NA	MG/KG
CH2M HILL	VANADIUM	SS67B	26.8	J	48.4	55	1400	MG/KG
LAW	BARIUM	SS25	130	=	234	550	14000	MG/KG
LAW	bis(2-ETHYLHEXYL) PHTHALATE	SS25	0.51	=	NA	46	410	MG/KG
LAW	COPPER	SS25	20	=	33	310	8200	MG/KG
LAW	DIELDRIN	SS25	0.036	=	.086	.04	.36	MG/KG
LAW	MERCURY	SS25	0.03	=	.43	2.3	61	MG/KG
LAW	METHYLENE CHLORIDE	SS25	0.025	=	NA	85	760	MG/KG

Table 67-B
Summary of Detected Compounds in Surface Soils
Compared to Non-BCT Screening Levels for Site 67
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	Risk-Based Concentrations Soil Ingestion[4]		Units
						Residential	Industrial	
LAW	N-NITROSODIPHENYLAMINE	SS25	0.056	J	NA	130	1200	MG/KG
LAW	NICKEL	SS25	19	=	30	160	4100	MG/KG
LAW	Total Polynuclear Aromatic Hydrocarbons	SS25	0.769	=	NA	NA	NA	MG/KG

Notes:
1. Detected values are obtained from the *Draft Parcel 4 Report-Screening Sites Sampling Program for Defense Depot Memphis, TN*, CH2M HILL, 1997, and the *Remedial Investigation at DDMT Final Report*, Law Environmental, August 1990.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. Risk-Based Concentrations are obtained from the *EPA Region III Risk-based Concentrations Table*, R.L. Smith, April, 1997.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
= - indicates unqualified detection.
J - indicates estimated value above the detection limit but below the reporting limit.

Table 67-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 67
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	ACETONE	SB67A	38 to 40	0.044	=	NA	16	MG/KG
CH2M HILL	ACETONE	SB67B	3 to 5	0.004	J	NA	16	MG/KG
CH2M HILL	ACETONE	SB67B	38 to 40	0.005	J	NA	16	MG/KG
CH2M HILL	ALUMINUM	SB67A	8 to 10	12600	=	21829	NA	MG/KG
CH2M HILL	ARSENIC	SB67A	18 to 20	11.3	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB67A	38 to 40	6.5	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB67A	4 to 6	12.4	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB67A	8 to 10	4.2	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB67B	18 to 20	7.4	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB67B	3 to 5	13.1	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB67B	38 to 40	4.1	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB67B	8 to 10	17.3	=	17	29	MG/KG
CH2M HILL	BARIUM	SB67A	8 to 10	115	=	300	1600	MG/KG
CH2M HILL	BENZENE	SB67A	8 to 10	0.39	=	NA	.03	MG/KG
CH2M HILL	BENZENE	SB67A	18 to 20	0.082	=	NA	.03	MG/KG
CH2M HILL	BENZENE	SB67A	4 to 6	0.17	=	NA	.03	MG/KG
CH2M HILL	BERYLLIUM	SB67A	18 to 20	1.2	=	1.2	63	MG/KG
CH2M HILL	BERYLLIUM	SB67A	8 to 10	0.4	J	1.2	63	MG/KG
CH2M HILL	BERYLLIUM	SB67B	18 to 20	0.6	J	1.2	63	MG/KG
CH2M HILL	CALCIUM	SB67A	8 to 10	1530	=	2400	NA	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB67A	18 to 20	26.4	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB67A	38 to 40	11.3	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB67A	4 to 6	27.6	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB67A	8 to 10	13.7	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB67B	18 to 20	12.3	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB67B	3 to 5	26.7	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB67B	38 to 40	10.7	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB67B	8 to 10	27.4	=	26	38	MG/KG
CH2M HILL	COBALT	SB67A	8 to 10	6	J	20	NA	MG/KG
CH2M HILL	COPPER	SB67A	18 to 20	29.6	=	33	NA	MG/KG
CH2M HILL	COPPER	SB67A	38 to 40	6.9	=	33	NA	MG/KG

Table 67-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 67
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	COPPER	SB67A	4 to 6	29.2	=	33	NA	MG/KG
CH2M HILL	COPPER	SB67A	8 to 10	11.9	J	33	NA	MG/KG
CH2M HILL	COPPER	SB67B	18 to 20	16.3	J	33	NA	MG/KG
CH2M HILL	COPPER	SB67B	3 to 5	30.2	=	33	NA	MG/KG
CH2M HILL	COPPER	SB67B	38 to 40	5.3	=	33	NA	MG/KG
CH2M HILL	COPPER	SB67B	8 to 10	33.9	=	33	NA	MG/KG
CH2M HILL	ETHYLBENZENE	SB67A	8 to 10	0.099	=	NA	13	MG/KG
CH2M HILL	IRON	SB67A	8 to 10	13700	J	38000	NA	MG/KG
CH2M HILL	LEAD	SB67A	18 to 20	18.9	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB67A	38 to 40	4	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB67A	4 to 6	16.2	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB67A	8 to 10	7.8	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB67B	18 to 20	13.1	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB67B	3 to 5	19.1	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB67B	38 to 40	5.6	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB67B	8 to 10	19.3	=	24	1.5	MG/KG
CH2M HILL	MAGNESIUM	SB67A	8 to 10	2040	=	4900	NA	MG/KG
CH2M HILL	MANGANESE	SB67A	8 to 10	421	=	1500	NA	MG/KG
CH2M HILL	METHYL ETHYL KETONE (2-BUTANONE)	SB67A	8 to 10	0.016	J	NA	NA	MG/KG
CH2M HILL	METHYL ETHYL KETONE (2-BUTANONE)	SB67A	38 to 40	0.018	=	NA	NA	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SB67A	4 to 6	0.009	J	NA	.02	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SB67B	3 to 5	0.002	J	NA	.02	MG/KG
CH2M HILL	NICKEL	SB67A	18 to 20	31.2	=	37	130	MG/KG
CH2M HILL	NICKEL	SB67A	38 to 40	5	=	37	130	MG/KG
CH2M HILL	NICKEL	SB67A	4 to 6	35.7	=	37	130	MG/KG
CH2M HILL	NICKEL	SB67A	8 to 10	14.2	J	37	130	MG/KG
CH2M HILL	NICKEL	SB67B	18 to 20	13	J	37	130	MG/KG
CH2M HILL	NICKEL	SB67B	3 to 5	35.4	=	37	130	MG/KG
CH2M HILL	NICKEL	SB67B	8 to 10	41.7	=	37	130	MG/KG
CH2M HILL	POTASSIUM	SB67A	8 to 10	663	=	1800	NA	MG/KG
CH2M HILL	Total Xylenes	SB67A	8 to 10	0.22	=	.002	190	MG/KG

Table 67-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 67
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	Total Xylenes	SB67A	18 to 20	0.002	J	.002	190	MG/KG
CH2M HILL	Total Xylenes	SB67A	4 to 6	0.4	=	.002	190	MG/KG
CH2M HILL	VANADIUM	SB67A	8 to 10	26.3	=	51	6000	MG/KG
CH2M HILL	ZINC	SB67A	18 to 20	79.2	=	110	12000	MG/KG
CH2M HILL	ZINC	SB67A	38 to 40	13.6	=	110	12000	MG/KG
CH2M HILL	ZINC	SB67A	4 to 6	96.5	=	110	12000	MG/KG
CH2M HILL	ZINC	SB67A	8 to 10	35.9	J	110	12000	MG/KG
CH2M HILL	ZINC	SB67B	18 to 20	34.7	J	110	12000	MG/KG
CH2M HILL	ZINC	SB67B	3 to 5	86.8	=	110	12000	MG/KG
CH2M HILL	ZINC	SB67B	38 to 40	18.1	=	110	12000	MG/KG
CH2M HILL	ZINC	SB67B	8 to 10	112	=	110	12000	MG/KG

Notes:
1. Detected values are obtained from the *Draft Parcel 4 Report-Screening Sites Sampling Program for Defense Depot Memphis, TN*, CH2M HILL, 1997.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. RBC-GWP values are obtained from the *EPA Region III Risk-based Concentrations Table*, R. L. Smith, April, 1997.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
= - indicates unqualified detection
J - indicates estimated value above the detection limit but below the reporting limit.
RBC-GWP - Risk-Based Concentrations - Groundwater Protection

TAB

Parcel 7

Parcel 7

Screening Sites Sampling Program

for

Defense Distribution Depot Memphis, Tennessee

March 1998

Prepared for

U.S. Army Engineering and Support Center, Huntsville

Prepared by

CH2M HILL

2567 Fairlane Drive

Montgomery, Alabama 36116

137449.RR.ZZ

Parcel 7
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Parcel 7 is a 1,325-square-foot (ft^2) parcel in the east-central part of the Main Installation in Operable Unit (OU)-3 (shown in Figure 1). Parcel 7 consists of Building 249 and the associated railroad tracks.

The screening sites in this document have been identified by the Defense Distribution Depot Memphis, Tennessee (DDMT), through a review of existing documents, interviews with facility personnel, and knowledge of the facility's operations. Screening sites are locations at DDMT where there is a potential for materials to have been released to the environment from past operations. One screening site is in Parcel 7:

- Screening Site 65 – XXCC-3, Building 249

Sites where there is a confirmed presence of contaminants from past operations are addressed in the Remedial Investigation Sampling Program. Other facilities have been addressed in the Base Realignment and Closure (BRAC) Sampling Program. Results of these programs are addressed in separate reports.

The purpose of the Screening Sites Sampling Program is to identify whether past activities at each of the sites have resulted in releases from the site that would require further investigation. The intent is not to fully delineate the nature and extent of soil or groundwater contamination attributable to past operations, but to conduct technically based screening analyses sufficient to identify the likelihood of contamination.

The purpose of this letter report is to evaluate the results of the Screening Sites Sampling Program and the sampling from previous investigations and to recommend No Further Action or further investigation at screening sites in this parcel. The remainder of this document presents the results of past investigations; Screening Sites Sampling Program strategy, procedures, and results; and recommendations for each site.

Surface soils, subsurface soils, surface water, and sediments were investigated as part of the Screening Sites Sampling Program. Surface soil samples (any sample whose lowest depth is two feet or less) were taken both as independent samples and as the upper interval of a soil boring profile. Thus, surface soil samples taken as part of a soil boring may have an "SB" designation and are initially discussed under Subsurface Soil Sampling Procedure (Section 2.2.2.2). However, the results from that upper interval are presented in the surface soils tables and discussions in Section 3.0.

GSI SSS

Screening Site 65–XXCC-3, Building 249

1.0 Introduction

The chart below presents the location and status information for this screening site.

Parcel	Building Number	RI/FS[1] OU	Site Number	CERCLA[2] Status
7	249	3	65	Screening

[1]RI/FS = Remedial Investigation/Feasibility Study
[2]CERCLA = Comprehensive Environmental Response, Compensation and Liability Act

Building 249, situated between 1st and 2nd Streets and between E and F Streets (shown in Figure 1), was formerly used to store clothing treated with impregnite, a chemical used as a preventive to the effects of chemical warfare agents on skin. The impregnite (XXCC-3) was produced by mixing CC-2, a chemical produced by E. I. du Pont Nemours during the 1940s and 1950s, with zinc oxide (ZnO). CC-2 is an unstable organic compound that is difficult to measure analytically because of its instability. By virtue of this unstable nature, this compound may not remain in the environmental media at measurable levels. No known releases have occurred at this site.

2.0 Study Area Investigation

2.1 Previous Investigations

There have been no previous investigations performed specifically for this site.

2.2 Screening Site Sampling Program

2.2.1 Sampling Strategy

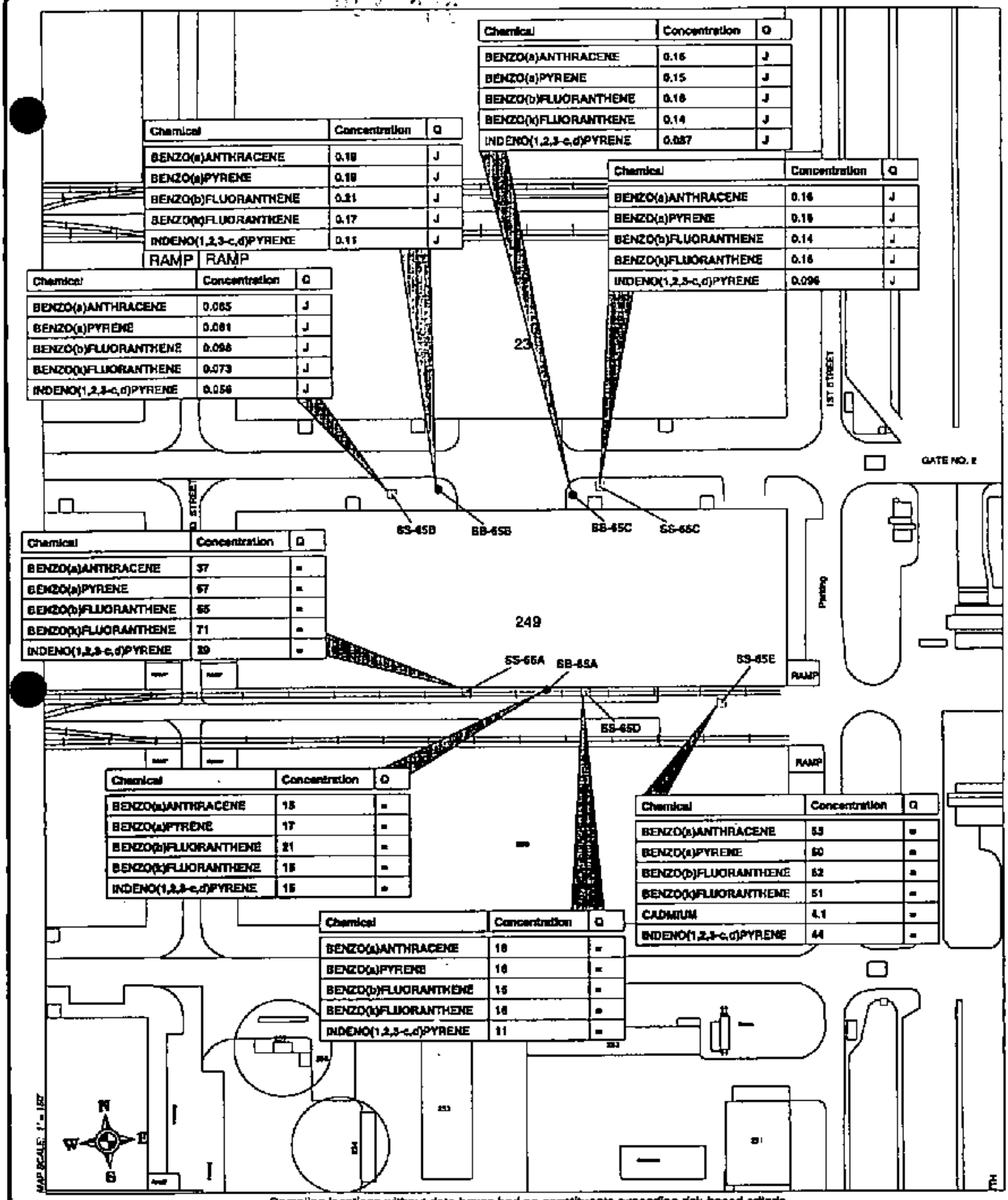
The sampling strategy was developed to evaluate whether releases have occurred to surface soils and subsurface soils. Three biased location soil borings were used to evaluate whether potential contaminants exist at the site. Samples were collected at the surface (zero to 12 inches) and at 5- and 10-foot depths (approximate). Five additional surface soil samples were collected. A boring depth of 10 feet was selected because shallow soil contamination is probable due to possible surface spills during loading and unloading operations.

2.2.2 Sampling Procedures

Sections 2.2.2.1 and 2.2.2.2 describe the sampling procedures and laboratory analyses conducted for surface and subsurface soil.

2.2.2.1 Surface Soil Sampling Procedures

With the approval of the Tennessee Department of Environment and Conservation (TDEC) and the U.S. Environmental Protection Agency (EPA), surface soil samples were collected from eight locations (SS65A, SS65B, SS65C, SS65D, SS65E, SB65A, SB65B, and SB65C) at this site



Sampling locations without data boxes had no constituents exceeding risk-based criteria

LEGEND

- Surface Soil Sampling Location (mg/kg)
- Soil Boring Sampling Location (mg/kg)

(Q) Qualifier Definitions
= - Indicates unqualified detection
J - Indicates estimated value above detection limit, but below reporting limit

Figure 1
Site 65, XXCC-3, Building 249
Constituents Exceeding Risk-Based Criteria
Defense Distribution Depot Memphis, TN

CH2MHILL

SITEILWOR

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(shown in Figure 1). The sample locations were selected near doorways because the stored material was loaded and unloaded in these areas. The following details the sample locations:

- Samples SS65B and SS65C were taken in a grassy area 27 feet north of Building 249. Sample SS65C was taken 27 feet east of a red water valve and 27 feet west of a green fire hydrant. Sample SS65B was taken 10 feet east of the same green fire hydrant.
- Samples SS65A and SS65D were taken south of Building 249. Sample SS65A was taken south of Bay Door 8, and Sample SS65D was taken south of Bay Doors 7 and 6A. Moreover, both samples were taken 2 feet south of the dock edge, and the samples are located just north of the nearby railroad track.
- Sample SS65E was taken 3 feet south of the railroad track and 6 feet west of the pavement extending south of the railroad track located south of Bay Door 3 and the dock edge.

The locations of the surface soil samples associated with borings are addressed in Section 2.2.2.2.

The soil was removed from the ground using a standard stainless-steel hand auger. Volatile organic compound (VOC) samples were immediately collected from the top six inches of soil before being mixed. Part of the VOC sample was placed into a sealable plastic bag and allowed to equilibrate. The head space in the sealable plastic bag was measured for VOCs using a hand-held photoionization detector (PID), and the results were used to determine which sample location was selected for Level 3 contaminant of potential concern (COPC) or target compound list/target analyte list (TCL/TAL) analyses. The soil was transferred to a stainless-steel bowl using stainless-steel trowels, mixed, and then placed into the appropriate sample jars.

All sampling tools were decontaminated before being used at each sample location according to the procedures specified in the *Generic Quality Assurance Project Plan* (CH2M HILL, 1995), for the RI/FS currently being conducted at DDMT.

2.2.2.2 Subsurface Soil Sampling Procedure

With the approval of the TDEC and the EPA, subsurface soil samples were taken from three locations (SB65A, SB65B, and SB65C) at this site. At each location, samples were taken at three depths: 0 to 2 feet, 4 to 6 feet, and 8 to 10 feet. The sample locations were selected near doorways because the stored material was loaded and unloaded in these areas. The following describes the locations of the samples:

- Sample SB65A was located south of Building 249, directly south of the sixth loading door of Building 249 starting from the west end of the building. The sample was taken 2 feet south of the loading dock and 2 feet north of the railroad track south of Building 249.
- Samples SB65B and SB65C were located north of Building 249. Boring SB65B was located 11 feet west of the drive, 19 feet north of Building 249, and 13 feet south of E Street.
- Boring SB65C was located 11 feet east of the drive and 14 feet south of E Street.

Samples were collected using a 2-inch-diameter, stainless-steel push sampler. VOC soil samples were collected directly from the continuous sampler using stainless-steel spoons. Part of the VOC sample was placed into a sealable plastic bag and allowed to equilibrate. The head space in the plastic bag was measured for VOCs using a hand-held PID, and the results were used to determine which interval within each boring was selected for Level 3 COPC or TCL/TAL

analyses. The remaining soil was placed into a stainless-steel bowl, mixed, and then transferred into the appropriate sample jars.

All sampling tools were decontaminated before being used at each sample location according to the procedures specified in the *Generic Quality Assurance Project Plan* (CH2M HILL, 1995).

2.2.3 Analytical Procedures

Five surface soil samples and nine soil samples from the borings were sent to CH2M HILL's Analytical Services in Montgomery, Alabama for semivolatile organic compound (SVOC), zinc, and TCL/TAL analyses. Samples received at the laboratory were analyzed in accordance with the procedures outlined in the *Generic Quality Assurance Project Plan* (CH2M HILL, 1995).

A data quality evaluation (DQE) was performed to assess the effect of the overall analytical process on the usability of the data. The DQE established that the detection of acetone and bis(2-ethylhexyl)phthalate can be attributed to field sampling and laboratory contamination rather than environmental conditions at the site. Also, low concentrations of dioxins and furans can be attributed to background or instrument noise and are not indicative of environmental conditions. With exception to the qualifications listed above, the DQE concluded that data can be used in the project decision-making process.

3.0 Sampling Results

3.1 Presentation of Results

Sections 3.1.1 through 3.1.4 present results of the Screening Sites Sampling Program for Site 65. Data are presented by media for surface soil and subsurface soil. Data are compared with appropriate screening criteria in three summary tables: Tables 65-A, 65-B, and 65-C. Data from the 1997 CH2M HILL investigation are presented along with historical data from the *Remedial Investigations at DDMT, Final Report* (Law Environmental, August 1990). If a value from a sampling location exceeds one of the comparison criteria, that value and the comparison criterion are shown in **bold** on the summary table.

COPCs are parameters that exceed both background values and the screening criteria. Where concentrations exceed the selected background value, the concentration is compared with the observed range of background values as reviewed and established by the BRAC Cleanup Team (BCT).

3.1.1 Surface Soil

Results of the surface soil analyses with values above detection limits are shown in Tables 65-A and 65-B.

3.1.1.1 BCT Screening Criteria

Table 65-A summarizes constituents for which the BRAC Cleanup Team (BCT) has selected a screening criteria. Polycyclic aromatic hydrocarbon (PAH) compounds, including benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluroanthene, and indo(1,2,3,c,d)pyrene, were found at concentrations exceeding the screening criteria. Some of the observed PAHs are high in samples collected south of the building, adjacent to the railroad

tracks. These PAH compounds appear to exist because of railroad operations and will be addressed in an upcoming evaluation.

3.1.1.2 Other Screening Criteria

Table 65-B compares the remaining constituents with the soil ingestion screening criteria for both residential and industrial exposure scenarios. Cadmium, dichlorodiphenyldichloroethylene (DDE), and dichlorodiphenyltrichloroethane (DDT) were found in Sample SS65E at concentrations exceeding the background values and the residential risk-based concentration (RBC) for soil ingestion. These constituents did not exceed the industrial RBC.

3.1.2 Subsurface Soils

Table 65-C summarizes subsurface soil sampling data. There were no results that exceeded the background value or the groundwater protection criteria for this site.

3.2 Vertical and Lateral Extent

Five surface soil and three soil boring locations were sampled in the north and south of the Building 249. PAHs were detected at high concentrations in samples collected from the railroad tracks.

Elevated PAH concentrations found in surface soil at Screening Site 65 are also found sitewide, although at lower concentrations, at DDMT and are attributed to railroad operations. Sample locations on the southern side of Building 249 (where the railroad tracks are located) had PAHs ranging between 10 to 65 milligrams per kilogram (mg/kg). Sample locations on the northern side of Building 249 away from the railroad tracks typically were below the screening criteria except for benzo(a)pyrene, which was found at concentrations less than 0.2 mg/kg. PAH compounds did not exceed the groundwater protection criteria in the subsurface soil samples.

DDE and DDT are found in surface soil sitewide at DDMT because of historical pesticide application; as a result, they will be addressed in an upcoming risk evaluation.

3.3 Potential Migration Pathways

The following paragraphs provide a general discussion of potential migration pathways for several constituents found at Screening Site 65.

Bbenzo(a)anthracene, benzo(a)pyrene, benzo(k)fluoranthene, benzo(b)fluoranthene, and indeno(1,2,3-c,d)pyrene, a group of related long-chain PAHs, has similar chemical and physical characteristics and tends to migrate and behave similarly in the environment. Generally, these compounds have low vapor pressures, are only marginally soluble in water, and have a high affinity for soils. All of these compounds have been detected at concentrations above screening values for surface soils at DDMT. Migration through runoff to surface water bodies is not a significant pathway at this site because there are no drainage features or surface water bodies within or near the site.

DDT and two of its degradation breakdown products, DDD and DDE, exist in surface soils at DDMT and should not be mobile in this environment. These compounds have an extremely high affinity for soil and essentially are insoluble in water. DDT also was reported in sediments at three sites on DDMT, indicating that migration via this pathway has occurred from surface

soil at DDMT. These compounds can bioaccumulate and become more concentrated as they move up in the food chain, and potentially could affect receptors via this migration pathway.

3.4 Additional Data Needs

Further risk evaluation is recommended to evaluate PAHs and pesticides in surface soil. Sufficient data are available for sitewide surface soils at DDMT for this evaluation, and additional sampling should not be required.

4.0 Interpretation of Screening Criteria Comparisons

4.1 Methodology

The Preliminary Risk Evaluation (PRE) was performed in accordance with the *Guidance on Preliminary Risk Evaluations for the Purpose of Reaching a Finding of Suitability to Lease (FOSL)* (EPA Region IV, 1994). A discussion of the PRE methodology is provided as Appendix A to this document.

4.2 Screening Site 65 Risk

Carcinogenic and noncarcinogenic risks for Screening Site 65 are presented in Table 4-17 of the draft PRE (USAESC, 1998). Detailed chemical-specific estimates are presented in Appendix A of the PRE.

The PRE carcinogenic risk ratios for an industrial worker are 400 in one million, and the residential risk ratios are 2,000 in one million, which are both above a risk level of one in a million. The risks primarily are due to PAHs in several surface soil samples collected from the railroad tracks adjacent to this site.

The noncarcinogenic ratios were below a value 1.0 for a worker, and are 4.0 for a residential receptor, primarily from PAHs.

In summary, PAHs are elevated at this site, possibly from the railroad tracks. Further risk evaluation is necessary at Screening Site 65.

5.0 Summary and Recommendations

5.1 Summary

PAH concentrations found in surface soil at Screening Site 65 are found sitewide at DDMT and possibly are due to railroad operations. Sample locations on the southern side of Building 249 (where the railroad tracks are located) are typically in the 10 to 65 mg/kg range for PAH compounds. Sample locations on the northern side of Building 249 typically were below the screening criteria except for benzo(a)pyrene, which was found at concentrations less than 0.2 mg/kg.

Cadmium, DDE, and DDT were found in Sample SS65E at concentrations exceeding the background values and the residential RBC for soil ingestion. These constituents did not exceed the industrial RBC. DDE and DDT are found sitewide at DDMT and will be addressed in an upcoming risk evaluation.

5.2 Recommendations

Because of the risks associated with PAHs in surface soils near the railroad tracks, a further risk evaluation is recommended. DDE and DDT will be addressed as part of an upcoming sitewide risk evaluation.

Table 65-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 65
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
CH2M HILL	ACENAPHTHENE	SB65A	1.1	J	NA	470	Residential RBC	MG/KG
CH2M HILL	ACENAPHTHENE	SS65D	1.1	J	NA	470	Residential RBC	MG/KG
CH2M HILL	ACENAPHTHENE	SS65E	5.7	=	NA	470	Residential RBC	MG/KG
CH2M HILL	ALUMINUM	SS65E	3950	=	24000	24000	Bkgd	MG/KG
CH2M HILL	ANTHRACENE	SB65A	2.8	J	.096	2300	Residential RBC	MG/KG
CH2M HILL	ANTHRACENE	SB65B	0.048	J	.096	2300	Residential RBC	MG/KG
CH2M HILL	ANTHRACENE	SS65A	3.5	J	.096	2300	Residential RBC	MG/KG
CH2M HILL	ANTHRACENE	SS65C	0.051	J	.096	2300	Residential RBC	MG/KG
CH2M HILL	ANTHRACENE	SS65D	2.9	J	.096	2300	Residential RBC	MG/KG
CH2M HILL	ANTHRACENE	SS65E	12	=	.096	2300	Residential RBC	MG/KG
CH2M HILL	ARSENIC	SS65E	4	J	20	20	Bckg	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	SB65A	15	=	.71	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	SB65B	0.19	J	.71	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	SB65C	0.16	J	.71	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	SS65A	37	=	.71	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	SS65B	0.085	J	.71	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	SS65C	0.16	J	.71	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	SS65D	16	=	.71	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	SS65E	55	=	.71	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(a)PYRENE	SB65A	17	=	.96	0.088	Residential RBC	MG/KG
CH2M HILL	BENZO(a)PYRENE	SB65B	0.19	J	.96	0.088	Residential RBC	MG/KG
CH2M HILL	BENZO(a)PYRENE	SB65C	0.15	J	.96	0.088	Residential RBC	MG/KG
CH2M HILL	BENZO(a)PYRENE	SS65A	67	=	.96	0.088	Residential RBC	MG/KG
CH2M HILL	BENZO(a)PYRENE	SS65B	0.081	J	.96	0.088	Residential RBC	MG/KG
CH2M HILL	BENZO(a)PYRENE	SS65C	0.16	J	.96	0.088	Residential RBC	MG/KG
CH2M HILL	BENZO(a)PYRENE	SS65D	16	=	.96	0.088	Residential RBC	MG/KG
CH2M HILL	BENZO(a)PYRENE	SS65E	60	=	.96	0.088	Residential RBC	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	SB65A	21	=	.78	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	SB65B	0.21	J	.78	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	SB65C	0.16	J	.78	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	SS65A	65	=	.78	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	SS65B	0.098	J	.78	0.88	Residential RBC	MG/KG

Table 65-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 65
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
CH2M HILL	BENZO(b)FLUORANTHENE	SS65C	0.14	J	.78	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	SS65D	15	=	.78	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	SS65E	62	=	.78	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(g,h,i)PERYLENE	SB65A	16	=	.82	230	Residential RBC	MG/KG
CH2M HILL	BENZO(g,h,i)PERYLENE	SB65B	0.12	J	.82	230	Residential RBC	MG/KG
CH2M HILL	BENZO(g,h,i)PERYLENE	SB65C	0.098	J	.82	230	Residential RBC	MG/KG
CH2M HILL	BENZO(g,h,i)PERYLENE	SS65A	42	=	.82	230	Residential RBC	MG/KG
CH2M HILL	BENZO(g,h,i)PERYLENE	SS65B	0.062	J	.82	230	Residential RBC	MG/KG
CH2M HILL	BENZO(g,h,i)PERYLENE	SS65C	0.11	J	.82	230	Residential RBC	MG/KG
CH2M HILL	BENZO(g,h,i)PERYLENE	SS65D	12	=	.82	230	Residential RBC	MG/KG
CH2M HILL	BENZO(g,h,i)PERYLENE	SS65E	48	=	.82	230	Residential RBC	MG/KG
CH2M HILL	BENZO(k)FLUORANTHENE	SB65A	15	=	.78	8.8	Residential RBC	MG/KG
CH2M HILL	BENZO(k)FLUORANTHENE	SB65B	0.17	J	.78	8.8	Residential RBC	MG/KG
CH2M HILL	BENZO(k)FLUORANTHENE	SB65C	0.14	J	.78	8.8	Residential RBC	MG/KG
CH2M HILL	BENZO(k)FLUORANTHENE	SS65A	71	=	.78	8.8	Residential RBC	MG/KG
CH2M HILL	BENZO(k)FLUORANTHENE	SS65B	0.073	J	.78	8.8	Residential RBC	MG/KG
CH2M HILL	BENZO(k)FLUORANTHENE	SS65C	0.16	J	.78	8.8	Residential RBC	MG/KG
CH2M HILL	BENZO(k)FLUORANTHENE	SS65D	16	=	.78	8.8	Residential RBC	MG/KG
CH2M HILL	BENZO(k)FLUORANTHENE	SS65E	51	=	.78	8.8	Residential RBC	MG/KG
CH2M HILL	BERYLLIUM	SS65E	0.27	J	1.1	1.1	Bckg	MG/KG
CH2M HILL	CARBAZOLE	SB65A	2.7	J	.067	32	Residential RBC	MG/KG
CH2M HILL	CARBAZOLE	SB65B	0.053	J	.067	32	Residential RBC	MG/KG
CH2M HILL	CARBAZOLE	SS65A	1.6	J	.067	32	Residential RBC	MG/KG
CH2M HILL	CARBAZOLE	SS65C	0.048	J	.067	32	Residential RBC	MG/KG
CH2M HILL	CARBAZOLE	SS65D	2.9	J	.067	32	Residential RBC	MG/KG
CH2M HILL	CARBAZOLE	SS65E	12	=	.067	32	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS65E	29.9	J	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHRYSENE	SB65A	22	=	.94	88	Residential RBC	MG/KG
CH2M HILL	CHRYSENE	SB65B	0.24	J	.94	88	Residential RBC	MG/KG
CH2M HILL	CHRYSENE	SB65C	0.19	J	.94	88	Residential RBC	MG/KG
CH2M HILL	CHRYSENE	SS65A	47	=	.94	88	Residential RBC	MG/KG
CH2M HILL	CHRYSENE	SS65B	0.11	J	.94	88	Residential RBC	MG/KG

Table 65-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 65
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
CH2M HILL	CHRYSENE	SS65C	0.21	J	.94	88	Residential RBC	MG/KG
CH2M HILL	CHRYSENE	SS65D	21	=	.94	88	Residential RBC	MG/KG
CH2M HILL	CHRYSENE	SS65E	68	=	.94	88	Residential RBC	MG/KG
CH2M HILL	DIBENZOFURAN	SS65E	1.9	J	.647	31	Residential RBC	MG/KG
CH2M HILL	FLUORANTHENE	SB65A	39	=	1.6	310	Residential RBC	MG/KG
CH2M HILL	FLUORANTHENE	SB65B	0.48	=	1.6	310	Residential RBC	MG/KG
CH2M HILL	FLUORANTHENE	SB65C	0.38	J	1.6	310	Residential RBC	MG/KG
CH2M HILL	FLUORANTHENE	SS65A	44	=	1.6	310	Residential RBC	MG/KG
CH2M HILL	FLUORANTHENE	SS65B	0.26	J	1.6	310	Residential RBC	MG/KG
CH2M HILL	FLUORANTHENE	SS65C	0.44	=	1.6	310	Residential RBC	MG/KG
CH2M HILL	FLUORANTHENE	SS65D	42	=	1.6	310	Residential RBC	MG/KG
CH2M HILL	FLUORANTHENE	SS65E	130	=	1.6	310	Residential RBC	MG/KG
CH2M HILL	FLUORENE	SB65A	1.1	J	NA	310	Residential RBC	MG/KG
CH2M HILL	FLUORENE	SS65D	0.82	J	NA	310	Residential RBC	MG/KG
CH2M HILL	FLUORENE	SS65E	5.2	=	NA	310	Residential RBC	MG/KG
CH2M HILL	INDENO(1,2,3-c,d)PYRENE	SB65A	15	=	.7	0.88	Residential RBC	MG/KG
CH2M HILL	INDENO(1,2,3-c,d)PYRENE	SB65B	0.11	J	.7	0.88	Residential RBC	MG/KG
CH2M HILL	INDENO(1,2,3-c,d)PYRENE	SB65C	0.087	J	.7	0.88	Residential RBC	MG/KG
CH2M HILL	INDENO(1,2,3-c,d)PYRENE	SS65A	39	=	.7	0.88	Residential RBC	MG/KG
CH2M HILL	INDENO(1,2,3-c,d)PYRENE	SS65B	0.056	J	.7	0.88	Residential RBC	MG/KG
CH2M HILL	INDENO(1,2,3-c,d)PYRENE	SS65C	0.096	J	.7	0.88	Residential RBC	MG/KG
CH2M HILL	INDENO(1,2,3-c,d)PYRENE	SS65D	11	=	.7	0.88	Residential RBC	MG/KG
CH2M HILL	INDENO(1,2,3-c,d)PYRENE	SS65E	44	=	.7	0.88	Residential RBC	MG/KG
CH2M HILL	IRON	SS65E	8280	=	37000	37000	Bckg	MG/KG
CH2M HILL	LEAD	SS65E	97.7	=	30	400	CERCLA	MG/KG
CH2M HILL	MANGANESE	SS65E	162	=	1300	1300	Bckg	MG/KG
CH2M HILL	PHENANTHRENE	SB65A	20	=	.61	2300	Residential RBC	MG/KG
CH2M HILL	PHENANTHRENE	SB65B	0.33	J	.61	2300	Residential RBC	MG/KG
CH2M HILL	PHENANTHRENE	SB65C	0.26	J	.61	2300	Residential RBC	MG/KG
CH2M HILL	PHENANTHRENE	SS65A	7.3	=	.61	2300	Residential RBC	MG/KG
CH2M HILL	PHENANTHRENE	SS65B	0.18	J	.61	2300	Residential RBC	MG/KG
CH2M HILL	PHENANTHRENE	SS65C	0.27	J	.61	2300	Residential RBC	MG/KG

Table 65-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 65
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
CH2M HILL	PHENANTHRENE	SS65D	16	=	.61	2300	Residential RBC	MG/KG
CH2M HILL	PHENANTHRENE	SS65E	61	=	.61	2300	Residential RBC	MG/KG
CH2M HILL	PYRENE	SB65A	26	=	1.5	230	Residential RBC	MG/KG
CH2M HILL	PYRENE	SB65B	0.46	=	1.5	230	Residential RBC	MG/KG
CH2M HILL	PYRENE	SB65C	0.39	J	1.5	230	Residential RBC	MG/KG
CH2M HILL	PYRENE	SS65A	52	=	1.5	230	Residential RBC	MG/KG
CH2M HILL	PYRENE	SS65B	0.2	J	1.5	230	Residential RBC	MG/KG
CH2M HILL	PYRENE	SS65C	0.35	J	1.5	230	Residential RBC	MG/KG
CH2M HILL	PYRENE	SS65D	35	=	1.5	230	Residential RBC	MG/KG
CH2M HILL	PYRENE	SS65E	120	=	1.5	230	Residential RBC	MG/KG
CH2M HILL	ZINC	SB65A	95	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SB65B	196	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SB65C	134	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SS65A	646	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SS65B	64.9	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SS65C	131	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SS65D	96.3	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SS65E	116	=	130	23000	Residential RBC	MG/KG

Notes:
1. Detected values are obtained from the *Draft Parcel 7 Report-Screening Sites Sampling Program for Defense Depot* Memphis, TN, CH2M HILL, 1997.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. Based on values selected by the BRAC Cleanup Team in the August 1997 BCT meeting minutes, Memphis, Tennessee.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
J - indicates estimated value above the detection limit but below the reporting limit.
= - indicates unqualified detection.
BCT - BRAC Cleanup Team

Table 65-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 65
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units

Table 65-B
Summary of Detected Compounds in Surface Soils
Compared to Non-BCT Screening Levels for Site 65
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	Risk-Based Concentrations Soil Ingestion[4]		Units
						Residential	Industrial	
CH2M HILL	ACENAPHTHYLENE	SS65A	9.5	J	.19	NA	NA	MG/KG
CH2M HILL	BARIUM	SS65E	81.2	=	234	550	14000	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB65B	0.31	J	NA	46	410	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SS65C	0.1	J	NA	46	410	MG/KG
CH2M HILL	CADMIUM	SS65E	4.1	=	1.4	3.9	100	MG/KG
CH2M HILL	CALCIUM	SS65E	134000	=	5840	NA	NA	MG/KG
CH2M HILL	COBALT	SS65E	4.5	J	18.3	470	12000	MG/KG
CH2M HILL	COPPER	SS65E	20.5	=	33	310	8200	MG/KG
CH2M HILL	DI-n-BUTYL PHTHALATE	SS65C	0.056	J	NA	780	20000	MG/KG
CH2M HILL	MAGNESIUM	SS65E	9590	=	4600	NA	NA	MG/KG
CH2M HILL	NAPHTHALENE	SS65E	0.66	J	NA	310	8200	MG/KG
CH2M HILL	NICKEL	SS65E	11.3	=	30	160	4100	MG/KG
CH2M HILL	p,p'-DDE	SS65E	2.8	=	.16	1.9	17	MG/KG
CH2M HILL	p,p'-DDT	SS65E	5.1	=	.074	1.9	17	MG/KG
CH2M HILL	POTASSIUM	SS65E	808	=	1820	NA	NA	MG/KG
CH2M HILL	SODIUM	SS65E	294	J	NA	NA	NA	MG/KG
CH2M HILL	VANADIUM	SS65E	10.7	J	48.4	55	1400	MG/KG

Notes:
1. Detected values are obtained from the *Draft Parcel 7 Report-Screening Sites Sampling Program for Defense Depot Memphis, TN*, CH2M HILL, 1997.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. Risk-Based Concentrations are obtained from the *EPA Region III Risk-based Concentrations Table*, R.L. Smith, April, 1997.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
= - indicates unqualified detection.
J - indicates estimated value above the detection limit but below the reporting limit.

Table 65-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 65
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB65A	8 to 10	0.11	J	NA	3600	MG/KG
CH2M HILL	CHRYSENE	SB65A	8 to 10	0.05	J	NA	160	MG/KG
CH2M HILL	DI-n-BUTYL PHTHALATE	SB65C	4 to 6	0.052	J	NA	2300	MG/KG
CH2M HILL	FLUORANTHENE	SB65A	8 to 10	0.066	J	.045	4300	MG/KG
CH2M HILL	PHENANTHRENE	SB65A	8 to 10	0.089	J	NA	4300	MG/KG
CH2M HILL	PYRENE	SB65A	8 to 10	0.06	J	.042	2800	MG/KG
CH2M HILL	ZINC	SB65A	4 to 6	155	=	110	12000	MG/KG
CH2M HILL	ZINC	SB65A	8 to 10	121	=	110	12000	MG/KG
CH2M HILL	ZINC	SB65B	4 to 6	127	=	110	12000	MG/KG
CH2M HILL	ZINC	SB65B	9.5 to 11	95.7	=	110	12000	MG/KG
CH2M HILL	ZINC	SB65C	4 to 6	112	=	110	12000	MG/KG
CH2M HILL	ZINC	SB65C	9 to 11	78.3	=	110	12000	MG/KG

Notes:
1. Detected values are obtained from the *Draft Parcel 7 Report-Screening Sites Sampling Program for Defense Depot Memphis, TN*, CH2M HILL, 1997.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum* , CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. RBC-GWP values are obtained from the *EPA Region III Risk-based Concentrations Table* , R. L. Smith, April, 1997.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
= - indicates unqualified detection
J - indicates estimated value above the detection limit but below the reporting limit.
RBC-GWP - Risk-Based Concentrations - Groundwater Protection

TAB

Parcel 15

Parcel 15

Screening Sites Sampling Program

for

Defense Distribution Depot Memphis, Tennessee

March 1998

Prepared for

U.S. Army Engineering and Support Center, Huntsville

Prepared by

CH2M HILL

2567 Fairlane Drive

Montgomery, Alabama 36116

137449.RR.ZZ

Parcel 15
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Parcel 15 is a 18,936-square-foot (ft^2) parcel in the north-central part of the Main Installation in Operable Unit (OU)-4. Parcel 15 consists of Buildings 308, 309, 319, 416, 417, and 702; the open storage areas X09, Y10, and Y50; and the adjacent railroad tracks.

The screening sites in this document have been identified by the Defense Distribution Depot Memphis, Tennessee (DDMT) through a review of existing documents, interviews with facility personnel, and knowledge of the facility's operations. Screening sites are locations at DDMT where there is a potential for materials to have been released to the environment from past operations. Screening sites in Parcel 15 include the following:

- Screening Site 35 – DRMO Building T-308
- Screening Site 36 – DRMO Drum Storage
- Screening Site 37 – DRMO Drum Storage
- Screening Site 38 – DRMO Drum Storage
- Screening Site 39 – DRMO Drum Storage
- Screening Site 54 – DRMO East Storm Water Runoff Canal
- Screening Site 55 – DRMO North Storm Water Runoff Area
- Screening Site 72 – Waste Oil (PDO Yard) Surface Application for Dust Control
- Screening Site 74 – Flammables and Toxics (West End Building 319)
- Screening Site 79 – Fuels, Miscellaneous Liquids, Wood, and Paper

Sites where there is a confirmed presence of contaminants from past operations are addressed in the Remedial Investigation Sampling Program. Other facilities have been addressed in the Base Realignment and Closure (BRAC) Sampling Program. Results of these programs are addressed in separate reports.

The purpose of the Screening Sites Sampling Program is to identify whether past activities at each site have resulted in releases from the site that would require further investigation. The intent is not to fully delineate the nature and extent of soil or groundwater contamination attributable to past operations, but to conduct technically based screening analyses sufficient to identify the likelihood of contamination.

The purpose of this letter report is to evaluate the results of the Screening Sites Sampling Program and sampling from previous investigations and to recommend No Further Action or further investigation at screening sites in this parcel. The remainder of this report presents the results of past investigations; Screening Sites Sampling Program strategy, procedures, and results; and recommendations for each site.

Surface soils, subsurface soils, surface water, and sediments were investigated as part of the Screening Sites Sampling Program. Surface soil samples (any sample whose lowest depth is two feet or less) were taken both as independent samples and as the upper interval of a soil boring

profile. Thus, surface soil samples taken as part of a soil boring may have an "SB" designation, and are initially discussed under Subsurface Soil Sampling Procedure (Section 2.2.2.2). However, the results from that upper interval are presented in the surface soils tables and discussions in Section 3.0.

Screening Site 35—Defense Reutilization Marketing Office (DRMO) Building T-308: Hazardous Waste Storage

1.0 Introduction

The chart below presents the location and status information for this screening site.

Parcel	Building Number	RI/FS[1] OU	Site Number	CERCLA[2] Status
15	T-308	4	35	Screening

[1]RI/FS: Remedial Investigation/Feasibility Study
[2]CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act

Screening Site 35 is in the northeastern corner of the Main Installation, south of Dunn Avenue (shown in Figure 1). Building T-308 is a roofed, tin-sided shed with a concrete floor. It has a 2-foot-high concrete berm and foundation on all four sides with 3-inch concrete or asphalt dikes at the entrances. Wastes are segregated and stored on pallets.

2.0 Study Area Investigations

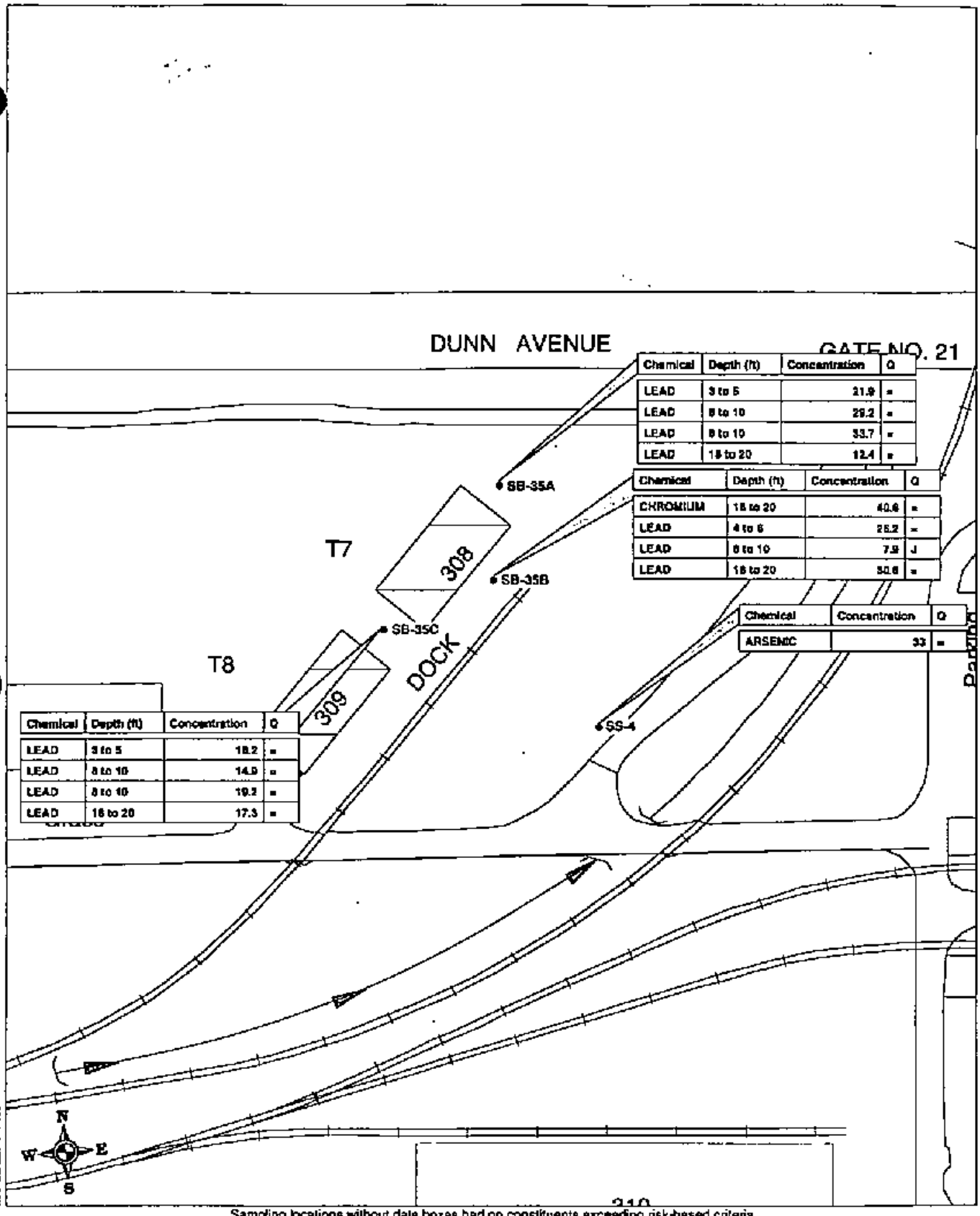
2.1 Previous Investigations

According to the *Remedial Investigation at DDMT, Final Report* (Law Environmental, 1990), a surface soil sample (SS4) was collected about 100 feet downslope from and to the southeast of this site in 1989. Data from Screening Site 35 are summarized by media below. Contaminants of potential concern (COPC) at historical sites are shown in Figure 1.

2.1.1 Surface Soil

In Sample SS4, methylene chloride and acetone were the only volatile organic compounds (VOCs) that were detected. However, acetone was detected at concentrations less than sample quantitation limits, and methylene chloride was detected in the laboratory method blank. These are common laboratory contaminants. No semivolatile organic compounds (SVOCs) were detected at concentrations greater than sample quantitation limits.

Dieldrin, the only pesticide detected in surface soil at Screening Site 35 during the 1989 site work, was present in Sample SS4 at the concentration of 0.065 milligrams per kilogram (mg/kg). Several inorganic compounds commonly found in soil were also detected in Sample SS4. The concentrations of these compounds will be compared to established background concentrations and screening criteria in Section 3.1.



Sampling locations without data boxes had no constituents exceeding risk-based criteria

LEGEND

- Surface Soil Sampling Location (mg/kg)
- Soil Boring Sampling Location (mg/kg)

(Q) Qualifier Definitions
= - indicates unqualified detection
J - indicates estimated value above detection limit, but below reporting limit.

Figure 1
Site 35, DRMO Building T-308
Constituents Exceeding Risk-Based Criteria
Defense Distribution Depot Memphis, TN

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2.2 Screening Site Sampling Program

2.2.1 Sampling Strategy

The sampling strategy was developed to evaluate whether releases have occurred to surface and subsurface soils. Samples were analyzed for VOCs, SVOCs, pesticides, and metals. At least one sample from each media for each site was analyzed for target compound list/target analyte list (TCL/TAL) constituents in accordance with the *Screening Sites Field Sampling Plan* (CH2M HILL, 1995). The sampling locations were selected based on areas used for waste storage and previous sampling results.

2.2.2 Sampling Procedures

Sections 2.2.2.1 and 2.2.2.2 describe the sampling procedures and laboratory analyses performed for surface soils and subsurface soils.

2.2.2.1 Surface Soil Sampling Procedures

Surface soil samples were collected from three locations (SB35A, SB35B, and SB35C) at this site associated with borings (shown in Figure 1). Their locations are described under Section 2.2.2.2.

2.2.2.2 Subsurface Soil Sampling Procedures

With the approval of the Tennessee Department of Environment and Conservation (TDEC) and the U.S. Environmental Protection Agency (EPA), subsurface soil samples were collected at three locations (SB35A, SB35B, and SB35C) at this site (shown in Figure 1). The following details the sample locations:

- Sample SB35A was taken 17 feet west and 6 feet north of the northeast corner of Building T308.
- Sample SB35B was taken 6 feet east and 40 feet south of the northeast corner of Building 308.
- Sample SB35C was taken 20 feet west and 4 feet south of the southeast corner of Building T308.

The Geoprobe™ was used to penetrate the concrete slab to collect these samples. At each location, samples were collected at three depths below the concrete slab: zero to 2 feet, 4 to 6 feet, and 8 to 10 feet. The samples were collected using a 2-inch-diameter, stainless-steel push sampler. Samples were also collected at an interval of 18 to 20 feet using a 1-inch-diameter, stainless-steel push sampler.

VOC soil samples were collected directly from the continuous sampler using stainless-steel spoons. Part of the VOC sample was placed into a sealable plastic bag and allowed to equilibrate. The head space in the plastic bag was measured for VOCs using a hand-held photoionization detector (PID), and the results were used to determine which interval within each boring was selected for Level 3 COPC or TCL/TAL analyses. The remaining soil was placed into a stainless-steel bowl, mixed, and then transferred into the appropriate sample jars.

All sampling tools were decontaminated before being used at each sample location according to the procedures specified in the *Generic Quality Assurance Project Plan* (CH2M HILL, 1995) for the RI/FS currently being conducted at the DDMT.

2.2.3 Analytical Procedures

Twelve subsurface soil samples were sent to CH2M HILL's Analytical Services in Montgomery, Alabama for VOC, SVOC, pesticide, metal, or TCL/TAL analyses. Samples received at the laboratory were analyzed in accordance with the procedures outlined in the *Generic Quality Assurance Project Plan* (CH2M HILL, 1995).

A United States Corps of Engineers (COE) split sample was collected from an 8- to 10-foot interval of Sample SB35A. This one subsurface soil sample was sent to COE's Atlanta, Georgia laboratory for analysis of VOCs, SVOCs, pesticides, and metals.

A data quality evaluation (DQE) was performed to assess the effect of the overall analytical process on the usability of the data CH2M HILL collected in 1997. The DQE established that the detection of acetone and bis(2-ethylhexyl)phthalate can be attributed to field sampling and laboratory contamination rather than to environmental conditions at the site. Also, low concentrations of dioxins and furans can be attributed to background or instrument noise and are not indicative of environmental conditions. With the exception of the qualifications listed above, the DQE concluded that data can be used in the project decision-making process.

3.0 Interpretation of Sampling Results

3.1 Presentation of Results

Sections 3.1.1 through 3.1.4 present results of the Screening Sites Sampling Program for Screening Site 35. Data are presented by media for surface and subsurface soils and compared with appropriate screening criteria in three summary tables: Tables 35-A, 35-B, and 35-C. Data from the 1997 CH2M HILL investigation are presented along with historical data from the *Remedial Investigations at DDMT, Final Report* (Law Environmental, 1990). If a value from a sampling location exceeds one of the comparison criteria, that value and the comparison criterion are shown in **bold** on the summary table.

COPCs are parameters that exceed both background values and the screening criteria. Where concentrations exceed the selected background value, the concentration is compared with the observed range of background values as reviewed and established by the BRAC Cleanup Team (BCT).

COPCs for Screening Site 35 include arsenic in the surface soils and total chromium and lead in the subsurface soils.

3.1.1 Surface Soil

Results of the surface soil analyses with values above detection limits are shown in Tables 35-A and 35-B.

3.1.1.1 BCT Screening Criteria

Table 35-A summarizes constituents for which the BCT has selected a screening criteria. Arsenic was detected at concentrations exceeding the BCT criteria.

In the *Remedial Investigations at DDMT, Final Report* (Law Environmental, 1990), arsenic was found in Sample SS4 at 33 mg/kg, which exceeds the background-based BCT criteria of 20 mg/kg. The more recent samples, which are also adjacent to Building 308 as well as previous Sample SS4, which is 100 feet away from the building, show that arsenic concentrations in surface soil at Screening Site 35 are below screening criteria.

3.1.1.2 Other Screening Criteria

Table 35-B compares the remaining constituents with the soil ingestion screening criteria for both residential and industrial exposure scenarios. All detected concentrations were below background and screening criteria, with the exception of one dieldrin value. Dieldrin at Sample SS4, detected at 0.065 mg/kg, exceeded the residential risk-based concentration (RBC) for soil ingestion, but did not exceed background values. Concentrations of dieldrin in surface soils sitewide are provided as Attachment 1 in the Executive Summary and Overview part of this letter report set.

3.1.2 Subsurface Soil

Table 35-C summarizes subsurface soil sampling data. Chromium and lead were found at concentrations slightly exceeding the background and groundwater protection criteria.

Total chromium was detected in ten subsurface soil samples; the concentrations exceeded background values in only five of those samples and exceeded background and groundwater protection (38 mg/kg) values in only one sample (Sample SB35B at 40.6 mg/kg at the 18- to 20-foot depth).

Lead was found at concentrations ranging from 7.9J to 33.7 kg/mg. All detected values exceeded the groundwater protection values, but only three samples (SB35A at 8 to 10 feet, SB35B at 18 to 20 feet, and SB35B at 4 to 6 feet) had detections that exceeded background and groundwater protection values.

Both chromium and lead levels in the subsurface soils are similar to the range of background levels.

3.2 Vertical and Lateral Extent

Based on the data collected so far, it appears that there are no site operations-related COPCs that exist in site soils at Screening Site 35.

Arsenic is detected at all depths in the soil borings adjacent to Building 308 but is below screening criteria at all depths with one exception. At Sample SB35A at the 8-to 10-foot depth, arsenic was detected slightly above background values but below the screening criteria. Arsenic only exceeds background and screening criteria at Sample SS4; however, more recent samples collected closer to the site did not have arsenic above background levels.Total chromium is detected at all depths in the samples associated with this site. In the three borings, chromium is above background levels in the deeper samples and below the groundwater protection level of

38 mg/kg. However, one Sample (SB35B) had a concentration of 40.6 mg/kg. These chromium levels are thought to be due to the natural variability in the geology with depth of the soils. Lead is detected in soil samples from different depths at slightly above background in three samples. The groundwater protection-based criterion was also exceeded by these three samples.

In general, Screening Site 35 exhibits waste accumulation-related contamination. Low levels of the metals arsenic, chromium, and lead appear to be naturally occurring based on the surface and subsurface soil data.

3.3 Potential Migration Pathways

The following paragraphs provide a general discussion of the potential migration pathways based on physical and chemical properties of the COPCs at Screening Site 35.

Arsenic exists at several sites on DDMT in surface soils at concentrations above screening levels. Arsenic's mobility and toxicity are tied to its complex geochemistry and its ability to readily form soluble complexes. Arsenic may also readily be adsorbed onto clays, oxides, or humic organic material and migrate as suspended soil in surface water or as a sediment. Arsenic can exist in four common oxidation states, and these control its solubility. It readily transports through aquatic environments as a dissolved salt, or as a complex with an organic compound.

Chromium has been reported from surface and subsurface soils at DDMT in concentrations greater than the screening levels. Chromium occurs in two oxidation states: +3 and +6. The trivalent form readily combines with aqueous hydroxide to form insoluble chromium hydroxide and is of little risk. The hexavalent form is soluble and tends to stay in solution, unless some activated carbon material is present for it to sorb onto. Dissolved chromium is readily adsorbed onto sediments but may be bioaccumulated through aquatic organisms.

Lead is present at concentrations greater than background, or above screening criteria, in surface and subsurface soils, and in sediment at DDMT. Lead is moderately soluble and potentially can be leached from any of these forms of occurrence, reaching concentrations in aqueous solution in both groundwater and surface water that would be of concern to both human and ecological receptors. Additionally, lead in surface soils and sediment potentially may move as suspended particulate matter in surface waters and impact aquatic organisms.

3.4 Additional Data Needs

Re-sampling is needed near Sample SS4 to confirm elevated arsenic levels observed during historical sampling.

4.0 Interpretation of Screening Criteria Comparisons

4.1 Methodology

The Preliminary Risk Evaluation (PRE) was performed in accordance with the *Guidance on Preliminary Risk Evaluations for the Purpose of Reaching a Finding of Suitability to Lease (FOSL)*

(EPA Region IV, 1994). A discussion of the PRE methodology is provided as Appendix A to this document.

4.2 Screening Site 35 Risk

Carcinogenic and noncarcinogenic risks for Screening Site 35 are presented in Table 4-26 of the draft PRE (USAESC, 1998), and detailed chemical-specific estimates are presented in Appendix A of the PRE.

There are no carcinogenic chemicals above background at this site. The noncarcinogenic ratios for an industrial worker and an industrial receptor were below a value of 1.0.

Therefore, in accordance with the PRE evaluation, Screening Site 35 does not pose a human health concern for workers or residents. Therefore, no further action is necessary at Screening Site 35. However, because historical data was not included in the PRE, evaluation or resampling near SS4 is required to evaluate arsenic concentrations at this location.

5.0 Summary and Recommendations

5.1 Summary

There are no site-related chemicals detected in the site soils. Arsenic, chromium, and lead associated with soil samples near Screening Site 35 were slightly above background. Resampling of one historical sample is required to evaluate if arsenic concentrations are elevated there. Health risks associated with Screening Site 35 are not significant and no further action is proposed, pending evaluation of the elevated historic arsenic levels.

5.2 Recommendation

Resampling at sampling station SS4 is recommended to evaluate elevated arsenic concentrations from a 1989 sample. Otherwise, no further assessment is proposed for Screening Site 35.

Screening Sites 36 through 39—DRMO Drum Storage

1.0 Introduction

The chart below presents the location and status information for this screening site.

Parcel	Building Number	RI/FS[1] OU	Site Number	CERCLA[2] Status
15	East DRMO	4	36-39	Screening

[1]RI/FS: Remedial Investigation/Feasibility Study
[2]CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act

Screening Sites 36, 37, 38, and 39 are located in the northeastern section of the Main Installation and make up an area of approximately 2.5 acres (Figure 2). Drums containing hazardous materials were stored at these open storage areas until shipment to a licensed hazardous waste disposal facility occurred. Some areas were used to store empty, damaged drums that may contain hazardous waste and petroleum, oil, and lubricants (POL) residues.

2.0 Study Area Investigation

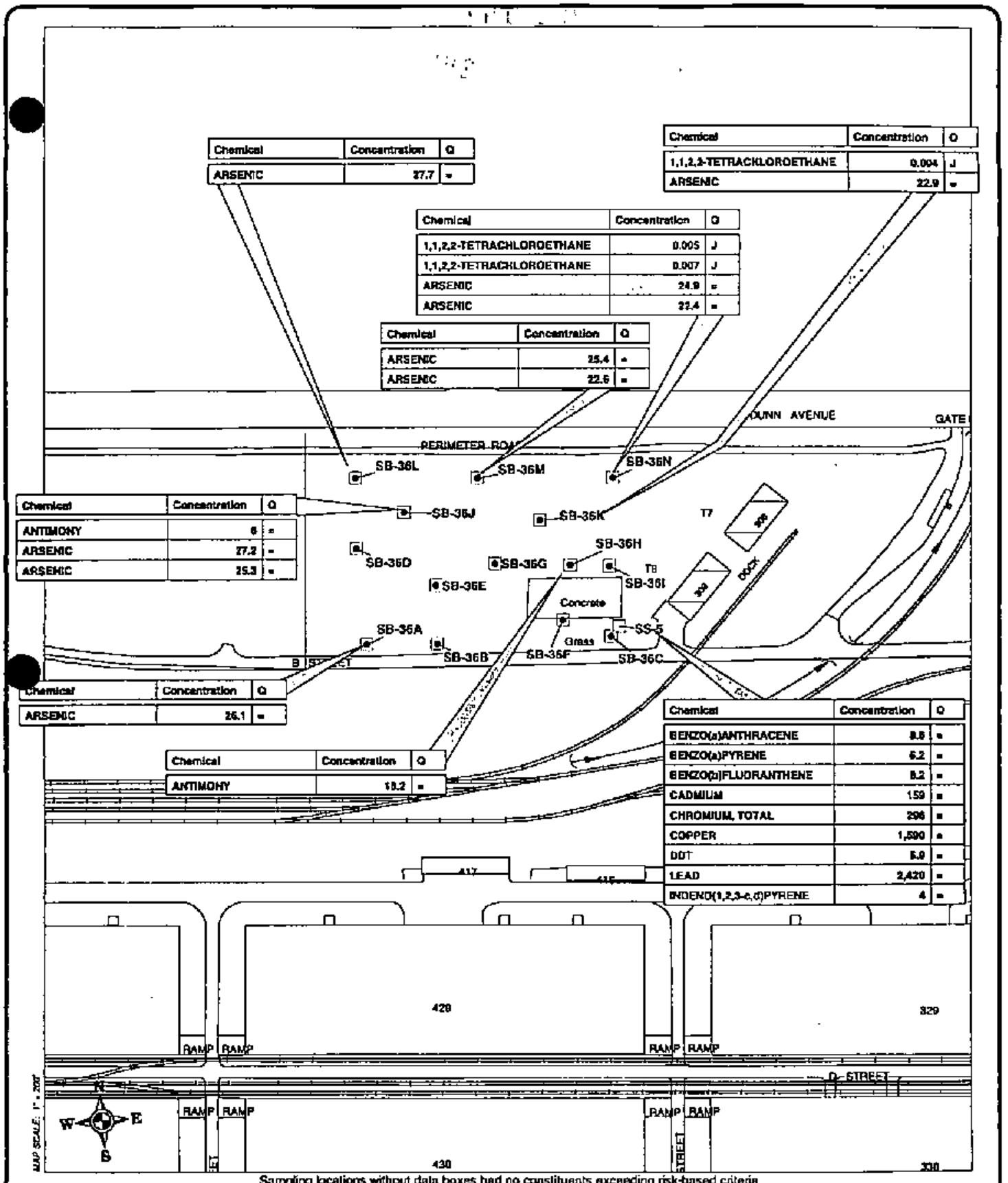
2.1 Previous Investigations

According to the *Remedial Investigation at DDMT, Final Report* (Law Environmental, 1990), one surface soil sample (SS5) was collected adjacent to the concrete pad at Screening Site 36. The sample indicated the presence of polycyclic aromatic hydrocarbons (PAHs), dieldrin, and metals (see Table B-9 and Figure 4-24 in the *Screening Sites Field Sampling Plan*, CH2M HILL, 1995). Historical data from Screening Site 36 is summarized by media below. COPCs at historical sites are shown in Figure 2.

2.1.1 Surface Soil

Methylene chloride, toluene, and acetone were the only VOCs that were detected in Sample SS5. However, acetone and toluene were detected at concentrations less than sample quantitation limits, and methylene chloride was detected in the laboratory method blank. Nineteen SVOCs were detected in Sample SS5, 15 of which were detected at concentrations greater than sample quantitation limits. Among the highest concentrations of SVOCs were benzo(a)pyrene at 6.2 mg/kg, fluoranthene at 15 mg/kg and pyrene at 17 mg/kg.

Endosulfan sulfate, dichlorodiphenyldichloroethane (DDD), dichlorodiphenyldichloroethene (DDE), and dichlorodiphenyltrichloroethane (DDT) were the only pesticides detected in surface soil at Screening Site 36 during the 1989 site work. DDE and DDT were detected at the highest concentrations: 1.1 and 5.9 mg/kg, respectively. Several inorganic compounds common in soil were also detected at elevated levels in Sample SS5. The concentrations of these compounds will be compared to established background concentrations and screening criteria in Section 3.1.



Sampling locations without data boxes had no constituents exceeding risk-based criteria

LEGEND

Surface Soil Sampling Location (mg/kg)

Soil Boring Sampling Location (mg/kg)

(Q) Qualifier Definitions
= - Indicates unqualified detection
J - Indicates estimated value above detection limit, but below reporting limit.

Figure 2, Sheet 1
Sites 36-39 (surface soil interval) , DRMO Drum Storage Constituents Exceeding Risk-Based Criteria
Defense Distribution Depot Memphis, TN

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SITEMAP

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Chemical	Depth (ft)	Concentration	Q
CHROMIUM	16 to 20	43.7	=
LEAD	4 to 6	27.3	=
LEAD	8 to 10	19.6	=
LEAD	16 to 20	14.5	=

Chemical	Depth (ft)	Concentration	Q
1,1,2,2-TETRACHLOROETHANE	8 to 10	0.006	J
1,1,2,2-TETRACHLOROETHANE	4 to 6	0.019	=
LEAD	4 to 6	30.4	=
LEAD	8 to 10	17.5	=
LEAD	16 to 20	18.6	=

Chemical	Depth (ft)	Concentration	
1,1,2,2-TETRACHLOROETHANE	4 to 6		0.012
1,1,2,2-TETRACHLOROETHANE	8 to 10		0.02
1,1,2,2-TETRACHLOROETHANE	16 to 20		0.005
LEAD	4 to 6		26.9
LEAD	8 to 10		22.1
LEAD	16 to 20		17.6
TRICHLOROETHYLENE (TCE)	16 to 20		0.32

Chemical	Depth (ft)	Concentration	Q
LEAD	4 to 6	25.3	=
LEAD	8 to 10	16.6	=
LEAD	16 to 20	15.1	=

Chemical	Depth (ft)	Concentration	Q
CHROMIUM	16 to 20	38.1	=
LEAD	4 to 6	21.7	=
LEAD	8 to 10	16.6	=
LEAD	16 to 20	15.7	=

Chemical	Depth (ft)	Concentration	Q
LEAD	4 to 6	17.3	=
LEAD	8 to 10	15.1	=
LEAD	16 to 20	13.7	=
TRICHLOROETHYLENE	16 to 20	0.14	=

Chemical	Depth (ft)	Concentration	Q
CHROMIUM	16 to 20	40.2	=
LEAD	4 to 6	21.8	=
LEAD	8 to 10	18.2	J
LEAD	16 to 20	16.7	=

Chemical	Depth (ft)	Concentration	Q
CHROMIUM	16 to 20	45.3	=
LEAD	4 to 6	15.4	J
LEAD	8 to 10	19.9	=
LEAD	16 to 20	17.7	=

Chemical	Depth (ft)	Concentration	Q
LEAD	4 to 6	23.2	=
LEAD	8 to 10	19.7	=
LEAD	16 to 20	14.8	=

Chemical	Depth (ft)	Concentration	Q
CHROMIUM	16 to 20	39.7	=
LEAD	4 to 6	29.1	=
LEAD	8 to 10	19.6	=
LEAD	16 to 20	20.8	=

Chemical	Depth (ft)	Concentration	Q
ARSENIC	4 to 6	29.8	=
CHROMIUM	16 to 20	39.4	=
LEAD	4 to 6	31.6	=
LEAD	8 to 10	21.3	=
LEAD	16 to 20	19.9	=

Chemical	Depth (ft)	Concentration	Q
LEAD	4 to 6	10.7	J
LEAD	8 to 10	12	J
LEAD	16 to 20	7.6	=

Chemical	Depth (ft)	Concentration	Q
LEAD	4 to 6	22.2	=
LEAD	8 to 10	24.5	=
LEAD	16 to 20	16.2	=

Chemical	Depth (ft)	Concentration	Q
ANTIMONY	4 to 6	8.7	=
CHROMIUM	16 to 20	43.6	=
LEAD	4 to 6	26.7	=
LEAD	8 to 10	18.9	=
LEAD	16 to 20	19.1	=

REMINGTON ROAD
GUNN AVENUE
GATE NO. 21
GATE NO. 22
T.V.A. LINES
SB-36L
SB-36M
SB-36N
SB-36J
SB-36K
SB-36H
SB-36I
SB-36D
SB-36G
SB-36E
SB-36A
SB-36B
SB-36F
SB-36C
SS-6
Container
Grass
Parking
B STREET
C STREET
D STREET
RAMP
529
530
329
330
425
430
415
MAP SCALE: 1" = 200'

Sampling locations without data boxes had no constituents exceeding risk-based criteria

LEGEND

- Surface Soil Sampling Location (mg/kg)
- Soil Boring Sampling Location (mg/kg)

(Q) Qualifier Definitions
= - indicates unqualified detection
J - Indicates estimated value above detection limit, but below reporting limit.

Figure 2, Sheet 2
Sites 36-39 (subsurface soils), DRMO Drum Storage
Constituents Exceeding Risk-Based Criteria
Defense Distribution Depot Memphis, TN

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2.2 Screening Site Sampling Program

2.2.1 Sampling Strategy

The sampling strategy was developed to evaluate whether releases have occurred to subsurface soils. Samples were analyzed for VOCs, SVOCs, pesticides, and metals. At least one sample from each media for each site was analyzed for TCL/TAL constituents in accordance with the *Screening Sites Field Sampling Plan* (CH2M HILL, 1995).

2.2.2 Sampling Procedures

Sections 2.2.2.1 and 2.2.2.2 describe the sampling procedures and laboratory analyses performed for surface soils and subsurface soils.

2.2.2.1 Surface Soil Sampling Procedures

All surface soil samples collected from this site were associated with soil borings as discussed in Section 2.2.2.2.

2.2.2.2 Subsurface Soil Sampling Procedures

With the approval of the TDEC and EPA, subsurface soil samples were collected from 14 locations (SB36A, SB36b, SB36C, SB36D, SB36E, SB36F, SB36G, SB36H, SB36I, SB36J, SB36K, SB36M, and SB36N) from this site (shown in Figure 2). At each location, samples were collected at three depths: zero to 2 feet, 4 to 6 feet, and 8 to 10 feet. The following details each sample location:

- Sample SB36A was taken in a grassy area 7 feet north of a fenceline just north of B Street.
- Sample SB36B was taken 6 feet north of B Street and 52 feet west of a nearby fenceline.
- Sample SB36C was taken 5 feet north of B Street just 40 feet west of a concrete box and storm drain located south of the fence line parallel to B Street.
- Sample SB36D was taken between two gravel roads at the storage area located between Perimeter Road and B Street. The sample was taken 14 feet west and 8 feet north of Storage Area Marker No. 50, 25, 78 and AA.
- Sample 36E was taken 15 feet west and 15 feet north of Storage Area Marker Y, 50, 29, 68 and AA.
- Sample 36F was taken 52 feet east and 7 feet south of a concrete pad located north of B Street and the fence line.
- Sample SB36G was taken in between two gravel roads located north of G Street. The sample was located 6 feet east and 10 feet north of Storage Area Marker No. Y, 50, 32, 77, and AA.
- Sample SB36H was taken 52 feet east and 6 inches north of the concrete pad.
- Sample SB36I was taken 10 feet west and 2.5 feet north of the northeast corner of Building T404.

Samples SB36J through SB36N were taken just south of Perimeter Road.

- Sample SB36J was taken 3 feet west and 3 feet north of Marker No. Y, 50, 28, 88, and AA.
- Sample SB36K was taken 3 feet east and 1 foot north of Marker No. Y, 50, 30, 88 and AA.
- Sample SB36L was taken 15 feet east and 36 feet north of Marker No. Y, 50, 25, 87 and AA.
- Sample SB36M was taken 18 feet east and 39 feet north of Marker No. Y, 50, 31, 87, and AA.
- Sample SB36N was taken 6 feet west and 52 feet north of Marker No. Y 50, 38, 88, and AA.

Samples were collected using a 2-inch-diameter, stainless-steel push sampler. Samples were also collected at an interval of 18 to 20 feet using a 1-inch-diameter stainless-steel push sampler. VOC soil samples were collected directly from the continuous sampler using stainless-steel spoons. Part of the VOC sample was placed into a sealable plastic bag and allowed to equilibrate. The head space in the plastic bag was measured for VOCs using a hand-held PID, and the results were used to determine which interval within each was selected for Level 3 COPC or TCL/TAL analyses. The remaining soil was placed into a stainless-steel bowl, mixed, and then transferred into the appropriate sample jars.

All sampling tools were decontaminated before being used at each sample location according to the procedures specified in the *Generic Quality Assurance Project Plan* (CH2M HILL, 1995) for the RI/FS currently being conducted at DDMT.

2.2.3 Analytical Procedures

Fifty-six subsurface soil samples were sent to CH2M HILL's Analytical Services in Montgomery, Alabama for VOC, SVOC, pesticide, metal, and TCL/TAL analyses. Samples received at the laboratory were analyzed in accordance with procedures outlined in the *Generic Quality Assurance Project Plan* (CH2M HILL, 1995).

COE split samples were collected from the zero- to 2-foot interval of Samples SB36I and SB36N. These two subsurface soil samples were sent to COE's Atlanta, Georgia laboratory for analysis of VOCs, SVOCs, pesticides, and metals.

A DQE was performed to assess the effect of the overall analytical process on the usability of the data CH2M HILL collected in 1997. The DQE established that the detection of acetone and bis(2-ethylhexyl)phthalate can be attributed to field sampling and laboratory contamination rather than to environmental conditions at the site. Also, low concentrations of dioxins and furans can be attributed to background or instrument noise and are not indicative of environmental conditions. With the exception of the qualifications listed above, the DQE concluded that data can be used in the project decision-making process.

3.0 Interpretation of Sampling Results

3.1 Presentation of Results

Sections 3.1.1 through 3.1.4 present results of the Screening Sites Sampling Program for Screening Site 36. Data are presented by media for surface and subsurface soils and compared with appropriate screening criteria in three summary tables: Tables 36-A, 36-B, and 36-C. Data from the 1997 CH2M HILL investigation are presented along with historical data from the

Remedial Investigations at DDMT, Final Report (Law Environmental, 1990). If a value from a sampling location exceeds one of the comparison criteria, that value and the comparison criterion are shown in bold on the summary table.

COPCs are parameters that exceed both background values and the screening criteria. Where concentrations exceed the selected background value, the concentration is compared with the observed range of background values as reviewed and established by the BCT.

The COPCs for surface soil at this site include the following:

- Metals: arsenic, chromium, antimony, lead, cadmium, and copper
- PAHs: benzo(a)anthracene, benzo(a)pyrene, dibenzo(a,h)anthracene, indeno(1,2,3-c,d)pyrene and benzo(b)fluoranthene
- DDT
- 1,1,2,2-tetrachloroethane

COPCs for subsurface soils include metals (arsenic, chromium, lead, and copper) and trichloroethene (TCE).

3.1.1 Surface Soil

Results of the surface soil analyses with values above detection limits are shown in Tables 36-A and 36-B.

3.1.1.1 BCT Screening Criteria

Table 36-A summarizes constituents for which the BCT has selected a screening criteria. Metals and PAHs were detected at concentrations exceeding the BCT criteria.

Antimony was found at four surface soil locations, at concentrations ranging from 2J to 22 mg/kg. Two of the detected values exceed the BCT criteria of 7 mg/kg. In the final RI at DDMT (Law Environmental, 1990), antimony was found in Sample SS5 at 22 mg/kg. The 1997 samples show that antimony concentrations in surface soils at Screening Sites 36 through 39 are closer to background values.

Arsenic was detected in surface soils at all locations sampled at this site, ranging in concentration from 11.4J mg/kg at Sample SB36D to 27.7 mg/kg at Sample SB36L. Of the 14 samples, six had detections that exceeded the BCT criteria of 20 mg/kg. A single sample (SS5) had detections of arsenic during the 1989 investigation (Law Environmental, 1990) of 20 mg/kg.

PAH compounds including—dibenzo(a,h)anthracene, benzo(a)anthracene, benzo(a)pyrene, indeno(1,2,3-c,d)pyrene, and benzo(b)fluoranthene—were found at one sample location (SS5) during the 1989 investigation (Law Environmental, 1990) that exceeded the screening criteria. PAH compounds are found sitewide at DDMT primarily due to railroad operations and will be addressed in an upcoming risk evaluation. The more recent sampling from Sample SB36C, which is immediately adjacent to SS5, indicated PAHs are no longer occurring at this location. Total chromium was detected in all 14 samples at concentrations that exceeded the background value of 24.8 mg/kg except for two cases (Samples SB36D and SB36E). However, none of the detections exceeded the residential RBC for soil ingestion. However, in the final RI at DDMT

(Law Environmental, 1990), total chromium at Sample SS5 was detected at 296 mg/kg, which greatly exceeds the residential RBC value of 39 mg/kg.

Lead was detected in surface soils at background levels and below residential exposure based RBCs value (400 mg/kg). Two notable exceptions are Sample SB36H, in which lead was detected at 131 mg/kg (above the background value of 30 mg/kg but below the BCT screening value of 400 mg/kg), and Sample SS5 from the 1989 investigation, in which lead was detected at 2420 mg/kg.

Thus the more recent samples from the site do not indicate significant contamination levels. Metals and PAHs are within the comparison criteria levels.

3.1.1.2 Other Screening Criteria

Table 36-B compares the remaining constituents with the soil ingestion screening criteria for both residential and industrial exposure scenarios. Cadmium, copper, and DDT had only historical concentrations at one location (SS5) that exceeded the screening criteria.

Cadmium was detected in only two recent samples (SB36F and SB36H) at concentrations that slightly exceeded background values but did not exceed screening values. In the 1989 investigation (Law Environmental, 1990), cadmium at Sample SS5 was detected at a concentration of 159 mg/kg, which exceeds background and residential and industrial RBCs.Copper was detected in all 14 surface soil samples at concentrations that were generally just slightly above or below the background value of 33 mg/kg. Only at Sample SS5 (in 1989) was copper detected at a concentration of 1,590 mg/kg. This value exceeds the background value and residential RBC value of 310 mg/kg but does not exceed the industrial RBC value.

DDT was detected at four sample locations (SB36E, SB36H, SB36K, and SB36N) at concentrations that were below all screening criteria with one exception. At Sample SB36H, DDT was detected at 0.23 mg/kg, which exceeds the background value but not the RBC values. In the 1989 investigation (Law Environmental, 1990), DDT was detected at 5.9 mg/kg, which exceeds both the background values and the residential RBC, but not the industrial RBC for soil ingestion criteria.

3.1.2 Subsurface Soil

Table 36-C summarizes subsurface soil sampling data. Metals (arsenic, chromium, lead, antimony, and copper), TCE, and 1,1,2-tetrachloroethane were found at concentrations exceeding the background or groundwater protection criteria. No historical subsurface data from the 1989 investigation are available for this site.

Antimony was only detected at Sample SB36G (at the 4- to 6-foot depth) at a concentration of 8.7 mg/kg. No background value is available for antimony, but this exceeds the groundwater protection value of 5 mg/kg. Arsenic was detected in all fourteen borings at all depths sampled. The detected concentrations were generally slightly above or below the background value of 17 mg/kg, but in only one instance did the detected value exceed the groundwater protection value. At Sample SB36H (at the 4- to 6-foot depth) the detected value of 29.9 mg/kg slightly exceeded the groundwater protection value of 29 mg/kg. However, samples from below this depth did not have arsenic above groundwater protection criteria (See Figure 2).

Total chromium was detected in all 14 borings at all depths sampled. The detected concentrations generally ranged slightly above or below the background value of 26 mg/kg,

but below the groundwater protection value of 38 mg/kg. Of the seven instances in which the detected value exceeds both screening criteria, the exceedances always occurred at the 18-to-20-foot depth. Exceedances above screening criteria ranged from 38.1 mg/kg at Sample SB36J to 45.3 mg/kg at Sample SB36C. These concentration ranges appear to be normal for the soil types at these depths. Thus, the detected chromium could be from naturally occurring geological soil types. Such variability was consistently observed at these depths elsewhere at this site.

Copper was also detected in all 14 borings at all depths sampled. Concentrations of copper ranged from 15.6 mg/kg at Sample SB36A (at the 18- to 20-foot depth) to 44.4 mg/kg (at the 4- to 6-foot depth) at Sample SB36E. No groundwater protection criteria exist for copper, but the detected concentrations are generally below the background concentration of 33 mg/kg. In all cases where the background values are exceeded, the criteria were exceeded between 4 and 10 feet in depth. The criteria are not exceeded at the deeper sample locations.

Lead was detected in all 14 borings at all depths sampled. In all instances, the detected values exceeded the groundwater protection value of 1.5 mg/kg. The background value of 24 mg/kg was exceeded at eight sample points. Seven of the eight sample points were at the 4- to 6-foot depth; the eighth was at the 8- to 10-foot depth. Criteria were not exceeded at depths greater than 10 feet.

TCE was detected at four sample locations (SB36H, SB36I, SB36K, and SB36N) at all sampling depths. In two samples (SB36I and SB36K) the detected value exceeds the groundwater protection value of 0.06 mg/kg. TCE was detected at 0.14 mg/kg at Sample SB36I and at 0.32 mgkg at Sample SB36K, but at only the deepest (18- to-20-foot) interval.

1,1,2,2-Tetrachloroethane was detected at two sample locations (SB36K and SB36N) at this site. No background value exists, but the groundwater protection value of 0.003 mg/kg was slightly exceeded at these locations. 1,1,2,2-Tetrachloroethane was detected at all three sampling intervals in Sample SB36K, ranging from 0.005J mg/kg at the 18 to 20-foot interval to 0.02 at the 8- to 10-foot interval. In Sample SB36N, it was detected at 0.019 mg/kg at the 4- to 6-foot interval and at 0.006J mg/kg at the 8- to 10-foot interval.

Groundwater associated with Screening Sites 36-39 should be sampled to determine if the chlorinated solvents have migrated to groundwater during historical operations in the area.

3.2 Vertical and Lateral Extent

A total of 15 surface soils, and nearly 50 subsurface soil samples have been collected from the suspected release areas at these sites. Based on the data collected, it appears that there are metals that are naturally occurring; however, several COPCs that persist in the soil substrate are attributed to Screening Sites 36 through 39 historical operations.Four metals—arsenic, total chromium, copper, and lead—were found sitewide in all surface and subsurface intervals sampled. No trends were noted across the site in any lateral direction; the concentrations of each of these metals did not vary substantially in lateral direction. However, some trends were noted with total chromium, in that the highest concentration occurred at the 18- to 20-foot depth interval in 12 of the 14 borings. This is consistent with the chromium occurrence elsewhere at the site at the same depths. For the remaining three metals, the highest concentrations occurred in the 4- to 10-foot interval. These increases in concentration at depth likely result from natural variations in soil types.

In the 1989 investigation (Law Environmental, 1990), copper was reported in the surface soil at Sample SS5 at a high concentration of 1,590 mg/kg. These levels were not duplicated in the more recent investigation, where the highest concentration of copper at the surface was 86 mg/kg at Sample SB36H.

Cadmium is not a sitewide problem, as it was only detected in a total of three sampling locations. Cadmium was detected in Samples SB36F and SB36H at concentrations below all screening values. Cadmium is a COPC because in 1989, at Sample SS5, it was detected at 159 mg/kg, which exceeds all screening criteria.

Antimony was only detected in four surface soil sampling locations at concentrations slightly above background and in only one subsurface soil location (Sample SB36G at 4 to 6 feet) at a concentration slightly above groundwater protection values. Antimony is not considered a site-wide problem.

PAHs at Screening Site 36 were only detected in surface soils at Sample SB36H in the recent investigation at levels that did not exceed any screening criteria. PAH compounds were detected in surface soils at Sample SS5 (Law Environmental, 1990) at concentrations that exceeded the residential RBC values. PAH compounds are found in surface soil and will be addressed on a facilitywide basis as part of an upcoming risk evaluation.

Recent sampling for DDT found detections in surface soils at 4 of the 15 sampling locations (SB36E, SB36H, SB36K, and SB36N), none of which exceeded any screening criteria. DDT is a COPC because in one instance (Sample SS5) in 1989 (Law Environmental, 1990) it was detected at concentrations of 5.9 mg/kg. This value exceeds the background and residential RBC values for DDT.

1,1,2,2-Tetrachloroethane occurrences are confined to two sample locations (SB36K and SB36N). Surface soil detections did not exceed any criteria, and subsurface soil detections only slightly exceeded screening criteria.TCE was detected at the 18- to 20-foot interval (in Samples SB36I and SB36K) exceeded the groundwater protection value. TCE is detected in only four boring locations: SB36H, SB36I, SB36K, and SB36N. At Sample SB36K, it is detected at every surface and subsurface soil depth sampled, but only exceeds screening criteria at the 18- to 20-foot depth. At Sample SB36I, it is detected at all subsurface boring depths and at Sample SB36H and Sample SB36N, it is detected at a single depth. These volatile chlorinated solvents tend to degrade faster at the surface, although they migrate downward from subsurface soils to groundwater. Typically, they are measured at low levels in soil media.

3.3 Potential Migration Pathways

The following paragraphs provide a general discussion of the potential migration pathways for several constituents found at Screening Site 36.

Arsenic exists at several sites on DDMT in surface soils at concentrations above screening levels. Arsenic's mobility and toxicity are tied to its complex geochemistry and its ability to readily form soluble complexes. Arsenic may also readily be adsorbed onto clays, oxides, or humic organic material and migrate as suspended soil in surface water or as a sediment. Arsenic can exist in four common oxidation states, and these control its solubility. It readily transports through aquatic environments as a dissolved salt, or as a complex with an organic compound.

Chromium has been reported from surface and subsurface soils at DDMT in concentrations greater than the screening levels. Chromium occurs in two oxidation states: +3 and +6. The trivalent form readily combines with aqueous hydroxide to form insoluble chromium hydroxide and is of little risk. The hexavalent form is soluble and tends to stay in solution, unless some activated carbon material is present for it to sorb onto. Dissolved chromium is readily adsorbed onto sediments but may be bioaccumulated through aquatic organisms.

Lead is present at concentrations greater than background, or above screening criteria, in surface and subsurface soils, and in sediment at DDMT. Lead is moderately soluble and potentially can be leached from any of these forms of occurrence, reaching concentrations in aqueous solution in both groundwater and surface water that would be of concern to both human and ecological receptors. Additionally, lead in surface soils and sediment potentially may move as suspended particulate matter in surface waters and impact aquatic organisms.

Benzo(a)anthracene, benzo(a)pyrene, benzo(k)fluoranthene, benzo(b)fluoranthene, and indeno(1,2,3-c,d)pyrene, a group of related long chain, polycyclic aromatic hydrocarbons, have similar chemical and physical characteristics, and tend to migrate and behave in the environment in a similar manner. Generally, these compounds have low vapor pressures, and are only marginally soluble in water, and have a high affinity for soils. All of these compounds have been detected at concentrations above screening values for surface soils at DDMT. They would be expected to migrate as adsorbed components of the soils, and would potentially be available to aquatic organisms in turbid surface water or to bottom feeders in areas with contaminated sediments. That none of these compounds was detected in sediments indicates this is not a major source of contaminant migration for these compounds at this site. These compounds do not bioaccumulate significantly due to their rapid metabolism and excretion by most aquatic organisms.

3.4 Additional Data Needs

Chlorinated solvents were detected in site subsurface soils north of the concrete pad between Perimeter Road and the pad. Groundwater quality within the site and downgradient of it should be further evaluated for the presence of chlorinated solvents. Potential risks associated with metals found at low concentrations—including arsenic, total chromium, copper, and lead—require further comparison of the background population with the data collected. Available data are considered sufficient to perform this analysis, and additional data collection is not required for these sites.

4.0 Interpretation of Screening Criteria Comparisons

4.1 Methodology

The PRE was performed in accordance with the *Guidance on Preliminary Risk Evaluations for the Purpose of Reaching a Finding of Suitability to Lease (FOSL)* (EPA Region IV, 1994). A discussion of the PRE methodology is provided as Appendix A to this document.

4.2 Screening Sites 36 through 39 Risk

Carcinogenic and noncarcinogenic risks for Screening Sites 36 through 39 are presented in Table 4-27 of the draft PRE (USAESC, 1998), and detailed chemical-specific estimates are presented in Appendix A of the PRE.

The PRE risk ratio was estimated at a maximum of 7 in a million for an industrial worker and 64 in a million for a residential receptor. All carcinogenic risks are from the presence of arsenic in soil samples at a concentration ranging between 22.4 and 27.7 mg/kg, compared to a background level of 20 mg/kg. A total of 14 samples were collected from Screening Sites 36 through 39. Six samples had these reported arsenic levels; all others were within background levels. Thus, the observed arsenic could be the naturally occurring levels for the site.

The noncarcinogenic ratio was below a value of 1.0 for an industrial worker and is above a value of 1.0 for several of the samples for a residential receptor. While no industrial chemical exceeded a ratio of 1.0, each sample exceeded a value of 1.0, due to the presence of low levels of the inorganic chemicals, chromium, copper, nickel, antimony (1 out of 14 samples), lead, and zinc.

There are no organic chemicals of interest in surface soil at this site. Several naturally occurring inorganic chemicals are present at levels that are slightly above background levels.

This PRE addresses only the potential human exposures to the surface soils at a site. Potential indirect pathways such as migration to groundwater are addressed by comparing the concentrations with groundwater protection criteria. Based on the groundwater protection exceedence, chlorinated solvents should be further evaluated in the site groundwater.5.0 Summary and Recommendations

5.1 Summary

Several metals are found consistently throughout the site at all depths sampled at concentrations near background values.

Arsenic was detected in surface soils at all locations sampled at this site. Of the 14 samples, six had detections that exceeded the BCT criteria of 20 mg/kg. Arsenic was detected in all 14 samples collected at all depths. The detected concentrations were generally slightly above or below the background value of 17 mg/kg, but in only one instance did the detected value exceed the groundwater protection value. The highest detections of arsenic were consistently found in the upper six feet of the sample location.

Total chromium was found throughout the site at all depths, with the greatest concentration of chromium consistently occurring at the 18- to 20-foot depth. Several exceedances of the groundwater protection screening criteria occur at this depth.

Low levels of PAH compounds are found in historical surface soil sample and will be addressed on a facilitywide basis as part of an upcoming risk evaluation.

Generally higher concentrations of the COPCs detected at Sample SS5 in 1989 (Law Environmental, 1990) were not reflected in the more recent sampling events.

Groundwater at the site should be sampled to investigate if the chlorinated solvents have migrated to the regional aquifer.

5.2 Recommendations

Potential risks associated with arsenic require further comparison of the background population with the data collected. Monitor groundwater at the site and downgradient from the site.

Screening Site 54—DRMO East Storm Water Runoff Canal

1.0 Introduction

The chart below presents the location and status information for this screening site.

Parcel	Building Number	RI/FS[1] OU	Site Number	CERCLA[2] Status
15	DRMO East Canal	4	54	Screening

[1]RI/FS: Remedial Investigation/Feasibility Study
[2]CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act

Screening Site 54 is a canal that collects the stormwater runoff from the DRMO yard (and associated sites) and other DDMT facilities. Figure 3 shows the sites associated with Screening Site 54. This site is located near the northeastern part of the Main Installation. The canal is approximately 930 feet long.

2.0 Study Area Investigation

2.1 Previous Investigations

No previous sampling data exist for the site. Therefore, a biased sampling approach was implemented to evaluate the presence of contamination at the site.

2.2 Screening Site Sampling Program

2.2.1 Sampling Strategy

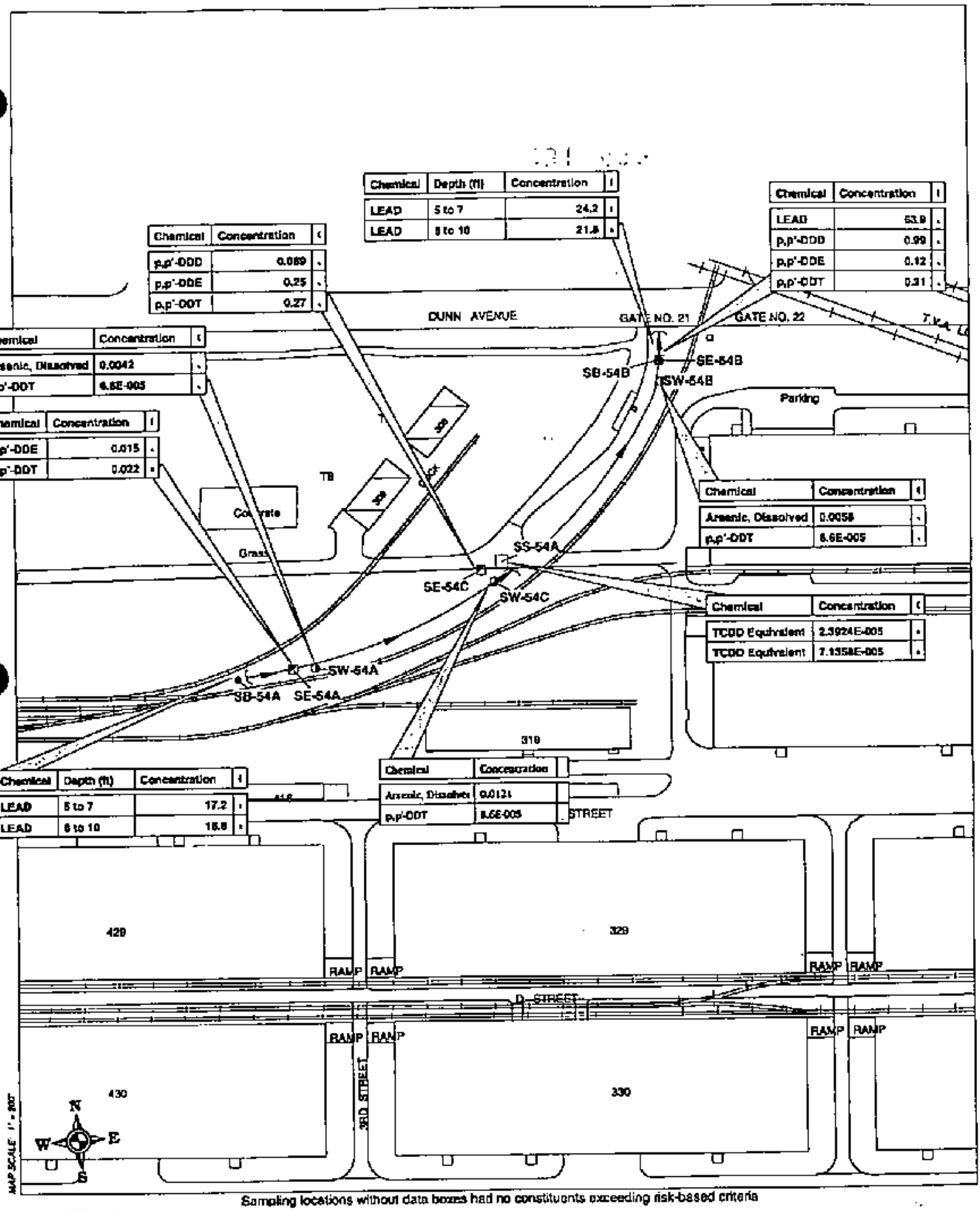
The sampling strategy was developed to evaluate whether releases have occurred to surface soils, subsurface soils, surface water and sediments. Surface soil, subsurface soil, and sediment samples were analyzed for VOCs, SVOCs, pesticides, dioxins, and metals. At least one sample from these media at this site was analyzed for TCL/TAL constituents in accordance with the *Screening Sites Field Sampling Plan* (CH2M HILL, 1995). Surface water samples were analyzed for VOCs, SVOCs, pesticides, dioxins, and total and soluble metals.

2.2.2 Sampling Procedures

Sections 2.2.2.1 and 2.2.2.2 describe the sampling procedures and laboratory analyses performed for surface soils and subsurface soils.

2.2.2.1 Surface Soil Sampling Procedures

With the approval of the TDEC and EPA, one surface soil sample (SS54A) was collected from this site (shown in Figure 3). Sample SS54A was taken approximately 2 feet east of the canal just south of B Street.



Sampling locations without data boxes had no constituents exceeding risk-based criteria

LEGEND

- Surface Soil Sampling Location (mg/kg)
- Soil Boring Sampling Location (mg/kg)
- Surface Water Sampling Location (mg/L)
- Sediment Sampling Location (mg/kg)

(Q) Qualifer Definitions
= - indicates unqualified detection
J - indicates estimated value above detection limit, but below reporting limit.

Figure 3
Site 54, DRMO Storm Water Runoff Canal
Constituents Exceeding Risk-Based Criteria
Defense Distribution Depot Memphis, TN

CH2MHILL

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The soil was removed from the ground using a standard stainless-steel hand auger. VOC samples were immediately collected from the top six inches of soil before being mixed. Part of the VOC sample was placed into a sealable plastic bag and allowed to equilibrate. The head space in the plastic bag was measured for VOCs using a hand-held PID, and the results were used to determine which sample location was selected for Level 3 COPC or TCL/TAL analyses. The soil was transferred into a stainless-steel bowl using stainless-steel trowels, mixed, and then placed into the appropriate sample jars.

All sampling tools were decontaminated before being used at each sample location according to the procedures specified in the *Generic Quality Assurance Project Plan* (CH2M HILL, 1995) for the RI/FS currently being conducted at DDMT.

2.2.2.2 Subsurface Soil Sampling Procedures

With the approval of the TDEC and EPA, subsurface soil samples were collected from two locations (SB54A and SB54B) at this site. Samples at both locations were collected at three depths: zero to 2 feet, 5 to 7 feet, and 8 to 10 feet. Sample SB54A was taken at the inlet of the canal, and Sample SB54B was taken at the outlet of the canal.

Samples were collected using a 2-inch-diameter, stainless-steel push sampler. VOC soil samples were collected directly from the continuous sampler using stainless-steel spoons. Part of the VOC sample was placed into a sealable plastic bag and allowed to equilibrate. The head space in the plastic bag was measured for VOCs using a hand-held PID, and the results were used to determine which interval within each boring was selected for Level 3 COPC or TCL/TAL analyses. The remaining soil was placed into a stainless-steel bowl, mixed, and then transferred into the appropriate sample jars.

2.2.2.3 Surface Water/Sediment Sampling Procedure

After a rainfall event of at least 0.2 inch following a 72-hour dry spell, three stormwater samples (SW54A, SW54B, and SW54C) were collected from three locations within the stormwater ditch (shown in Figure 3). Each sample was collected from the center of the channel at mid-depth. All surface water samples were collected within four hours of the end of the rainfall event. The following details the sample locations:

- Sample SW54A was taken east of Sample SB54A between the railroad tracks.
- Sample SW54B was taken south of SB54B, just south of Dunn Avenue and Perimeter Road.
- Sample SW54C was taken just southwest of Sample SS54A, and south of B Street.

Sediment samples were collected from three locations (SE54A, SE54B, and SE54C) in the ditch system. The following details the sample locations:

- Sample SE54A was taken approximately 40 feet downstream of Sample SW54A.
- Sample SE54B was taken south of Sample SB54B and north of Sample SW54B just south of Dunn Avenue.
- Sample SE54C was taken west of Sample SS54A, and south of B Street.

The Geoprobe™ was used to penetrate the concrete lining and to sample the soil just below the concrete lining. This method of sampling was performed to evaluate the soil that had been

exposed to runoff before the construction of the concrete lining. The concrete lining was penetrated at the bottom of the ditch and near the center, and sediment samples were collected when the ditch was dry.

All sampling tools were decontaminated before being used at each sample location according to the procedures specified in the *Generic Quality Assurance Project Plan* (CH2M HILL, 1995).

2.2.3 Analytical Procedures

All samples were sent to CH2M HILL's Analytical Services in Montgomery, Alabama for analyses. One surface soil, six subsurface soil, and three sediment samples were analyzed for VOCs, SVOCs, pesticides, dioxins, metals, and TCL/TAL. Three surface water samples were analyzed for VOCs, SVOCs, pesticides, dioxins, total metals, and soluble metals. Samples received at the laboratory were analyzed in accordance with the procedures outlined in the *Generic Quality Assurance Project Plan* (CH2M HILL, 1995).

A DQE was performed to assess the effect of the overall analytical process on the usability of the data CH2M HILL collected in 1997. The DQE established that the detection of acetone and bis(2-ethylhexyl)phthalate can be attributed to field sampling and laboratory contamination rather than to environmental conditions at the site. Also, low concentrations of dioxins and furans can be attributed to background or instrument noise and are not indicative of environmental conditions. With the exception of the qualifications listed above, the DQE concluded that data can be used in the project decision-making process.

3.0 Interpretation of Sampling Results

3.1 Presentation of Results

Sections 3.1.1 through 3.1.4 present results of the Screening Sites Sampling Program for Screening Site 54. Data are presented by media for surface soil, subsurface soils, surface water and sediment. Data are compared with appropriate screening criteria in five summary tables: Tables 54-A, 54-B, 54-C, 54-D, and 54-E. Data from the 1997 CH2M HILL investigation are presented along with historical data from the *Remedial Investigations at DDMT, Final Report* (Law Environmental, 1990). If a value from a sampling location exceeds one of the comparison criteria, that value and the comparison criterion are shown in bold on the summary table.

COPCs are parameters that exceed both background values and the screening criteria. Where concentrations exceed the selected background value, the concentration is compared with the observed range of background values as reviewed and established by the BCT.

The COPCs at Screening Site 54 include arsenic, dieldrin, and TCDD equivalent for surface soils; lead in subsurface soils; dissolved arsenic and DDT in surface water; and lead, DDT, DDD, and DDE in sediments. The BCT has identified dieldrin as a sitewide COPC, and it will be evaluated on a sitewide basis.

3.1.1 Surface Soil

Results of the surface soil analyses with values above detection limits are shown in Tables 54-A and 54-B.

3.1.1.1 BCT Screening Criteria

Table 54-A summarizes constituents for which the BCT has selected screening criteria. Arsenic and TCDD equivalent were detected at concentrations exceeding the BCT criteria.

Arsenic was found in Sample SB54B at a concentration of 27.3 mg/kg, which is slightly above the background value of 20 mg/kg. Arsenic was detected at two other surface soil sample locations (SB54A and SS54A) at concentrations that were below the background level.

TCDD Equivalent was detected at three sample locations (SB54A, SB54B, and SS54A) at concentrations that slightly exceed the BCT criteria of 0.00001 mg/kg.

3.1.1.2 Other Screening Criteria

Table 54-B compares the remaining constituents with the health-based RBCs for both residential and industrial exposure scenarios. Dieldrin is the only remaining constituent that was found at concentrations exceeding the screening criteria. Dieldrin was found at a concentration of 0.12 mg/kg in Sample SB54B, which exceeds the screening criteria of 0.04 mg/kg (residential RBC for soil ingestion). Dieldrin is found sitewide at DDMT and will be addressed in an upcoming risk evaluation.

3.1.2 Subsurface Soil

Table 54-C summarizes subsurface soil sampling data. Lead was the only constituent found at concentrations exceeding the background or groundwater protection criteria. At all depths of both borings, lead was detected at concentrations exceeding the groundwater protection value of 1.5 mg/kg. However, in only one case, Sample SB54B at 5 to 7 feet, did the lead concentration of 24.2 mg/kg slightly exceed the background value of 24 mg/kg.

3.1.3 Surface Water

Table 54-D summarizes surface water sampling data. Dissolved arsenic and DDT exceeded the screening criteria.

Dissolved arsenic was detected in all three surface water samples at values that exceeded the ambient water quality criteria for human health of 0.000018 milligrams per liter (mg/L). However, the background value for dissolved arsenic is 0.012 mg/L, and only Sample SW54C (at 0.0121 mg/L) slightly exceeded this background value.

DDT was detected in all three surface water samples at concentrations that exceeded all screening criteria. The detected values ranged from 0.000066J to 0.000086J mg/L.

Since both arsenic and DDT have very low solubility, detected concentrations are suspected to be from the suspended particulates in the surface water samples.

3.1.4 Sediment

Table 54-E summarizes the sediment sampling data. Note that sediment samples were taken from below the concrete ditch liner by augering through the concrete to collect a sample of underlying soil. This was done to evaluate the potential effects of historical operations at DDMT before the concrete lining was installed.

Lead was detected in all three sediment samples but only exceeded background values and screening criteria at Sample SE54B. Concentrations of lead at Sample SE54E were 63.9J mg/kg.

Concentrations of DDD exceeded background values and National Oceanic and Atmospheric Administration (NOAA) sediment criteria (0.002 mg/kg) at Samples SE54B and SE54C, with concentrations of 0.99J and 0.089J mg/kg, respectively.

At all three sediment sample locations, the concentrations of DDE exceeded the background values, the sediment PRG values, and the NOAA sediment criteria. DDE was detected at 0.015J mg/kg (SE54A), 0.12J mg/kg (SE54B), and 0.25J (SE54C).

DDT was detected at all three sediment sample locations, at concentrations exceeding the NOAA sediment criteria (0.001 mg/kg). No background values or PRG values are available for sediment for DDT. However, in terms of risk exposure, none of these are true sediment samples because they were collected from underneath the cement lining of the ditch and are currently not exposed to aquatic populations or subject to surface water transport.

3.2 Vertical and Lateral Extent

The site is a cement lined stormwater ditch. Potential historical releases have been investigated by sampling soils undeneath the cement lining, as well as collecting surface water after a rain event. Based on the data collected so far only low levels of historically used organo-chlorine pesticides were detected in the soils of the ditch. Their concentrations are similar to those found elsewhere at the site. Many of the inorganic constituents that were found are at concentrations similar to background levels.

Arsenic was detected in all media at this site, but only exceeded background values and screening criteria in surface soils (Sample SB54B at 27.3 mg/kg) and surface water (Sample SW54C at 0.0121 mg/L for dissolved arsenic). The maximum value of arsenic in surface soils detected from sampling across all screening sites on the Main Installation was in Sample SS52B at 45.1 mg/kg. Arsenic values exceeding the background value of 20 mg/kg in surface soil may be due to the natural variability of arsenic with changing soil type, or it could be from operations such as sitewide pesticide application.

Total dioxins, as expressed by the TCDD equivalent concentration, were detected in all media at extremely low concentrations across the site. Only in surface soil samples did the detected values exceed background or screening criteria. However, there were no localized high concentrations. Observed concentrations are similar to those detected in all the analyzed samples both at the site and background.Dieldrin is found in surface soil, subsurface soil, sediment, and surface water at this site, but only exceeds background or screening criteria is surface soils at one location (Sample SB54B at 0.12 mg/kg). Dieldrin will be addressed on a facilitywide basis as part of an upcoming risk evaluation.

Metals, such as lead, found in subsurface soils at concentrations that slightly exceed background are considered to be representative of the naturally occurring variability of metals with changing soil type. Elevated concentrations of metals were not found in surface soil samples.

DDD was only detected in sediments at this site in two (Samples SE54B and SE54C) of the three samples. The detected values exceeded background and screening criteria.

DDT was detected in all media at this site, but only in surface water (Samples SW54A, SW54B, and SW54C) and sediment (Samples SE54A, SE54B, and SE54C) at concentrations that exceeded screening criteria.

DDE was detected in all media except surface water. Only in the sediment samples (Samples SE54A, SE54B, and SE54C) did the detected concentrations exceed background and screening criteria.

Thus, low levels of metals, chlorinated pesticides, and dioxins were detected in soils underneath the cement lining of the canal at concentrations similar to surface soils. Stormwater contained arsenic, DDT, and DDE that could be from the soil particulates in the surface water sample.

3.3 Potential Migration Pathways

The following paragraphs provide a general discussion of the potential migration pathways for several constituents found at Screening Site 36.

Arsenic exists at several sites on DDMT in surface soils at concentrations above screening levels. Arsenic's mobility and toxicity are tied to its complex geochemistry and its ability to readily form soluble complexes. Arsenic may also readily be adsorbed onto clays, oxides, or humic organic material and migrate as suspended soil in surface water or as a sediment. Arsenic can exist in four common oxidation states, and these control its solubility. It readily transports through aquatic environments as a dissolved salt, or as a complex with an organic compound.

Lead is present at concentrations greater than background, or above screening criteria, in surface and subsurface soils, and in sediment at DDMT. Lead is moderately soluble and potentially can be leached from any of these forms of occurrence, reaching concentrations in aqueous solution in both groundwater and surface water that would be of concern to both human and ecological receptors. Additionally, lead in surface soils and sediment potentially may move as suspended particulate matter in surface waters and impact aquatic organisms.

Dieldrin is present at DDMT in surface and subsurface soils. Since this compound is only minutely soluble in water, its most likely migration pathway at this site is via erosion as suspended soil particles in the surface water, where it potentially would be available to aquatic organisms. Dieldrin in the subsurface soils should be relatively immobile, and not impact groundwater quality.

DDT, and two of its' degradation breakdown products, DDD and DDE, are present in subsurface soils at DDMT, and should not be mobile in this environment. These compounds have an extremely high affinity for soil and are essentially insoluble in water. So long as they are buried and the potential for direct contact is controlled, the potential to migrate is minimal. Should soil contaminated with these compounds be uncovered, they potentially would be able to be moved through wind action and/or as suspended material in surface water. DDT also was reported in sediments at two sites on DDMT, indicating migration via this pathway has occurred. These compounds can bioaccumulate and become more concentrated as they move up in the food chain, and could potentially affect receptors via this migration pathway.

3.4 Additional Data Needs

No additional data are needed for this site based on the existing information.

4.0 Interpretation of Screening Criteria Comparisons

4.1 Methodology

The PRE was performed in accordance with the *Guidance on Preliminary Risk Evaluations for the Purpose of Reaching a Finding of Suitability to Lease (FOSL)* (EPA Region IV, 1994). A discussion of the PRE methodology is provided as Appendix A to this document. This PRE addresses direct exposure concerns for human receptors using default assumptions.

4.2 Screening Site 54 Risk

Carcinogenic and noncarcinogenic risks for Screening Site 54 are presented in Table 4-28 of the draft PRE (USAESC, 1998), and detailed chemical-specific estimates are presented in Appendix A of the PRE.

The maximum PRE carcinogenic risk ratio for an industrial worker scenario is 7.5 in a million and the residential scenario is 67 in a million, which is from arsenic at 27.3 mg/kg compared to a background level of 20 mg/kg.

The noncarcinogenic ratio for an industrial worker is below a value of 1.0 and for a residential receptor is slightly above a value of 1.0, mostly from lead and other metals.

Because of the lack of organic contamination, there are no significant risks to human health at this site. Low levels of metals could be related to the historical background and do not indicate site-related impacts. No further action is recommended at Screening Site 54.

5.0 Summary and Recommendations

5.1 Summary

Chemicals detected underneath the cement lining of the ditch appear to be similar to surface soils across the base. Arsenic, dioxins/furans, dieldrin, lead, DDT, DDE, and DDD were detected at concentrations slightly exceeding the BCT criteria. Since there is not a current exposure pathway for these chemicals, additional characterization is not necessary. Chemicals detected across the base, such as metals and dieldrin, will be addressed through further risk evaluations.

5.2 Recommendations

No further action is recommended at Screening Site 54.

Screening Site 55—DRMO North Stormwater Runoff Area

1.0 Introduction

The chart below presents the location and status information for this screening site.

Parcel	Building Number	RI/FS[1] OU	Site Number	CERCLA[2] Status
15	DRMO North Runoff	4	55	Screening

[1]RI/FS: Remedial Investigation/Feasibility Study
[2]CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act

Screening Site 55 is located at the northern end of the Main Installation adjacent to Perimeter Road (Figure 4). It consists of the stormwater drain that collects runoff from the DRMO yard and the Main Installation. Sample locations were selected at the inlet of the stormwater drain that carries runoff across the northern DDMT boundary.

2.0 Study Area Investigation

2.1 Previous Investigations

No previous sampling data exist for this site.

2.2 Screening Site Sampling Program

2.2.1 Sampling Strategy

The sampling strategy was developed to evaluate whether releases have occurred to surface soils, subsurface soils, surface water, and sediments. Soil and sediment samples were analyzed for VOCs, SVOCs, pesticides, dioxins, and metals. At least one sample from these media at this site was analyzed for TCL/TAL constituents in accordance with the *Screening Sites Field Sampling Plan* (CH2M HILL, 1995). Surface water samples were analyzed for VOCs, SVOCs, pesticides, dioxins, and total and soluble metals.

2.2.2 Sampling Procedures

Sections 2.2.2.1 and 2.2.2.2 describe the sampling procedures and laboratory analyses performed for surface soils and subsurface soils.

2.2.2.1 Surface Soil Sampling Procedures

One surface soil sample was collected as part of soil boring SB55A; the location of this sample is described below and shown on Figure 4.

2.2.2.2 Subsurface Soil Sampling Procedures

With the approval of the TDEC and EPA, subsurface soil samples were collected at one location (SB55A) at this site (shown in Figure 4). At this location, samples were collected at three depths:

zero to 1 foot, 3 to 5 feet, and 8 to 10 feet . Sample SB55A was taken 10 feet south of Perimeter Road just south of a storm drain located west of the fence line.

Samples were collected using a 2-inch-diameter, stainless-steel push sampler. VOC soil samples were collected directly from the continuous sampler using stainless-steel spoons. Part of the VOC sample was placed into a sealable plastic bag and allowed to equilibrate. The head space in the plastic bag was measured for VOCs using a hand-held PID, and the results were used to determine which interval within each boring was selected for Level 3 COPC or TCL/TAL analyses. The remaining soil was placed into a stainless-steel bowl, mixed, and then transferred into the appropriate sample jars.

2.2.2.3 Surface Water/Sediment Sampling Procedures

After a rainfall event of at least 0.2 inch following a 72-hour dry spell, one stormwater sample (SW55A) was collected (shown in Figure 4). Sample SW55A was taken east of Sample SB55A and north of Perimeter Road and south of Dunn Avenue. The surface water sample was collected within four hours of the end of the rainfall event from the center of the stormwater drain. This sample was collected with the approval of the TDEC and EPA.

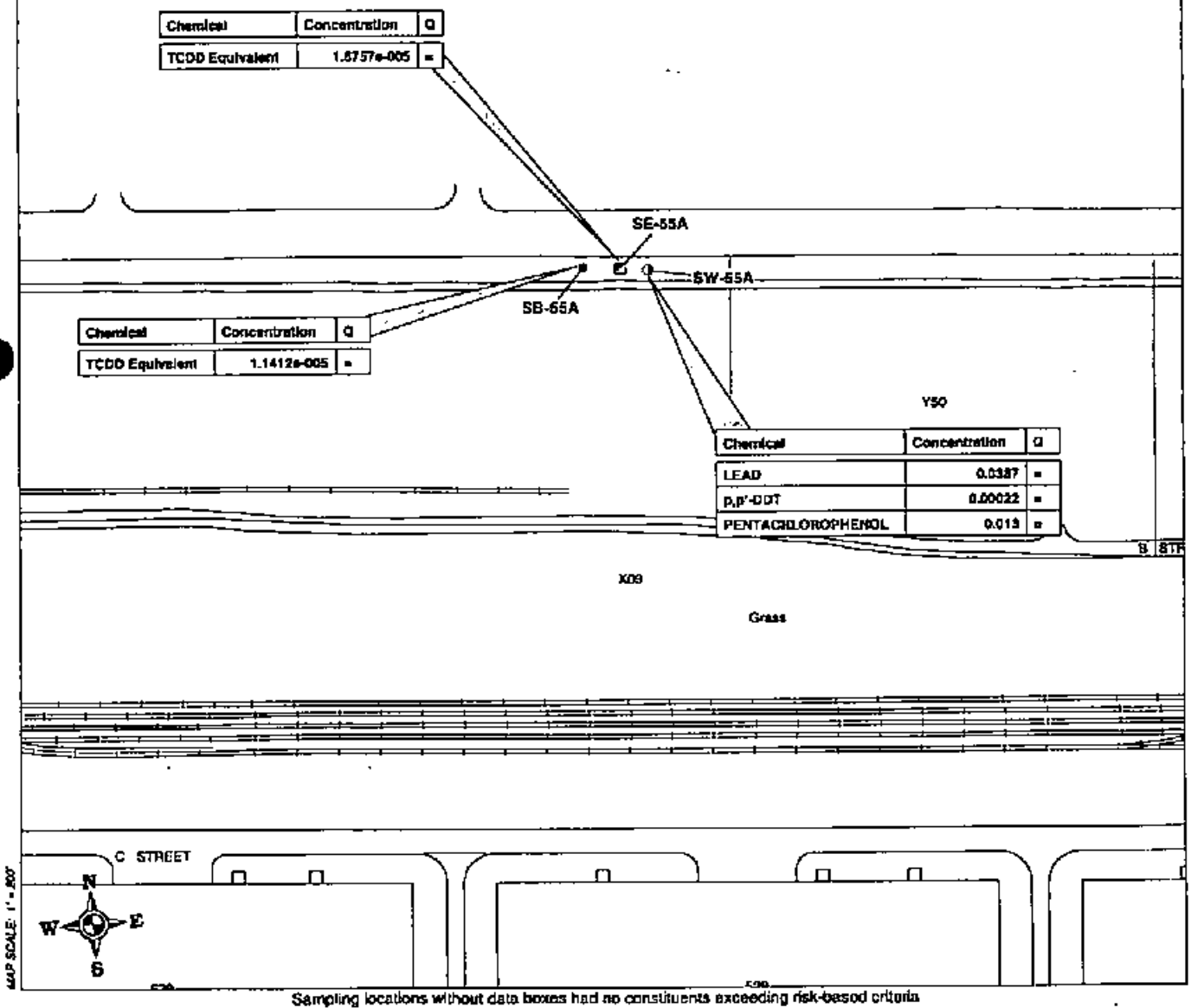
One sediment sample (SE55A) was collected from this site with the approval of the TDEC and EPA. Sample SE55A was taken east of Sample SB55A, west of Sample SW55A, north of Perimeter Road, and south of Dunn Avenue. A stainless-steel spoon was used to remove gravel and small amounts of sediment from the bottom of the drain or "trap." The large pieces of gravel from the sediment sample were removed before transferring the sample into the appropriate sample jars.

All sampling tools were decontaminated before being used at each sample location according to the procedures specified in the *Generic Quality Assurance Project Plan* (CH2M HILL, 1995) for the RI/FS currently being conducted at DDMT.

2.2.3 Analytical Procedures

All samples were sent to CH2M HILL's Analytical Services in Montgomery, Alabama for analyses. The three subsurface soil samples were analyzed for dioxins and TCL/TAL; the sediment sample was analyzed for VOCs, SVOCs, pesticides, dioxins, and TAL metals; and the surface water sample was analyzed for VOCs, SVOCs, pesticides, dioxins, total TAL metals, and soluble TAL metals. Samples received at the laboratory were analyzed in accordance with the procedures outlined in the *Generic Quality Assurance Project Plan* (CH2M HILL, 1995).

A DQE was performed to assess the effect of the overall analytical process on the usability of the data CH2M HILL collected in 1997. The DQE established that the detection of acetone and bis(2-ethylhexyl)phthalate can be attributed to field sampling and laboratory contamination rather than to environmental conditions at the site. Also, low concentrations of dioxins and furans can be attributed to background or instrument noise and are not indicative of environmental conditions. With the exception of the qualifications listed above, the DQE concluded that data can be used in the project decision-making process.



Sampling locations without data boxes had no constituents exceeding risk-based criteria

LEGEND

- Surface Soil Sampling Location (mg/kg)
- Soil Boring Sampling Location (mg/kg)
- Surface Water Sampling Location (mg/L)
- Sediment Sampling Location (mg/kg)

(Q) Qualifier Definitions
= - indicates unqualified detection
J - indicates estimated value above detection limit, but below reporting limit.

Figure 4
Site 55, DRMO North Storm Water Runoff Constituents Exceeding Risk-Based Criteria
Defense Distribution Depot Memphis, TN

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3.0 Interpretation of Sampling Results

3.1 Presentation of Results

Sections 3.1.1 through 3.1.4 present results of the Screening Sites Sampling Program for Screening Site 55. Data are presented by media for surface soils, subsurface soils, surface water, and sediments and compared with appropriate screening criteria in five summary tables: Tables 55-A, 55-B, 55-C, 55-D, and 55-E. Data from the 1997 CH2M HILL investigation are presented along with historical data from the *Remedial Investigations at DDMT, Final Report* (Law Environmental, 1990). If a value from a sampling location exceeds one of the comparison criteria, that value and the comparison criterion are shown in bold on the summary table.

COPCs are parameters that exceed both background values and the screening criteria. Where concentrations exceed the selected background value, the concentration is compared with the observed range of background values as reviewed and established by the BCT. Each detected concentration was compared with a criterion. Also the surface water detections for the stormwater were conservatively compared with aquatic life protection criteria, although these canals do not support aquatic life.COPCs at this site include lead, DDT, and pentachlorophenol (PCP) in surface water and DDD, DDE, DDT, and dioxins/furans in sediments. The dioxins/furans were in surface soils; there are no COPCs for subsurface soils.

3.1.1 Surface Soil

Results of the surface soil analyses with values above detection limits are shown in Tables 55-A and 55-B.

3.1.1.1 BCT Screening Criteria

Table 55-A summarizes constituents for which the BCT has selected a screening criteria. TCDD equivalent concentration was detected at 0.0000114 mg/kg in Sample SB55A, which slightly exceeds the background criteria of 0.00001 mg/kg.

3.1.1.2 Other Screening Criteria

Table 55-B compares the remaining constituents with the soil ingestion screening criteria for both residential and industrial exposure scenarios. No detected values that exceeded the (RBC) criteria for soil ingestion were found at this site. Most of the dioxin/furan detections were for the less toxic isomers, and their concentrations are similar or lower than those detected in the individual backgroundsamples.

3.1.2 Subsurface Soil

Table 55-C summarizes subsurface soil sampling data. No concentrations were detected that exceeded the background values and groundwater protection criteria.

3.1.3 Surface Water

Table 55-D summarizes surface water sampling data. Lead was detected at 0.0387 mg/L, which exceeds the background value of 0.019 mg/L, and the Federal Ambient Water Quality Criteria, Chronic criteria for the Protection of Freshwater Aquatic Life (AWQC-AO).

DDT was detected in Sample SW55A at a concentration of 0.00022 mg/L, which exceeds all three screening criteria shown in Table 55-D; however, no background value exists for DDT.

PCP was detected in Sample SW55A at 0.013 mg/L, which exceeds the Federal Ambient Water Quality Criteria for the Protection of Human Health for the Ingestion of Organisms and Water (AWQC-HH).

3.1.4 Sediment

These are dry-ditch lining soils, except during rain events. Table 55-E summarizes the sediment sampling data. DDD was detected in Sample SE55A at a concentration of 0.03 mg/kg, which exceeds the background value of 0.0061 mg/kg and the NOAA criteria of 0.002 mg/kg. DDE, detected at 0.032 mg/kg in Sample SE55A, exceeds the background value of 0.0072 mg/kg, the PRG criteria of 0.0017 mg/kg, and the NOAA criteria of 0.002 mg/kg. DDT, detected at 0.068 mg/kg, exceeds the NOAA criteria of 0.001 mg/kg. No background value or PRG criteria exist for this parameter.

TCDD Equivalent was estimated in sediments at this site at concentrations of 1.88E-05 mg/kg, which exceeds the background value of 0.0000054 mg/kg. However, since these ditches are dry, a surface soil background value is a more appropriate criterion, thus a value of 0.00001 is similar in concentration to that estimated for the site.

3.2 Vertical and Lateral Extent

The ditch was sampled during a rain event to represent the worst-case conditions. Thus, collected samples do not truly represent normal site conditions. Additionally, detected oncentrations were compared with sediment and surface water criteria protective of aquatic life, which is a conservative worst-case evaluation of the data. The dioxins and furans in surface soils, surface water, and sediments are similar to the background levels.Lead is detected in surface soils, subsurface soils, surface water, and sediments. However, only in surface water did the concentrations of lead exceed the background and screening criteria.

DDD, DDE, and DDT are found in surface soil, sediment, and surface water; however, screening criteria were exceeded in only surface water and sediments were. DDD, DDE, and DDT were all detected in sediments, but only DDT was detected in surface water. Surface water detections could be from suspended soil particulates.

PCP was only detected in surface water, again due to suspended soil particulates.

Soil boring samples to a depth of 10 feet indicated a lack of vertical transport of contaminants.

3.3 Potential Migration Pathways

The following paragraphs provide a general discussion of the potential migration pathways for several constituents found at Screening Site 55.

Lead is present at concentrations greater than background, or above screening criteria, in surface and subsurface soils, and in sediment at DDMT. Lead is moderately soluble and potentially can be leached from any of these forms of occurrence, reaching concentrations in aqueous solution in both groundwater and surface water that would be of concern to both

human and ecological receptors. Additionally, lead in surface soils and sediment potentially may move as suspended particulate matter in surface waters and impact aquatic organisms.

DDT, and two of its' degradation breakdown products, DDD and DDE, are present in subsurface soils at DDMT, and should not be mobile in this environment. These compounds have an extremely high affinity for soil and are essentially insoluble in water. So long as they are buried and the potential for direct contact is controlled, the potential to migrate is minimal. Should soil contaminated with these compounds be uncovered, they potentially would be able to be moved through wind action and/or as suspended material in surface water. DDT also was reported in sediments at two sites on DDMT, indicating migration via this pathway has occurred. These compounds can bioaccumulate and become more concentrated as they move up in the food chain, and could potentially affect receptors via this migration pathway.

3.4 Additional Data Needs

There are no additional data needs for Screening Site 55.

4.0 Interpretation of Screening Criteria Comparisons

4.1 Methodology

The PRE was performed in accordance with the *Guidance on Preliminary Risk Evaluations for the Purpose of Reaching a Finding of Suitability to Lease (FOSL)* (EPA Region IV, 1994). A discussion of the PRE methodology is provided as Appendix A to this document.

4.2 Screening Site 55 Risk

Carcinogenic and noncarcinogenic risks for Screening Site 55 are presented in Table 4-29 of the draft PRE (USAESC, 1998), and detailed chemical-specific estimates are presented in Appendix A of the PRE.

This evaluation addresses only direct exposures to human receptors to surface soil. The PRE carcinogenic risk is slightly above a level of one in a million due to presence of low levels of dioxins and furans in a single surface soil sample from this site. However, their concentrations are similar to the background levels and noncarcinogenic ratios were below a value of 1.0. The DDT concentrations were below BCT background levels. No Further Action is recommended at Screening Site 55.

5.0 Summary and Recommendations

5.1 Summary

Low levels of old pesticides and ambient atmospheric dions/furans were detected in surface soils at the site. Stormwater and sediment samples collected during rain events indicated presence of the same consituents at concentrations similar to the soil samples. The detected DDT (and its degradation products) and dioxin/furans were above aquatic life protection-

based criteria. However, these criteria are inappropriate because there are no aquatic life within the vicinity of the site. Overall, detected concentrations are low and similar to those detected elsewhere on the base as well as background.

5.2 Recommendations

No further action is recommended at Screening Site 55.

Screening Site 72—Waste Oil (PDO Yard) Surface Application for Dust Control

1.0 Introduction

The chart below presents the location and status information for this screening site.

Parcel	Building Number	RI/FS[1] OU	Site Number	CERCLA[2] Status
15	PDO Yard	4	72	Screening

[1]RI/FS: Remedial Investigation/Feasibility Study
[2]CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act

Waste oils mixed with PCP were applied to the soil surface in the Purchase Disposal Order (PDO) Yard for dust and weed control purposes. Screening Site 72, located in the northern section of the Main Installation, is north of B Street (Figure 5). Surface samples were selected based on the fact that waste oil has been applied directly to the surface soils, and therefore, surface soil contamination is probable.

2.0 Study Area Investigation

2.1 Previous Investigations

According to the *Remedial Investigations at DDMT, Final Report* (Law Environmental, 1990), four surface soil samples (SS1, SS2, SS3, and SS41) and three subsurface soil samples (STB31, STB32 and STB33) were collected at Screening Site 72 in 1989. Historical data from Screening Site 72 is summarized by media below. COPCs at historical sites are shown in Figure 5.

2.1.1 Surface Soil

Total xylenes, methylene chloride, acetone, and toluene (the only VOCs present in surface soil) were detected at up to 11, 7,100, 12, and 17 micrograms per kilogram (µg/kg), respectively. The methylene chloride concentration is suspect, however, because it also was detected in the method blank. Anthracene and pyrene (the only SVOCs that were detected at concentrations greater than sample quantitation limits) were detected in Sample SS1 at 6,100 and 3,100 µg/kg, respectively.

Three surface soil samples contained detectable amounts of DDE and DDT. The highest concentrations of these pesticides occurred in Sample SS2 at 290 and 1,500 µg/kg, respectively. Beta-BHC was also detected in Sample SS41 but was qualified as being not positively identifiable due to matrix interference. Several inorganic compounds common in soil were also detected in Screening Site 72. The concentrations of these compounds will be compared to established background concentrations and critical values in Section 3.0.

2.1.2 Subsurface Soil

Methylene chloride and acetone were found in subsurface soil samples at Screening Site 72; however, acetate, at 30 µg/kg in Sample STB33, was the only VOC detected at a concentration greater than the sample quantitation limit. Bis(2-ethylhexly)phthalate (detected in all three subsurface soil samples) is the only SVOC detected at concentrations greater than the sample quantitation limit, and it was also detected in the method blank. EP TOX procedure (SW846, Method 13.10) on the subsurface soil samples resulted in maximum barium and calcium concentrations of 49 and 7 µg/L, respectively.

2.2 Screening Site Sampling Program

2.2.1 Sampling Strategy

The sampling strategy was developed to evaluate whether releases have occurred to surface soils and subsurface soils. Samples were analyzed for PAHs and metals. At least one sample from each media was analyzed for TCL/TAL constituents in accordance with the *Screening Sites Field Sampling Plan* (CH2M HILL, 1995).

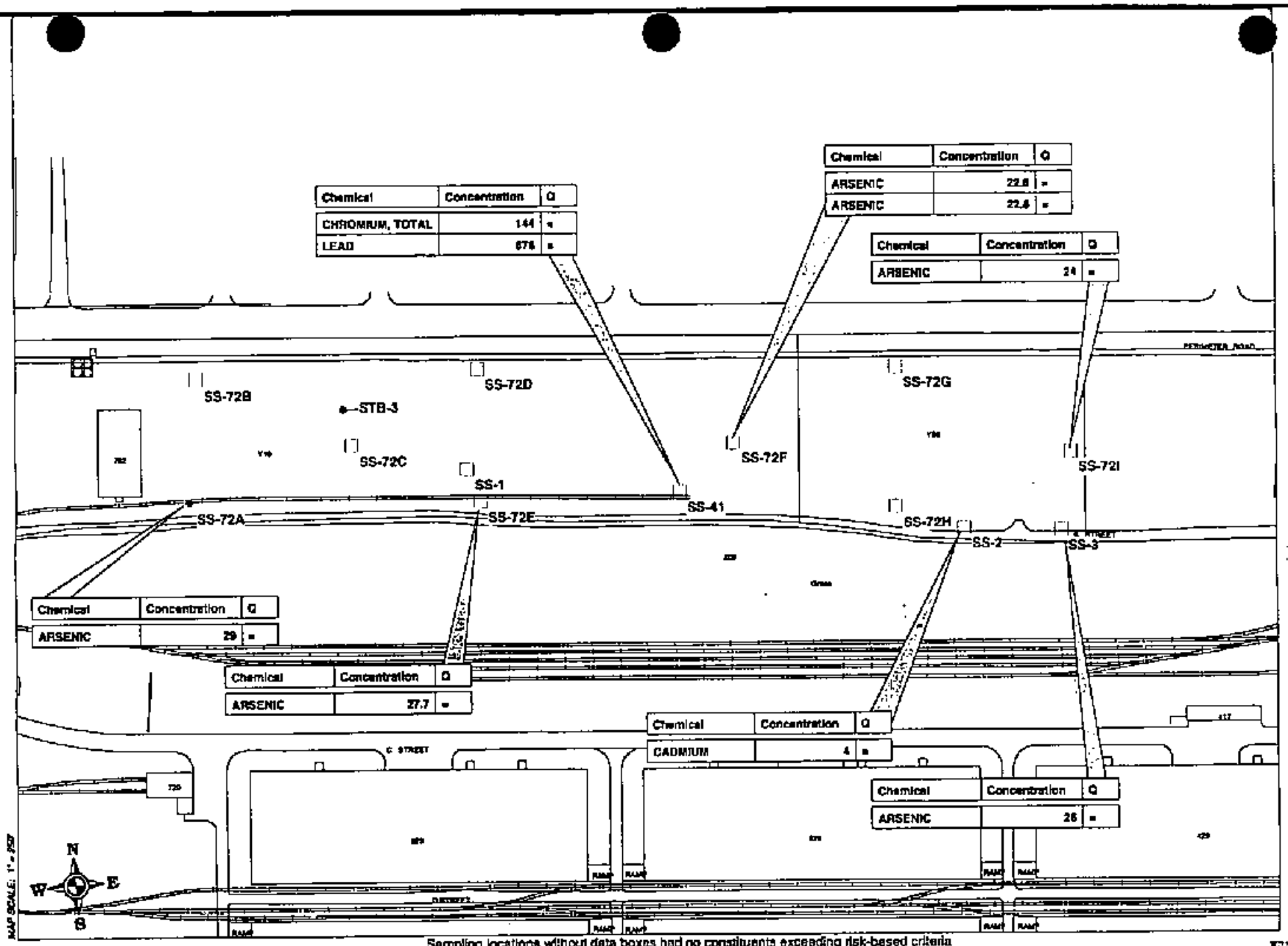
2.2.2 Sampling Procedures

Sections 2.2.2.1 and 2.2.2.2 describe the sampling procedures and laboratory analyses performed for surface soils and subsurface soils.

2.2.2.1 Surface Soil Sampling Procedures

With the approval of the TDEC and the EPA, surface soil samples were collected from nine locations (SS72A, SS72B, SS72C, SS72D, SS72E, SS72F, SS72G, SS72H, and SS72I) at this site (shown in Figure 5). The following details the sample locations:

- Sample SS72A was taken 87 feet east of the southeast corner of Building 702 and 7 feet south of a railroad track located just south of Building 702 and north of B Street.
- Sample SS72B was taken 75 feet east and 60 feet north of the northeastern corner of Building 702.
- Sample SS72C was taken southeast of Sample SS72B and southwest of Sample SS72D, which was 130 feet south of Perimeter Road and 130 feet east of the northeast corner of a nearby concrete pad. (The concrete pad is approximately 270 feet east of Building 702).
- Sample SS72D was taken northeast of Sample SS72C at 19 feet south of Perimeter Road, 4 feet north of a fire hydrant.
- Sample SS72E was taken 21 feet north of B Street and 8 feet south of a railroad track parallel to B Street. The sample location was 336 feet east of a nearby concrete pad. (The concrete pad is approximately 270 feet east of Building 702).
- Sample SS72F was taken south of Perimeter Road and 1000 feet east of Building 702. The sample was taken 60 feet north of a chain link fence located north of B Street and the railroad and 43 feet east of nearby wooden pallets.



Sampling locations without data boxes had no constituents exceeding risk-based criteria

LEGEND

- Surface Soil Sampling Location (mg/kg)
- Soil Boring Sampling Location (mg/kg)

(Q) Qualifier Definitions
= - indicates unqualified detection
J - indicates estimated value above detection limit, but below reporting limit.

Figure 5
Site 72, Waste Oil (PDO Yard)
Constituents Exceeding Risk-Based Criteria
Defense Distribution Depot Memphis, TN

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- Sample SS72G was taken 15 feet south of Perimeter Road, just south of a yellow brick house, and 87 feet east of a weather tower.
- Sample SS72H was taken southeast of Sample SS72F, north of B Street, 75 feet north of a chain link fence north of B Street extending east to west and 300 feet east of the same chain link fence which runs from north to south.
- Sample SS72I was taken 44 feet south of the fence line south of Perimeter Road and 117 feet east of a fire hydrant.

The samples were collected from the ground using a standard stainless-steel hand auger. VOC samples were immediately collected from the top six inches before being mixed. Part of the VOC sample was placed into a sealable plastic bag and allowed to equilibrate. The head space in the plastic bag was measured for VOCs using a hand-held PID, and the results were used to determine which interval within each boring might be selected for Level 3 analyses. The soil was transferred into a stainless-steel bowl using stainless-steel trowels, mixed, and then placed into the appropriate sample jar.

All sampling tools were decontaminated before use according to the *Generic Quality Assurance Project Plan* (CH2M HILL, 1995) for the RI/FS currently being conducted at DDMT.

2.2.2.2 Subsurface Soil Sampling Procedures

Subsurface soils were not sampled at this site during this sampling event.

2.2.3 Analytical Procedures

All samples were sent to CH2M HILL's Analytical Services in Montgomery, Alabama for analyses. The nine surface soil samples were analyzed for PAHs, metals, and TCL/TAL. Samples received at the laboratory were analyzed in accordance with the procedures outlined in the *Generic Quality Assurance Project Plan* (CH2M HILL, 1995).

A DQE was performed to assess the effect of the overall analytical process on the usability of the data CH2M HILL collected in 1997. The DQE established that the detection of acetone and bis(2-ethylhexyl)phthalate can be attributed to field sampling and laboratory contamination rather than to environmental conditions at the site. Also, low concentrations of dioxins and furans can be attributed to background or instrument noise and are not indicative of environmental conditions. With the exception of the qualifications listed above, the DQE concluded that data can be used in the project decision-making process.

3.0 Interpretation of Sampling Results

3.1 Presentation of Results

Sections 3.1.1 through 3.1.2 present results of the Screening Sites Sampling Program for Screening Site 72. Data are presented by media for surface and subsurface soils and compared with appropriate screening criteria in three summary tables: Tables 72-A, 72-B, and 72-C. Data from the 1997 CH2M HILL investigation are presented along with historical data from the *Remedial Investigations at DDMT, Final Report* (Law Environmental, 1990). If a value from a

sampling location exceeds one of the comparison criteria, that value and the comparison criterion are shown in bold on the summary table.

COPCs are parameters that exceed both background values and the screening criteria. Where concentrations exceed the selected background value, the concentration is compared with the observed range of background values as reviewed and established by the BCT.

There are four COPCs identified for Screening Site 72: arsenic, chromium, lead, and cadmium.

3.1.1 Surface Soil

Results of the surface soil analyses with values above detection limits are shown in Tables 72-A and 72-B.

3.1.1.1 BCT Screening Criteria

Table 72-A summarizes constituents for which the BCT has selected a screening criteria. Arsenic, chromium, and lead were detected at concentrations that exceed the BCT criteria and background values.

Arsenic was detected in ten surface soil samples at concentrations ranging from 13.3 mg/kg to 29 mg/kg. Arsenic concentrations detected in Samples SS72A (29 mg/kg), SS72E (27.7 mg/kg), SS72F (22.8 mg/kg), and SS72I (24 mg/kg) exceed the BCT criteria (background) value of 20 mg/kg. Arsenic was also detected in a previous investigation conducted by Law Environmental. In the *Remedial Investigations at DDMT, Final Report* (Law Environmental, 1990), arsenic was detected arsenic in Sample SS3 at 26 mg/kg, which exceeds the BCT criteria and background value.

In the same study, chromium was detected in Sample SS41 at 144 mg/kg, which exceeds the BCT criteria value of 24.8 mg/kg. No other surrounding samples had chromium above background levels.

Lead was detected in the 1990 RI (Law Environmental, 1990) in Sample SS41 at 878 mg/kg, which exceeds the BCT criteria value of 400 mg/kg and the background value of 30 mg/kg. Lead concentrations detected in the more recent CH2M HILL study did not exceed the BCT criteria value.

3.1.1.2 Other Screening Criteria

Table 72-B compares the remaining constituents with the soil ingestion screening criteria for both residential and industrial exposure scenarios. One constituent (cadmium) was detected at a concentration that exceeds screening criteria and background values.

Cadmium was detected in the *Remedial Investigations at DDMT, Final Report* (Law Environmental, 1990) in Sample SS2 at a concentration of 4 mg/kg, which slightly exceeds the residential soil ingestion screening value of 3.9 mg/kg and the background value of 1.4 mg/kg. Cadmium concentrations did not exceed the industrial soil ingestion screening value of 100 mg/kg. Also, cadmium was not detected in the recent 1997 sampling by CH2M HILL.

3.1.2 Subsurface Soil

Table 72-C summarizes subsurface soil sampling data. The data presented in the table consists of historical Law data (1990) because this site was not re-sampled during the more recent

sampling. There were no exceedances identified in the subsurface soil samples in the existing data.

3.2 Vertical and Lateral Extent

Thirteen surface soil samples were collected by CH2M HILL in the northern section of the Main Installation, north of B Street, east of Building 702 and west of Buildings 308 and 309. Elevated concentrations of arsenic, chromium, cadmium and lead were detected in the surface soil samples. No exceedences were detected in subsurface soils sampled by Law Environmental in 1990.

Arsenic concentrations exceed but are similar to background values in five surface soil samples (SS72A, SS72E, SS72F, SS72I, and SS3) at concentrations ranging from 22.8 mg/kg to 29 mg/kg.

One chromium and lead exceedance was detected in Sample SS41. No other chromium and lead concentrations detected in the surface soils were above background value ranges.

Cadmium was detected in the Law study (1990) in Sample SS2 at 4 mg/kg, which slightly exceeds the residential soil ingestion screening value of 3.9 mg/kg. It does not exceed the industrial soil ingestion screening value of 100 mg/kg. (Law's Sample SS2 is located just north of B Street, approximately 800 feet west of the south end of Building 309.)

COPCs (arsenic, chromium, cadmium, and lead) detected in the surface soil samples (SS72B, SS72D, SS72G, and STB-3) that are located in the northern most part of the Main Installation, just south of Perimeter Street, did not exceed background values. The detected concentrations were within background value ranges.

The boring samples taken by Law in 1990 (Sample STB3) at depths of 21 to 26 feet, 26 to 31 feet, and 93.5 to 98.5 feet did not detect any exceedances.

3.3 Potential Migration Pathways

The following paragraphs provide a general discussion of potential migration pathways for COPCs found at Screening Site 72.

Arsenic is present at several sites on the DDMT in surface soils, at concentrations above screening levels. Arsenic's mobility and toxicity are tied to its complex geochemistry, and its ability to readily form soluble complexes. Arsenic may also readily be adsorbed onto clays, oxides or humic organic material, and migrate as suspended soil in surface water or as a sediment. Arsenic can exist in four common oxidation states, and these control its solubility. It readily transports through aquatic environments as a dissolved salt, or as a complex with an organic compound.

Chromium has been reported from surface and subsurface soils at the DDMT in concentrations greater than the screening levels. Chromium occurs in two oxidation states: +3 and +6. The trivalent form readily combines with aqueous hydroxide to form insoluble chromium hydroxide and is of little risk. The hexavalent form is soluble and tends to stay in solution, unless some activated carbon material is present for it to sorb onto. Dissolved chromium is readily adsorbed onto sediments but may be bioaccumulated through aquatic organisms.

Lead is present at concentrations greater than background, or above screening criteria, in surface and subsurface soils, and in sediment at the DDMT. Lead is moderately soluble and potentially can be leached from any of these forms of occurrence, reaching concentrations in aqueous solution in both groundwater and surface water that would be of concern to both human and ecological receptors. Additionally, lead in surface soils and sediment potentially may move as suspended particulate matter in surface waters and impact aquatic organisms.

3.4 Additional Data Needs

No further characterization/investigations are suggested for this site.

4.0 Interpretation of Screening Criteria Comparisons

4.1 Methodology

The PRE was performed in accordance with the *Guidance on Preliminary Risk Evaluations for the Purpose of Reaching a Finding of Suitability to Lease (FOSL)* (EPA Region IV, 1994). A discussion of the PRE methodology is provided as Appendix A to this document.

4.2 Screening Site 72 Risk

Carcinogenic and noncarcinogenic risks for Screening Site 72 are presented in Table 4-30 of the draft PRE (USAESC, 1998), and detailed chemical-specific estimates are presented in Appendix A of the PRE.

The PRE carcinogenic risk ratio for an industrial worker is 7.6 million and a residential receptor is 67 in a million, primarily from arsenic at concentrations ranging between 22.8 and 29 mg/kg.

The noncarcinogenic ratio was below a value of 1.0 for an industrial worker scenario and is slightly above a value of 1.0 for a residential scenario. The average ratio is below 1.0.

In summary, there are no organic contaminants of concern at this site. The observed inorganic chemicals are naturally occurring, are nutritionally essential, and are within the same range as background concentrations. Thus, there are no significant human health concerns from Screening Site 72-related contamination and, therefore, no further action is expected at Screening Site 72; however, further risk evaluation is needed.

5.0 Summary and Recommendations

5.1 Summary

There are slight risks associated with Screening Site 72. According to Table 5-2, the PRE results indicate that the carcinogenic industrial and residential risk ratios are greater than 10^{-6} due to the elevated concentrations of arsenic.

Noncarcinogenic risk ratios are less than one.

5.2 Recommendations

It is recommended that a risk assessment be performed to determine that No Further Action is required for Screening Site 72.

Screening Site 74—Flammables and Toxics (West End Building 319)

1.0 Introduction

The chart below presents the location and status information for this screening site.

Parcel	Building Number	RI/FS[1] OU	Site Number	CERCLA[2] Status
15	319	4	74	Screening

[1]RI/FS: Remedial Investigation/Feasibility Study
[2]CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act

Figure 6 shows this site on the western end of Building 319, off of C Street. Screening Site 74 historically has been used for the storage of flammable and toxic materials. Sampling locations were selected based on activities conducted at the storage area such as loading and unloading areas and on surface water drainage pathways. Twenty-foot soil borings were selected because shallow and surface soil contamination is probable.

2.0 Study Area Investigation

2.1 Previous Investigations

No previous sampling data exists for this site.

2.2 Screening Site Sampling Program

2.2.1 Sampling Strategy

The sampling strategy was developed to evaluate whether releases have occurred to surface soils and subsurface soils. Samples were analyzed for SVOCs, VOCs, pesticides, and metals. At least one sample from each media was analyzed for TCL/TAL constituents in accordance with the *Screening Sites Field Sampling Plan* (CH2M HILL, 1995).

2.2.2 Sampling Procedures

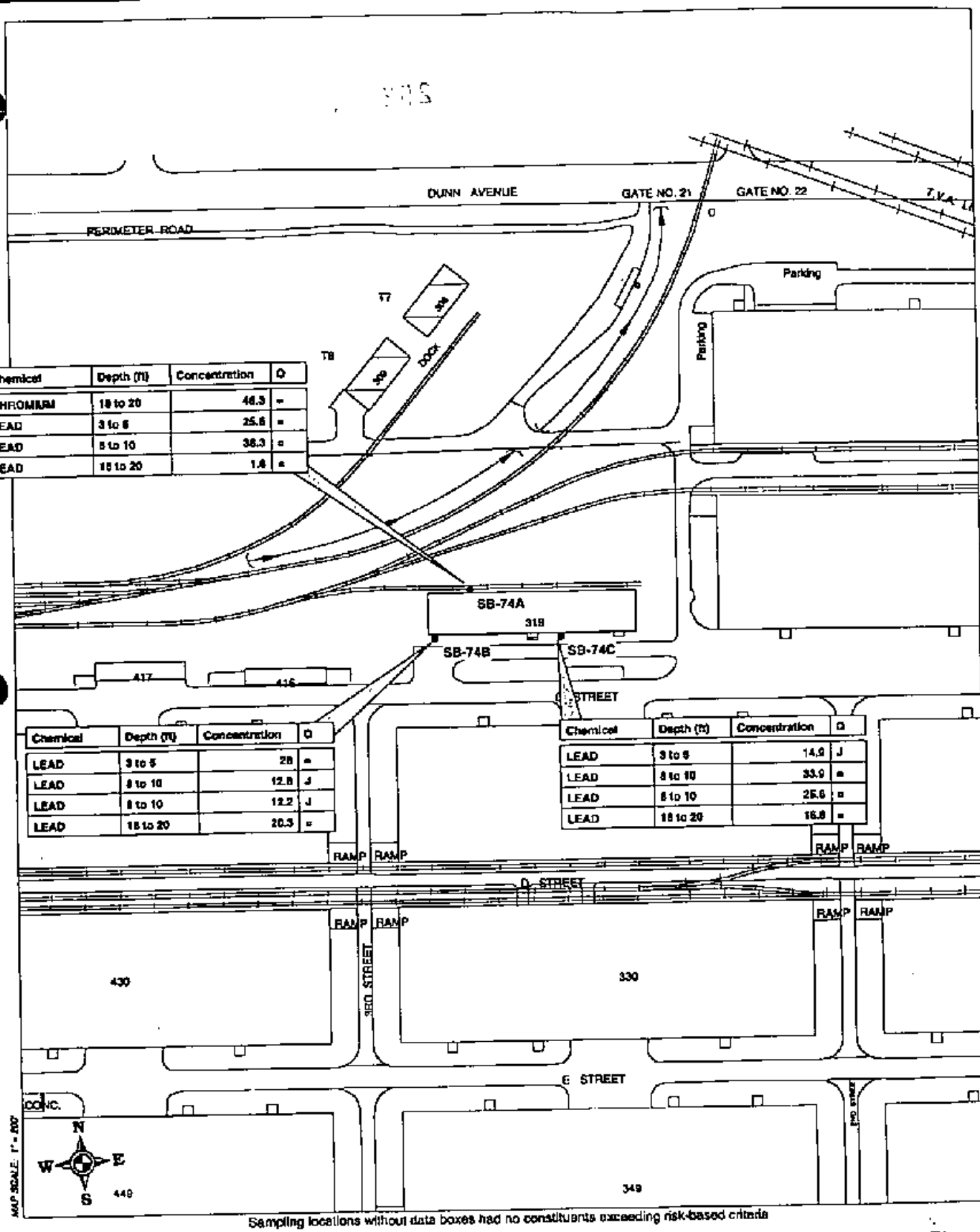
Sections 2.2.2.1 and 2.2.2.2 describe the sampling procedures and laboratory analyses performed for surface soils and subsurface soils.

2.2.2.1 Surface Soil Sampling Procedures

Surface soil samples were associated with borings, as discussed in Section 2.2.2.2.

2.2.2.2 Subsurface Soil Sampling Procedures

With the approval of the TDEC and the EPA, subsurface soil samples were collected from three locations (SB74A, SB74B, and SB74C) at this site (shown in Figure 6). At each location, samples



Chemical	Depth (ft)	Concentration	Q
CHROMIUM	18 to 20	46.3	=
LEAD	3 to 5	25.6	=
LEAD	8 to 10	36.3	=
LEAD	18 to 20	1.6	=

Chemical	Depth (ft)	Concentration	Q
LEAD	3 to 5	28	=
LEAD	8 to 10	12.8	J
LEAD	8 to 10	12.2	J
LEAD	18 to 20	20.3	=

Chemical	Depth (ft)	Concentration	Q
LEAD	3 to 5	14.9	J
LEAD	8 to 10	33.9	=
LEAD	8 to 10	25.6	=
LEAD	18 to 20	16.8	=

Sampling locations without data boxes had no constituents exceeding risk-based criteria

LEGEND

Soil Boring Sampling Location (mg/kg)

(Q) Qualifier Definitions
= - indicates unqualified detection
J - indicates estimated value above detection limit, but below reporting limit.

Figure 6
Site 74, West Ending Building 319
Constituents Exceeding Risk-Based Criteria
Defense Distribution Depot Memphis, TN

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were collected at three depths: zero to 1 foot, 4 to 6 feet, and 8 to 10 feet. The following details the sample locations:

- Sample SB74A was taken 60 feet east and 5 feet north of the northwest corner of Building 319.
- Sample SB74B was taken 4.5 feet south and 5 feet east of the southwest corner of Building 319.
- Sample SB74C was taken 10 feet south and 160 feet west of the southeast corner of Building 319.

Samples were collected using a 2-inch diameter, stainless-steel push sampler. Samples were collected at an interval of 18 to 20 feet using a 1-inch diameter stainless-steel push sampler. VOC soil samples were collected directly from the continuous sampler using stainless-steel spoons. Part of the VOC sample was placed into a sealable plastic bag and allowed to equilibrate. The head space in the plastic bag was measured for VOCs using a hand-held PID, and the results were used to determine which interval within each boring might be selected for Level 3 analyses. The remaining soil was placed into a stainless-steel bowl, mixed, and then transferred into the appropriate sample jar.

2.2.3 Analytical Procedures

All samples were sent to CH2M HILL's Analytical Services in Montgomery, Alabama for analyses. Twelve subsurface soil samples were analyzed for VOCs, SVOCs, pesticides, metals, and TCL/TAL. Samples received at the laboratory were analyzed in accordance with the procedures outlined in the *Generic Quality Assurance Project Plan* (CH2M HILL, 1995).

A DQE was performed to assess the effect of the overall analytical process on the usability of the data CH2M HILL collected in 1997. The DQE established that the detection of acetone and bis(2-ethylhexyl)phthalate can be attributed to field sampling and laboratory contamination rather than to environmental conditions at the site. Also, low concentrations of dioxins and furans can be attributed to background or instrument noise and are not indicative of environmental conditions. With the exception of the qualifications listed above, the DQE concluded that data can be used in the project decision-making process.

3.0 Interpretation of Sampling Results

3.1 Presentation of Results

Sections 3.1.1 through 3.1.2 present results of the Screening Sites Sampling Program for Screening Site 74. Data are presented separately for surface and subsurface soils and compared with appropriate screening criteria in three summary tables: Tables 74-A, 74-B, and 74-C. Data from the 1997 CH2M HILL investigation are presented along with historical data from the *Remedial Investigations at DDMT, Final Report* (Law Environmental, 1990). If a value from a sampling location exceeds one of the comparison criteria, that value and the comparison criterion are shown in bold on the summary table.

COPCs are parameters that exceed both background values and the screening criteria. Where concentrations exceed the selected background value, the concentration is compared with the observed range of background values as reviewed and established by the BCT.

There are two COPCs identified for Screening Site 74: chromium and lead. None of the other detected chemicals exceed screening criteria values.

3.1.1 Surface Soil

Results of the surface soil analyses with values above detection limits are shown in Tables 74-A and 74-B.

3.1.1.1 BCT Screening Criteria

Table 74-A summarizes constituents for which the BCT has selected screening criteria. There were no constituents detected at concentrations that exceed the BCT criteria and background values.

3.1.1.2 Other Screening Criteria

Table 74-B compares the remaining constituents with the soil ingestion screening criteria for both residential and industrial exposure scenarios. There were no constituents detected at concentrations that exceed screening criteria values.

3.1.2 Subsurface Soil

Table 74-C summarizes subsurface soil sampling data. Chromium and lead were detected at concentrations that exceed the groundwater protection screening level values.

Chromium was detected in eleven surface soil samples ranging from 16.8 mg/kg to 46.3 mg/kg. The highest detection of 46.3 mg/kg in Sample SB74A (18- to 20-foot depth) exceeded the groundwater protection value of 38 mg/kg and the background value of 26 mg/kg. However, these chromium levels appear to be naturally occurring at these depths across DDMT, thus are indicative of background conditions.

Lead was detected in eleven surface soil samples ranging from 1.8 mg/kg to 38.3 mg/kg. Five of the surface soil sample concentrations exceed the groundwater protection value of 1.5 mg/kg and the background value of 24 mg/kg but are thought to be from natural soils in the area at these depths.

3.2 Vertical and Lateral Extent

Surface and subsurface soil samples were taken north and south of Building 319 on the west side of the building. Elevated concentrations of chromium and lead were detected in the subsurface soils. Concentrations of chromium, lead, and other metals in the surface soils were within background value ranges. Constituents such as arsenic, PAHs, dieldrin, metals, and pesticides were detected in the surface and subsurface soils but none of the detected concentrations exceeded background and/or screening criteria values.

Chromium concentrations are normally within background range for subsurface soils, with the exception of the exceedance detected in the lower interval of Sample SB74A. Sample SB74A is located north of Building 319 just below a railroad track. Chromium concentrations detected in

Sample SB74A increased from the upper borehole sample (16.9 mg/kg at the 0- to 1-foot depth) to the lower interval sample (46.3 mg/kg at the 18- to 20-foot depth). The lower interval sample concentration exceeds screening criteria values.

Lead concentrations were observed to increase and decrease with depths between 0 to 20 feet. Exceedances were detected in all three sample locations (SB74A, SB74B, and SB74C) at depths between 3 to 5 feet and 8 to 10 feet.

Thus, surface soils are free of site-related contamination. Subsurface soils have slightly elevated lead and chromium levels, which are due to natural soil formations at these depths (mainly the 18- to 20-foot range).

3.3 Potential Migration Pathways

There is no localized elevated concentration for any of the chemicals detected at the site. Also, chromium and lead concentrations are close to background levels. Therefore, it is not evident that metals have significantly migrated through the soil column and ultimately towards groundwater. The following paragraphs provide a general discussion of potential hypothetical migration pathways for COPCs (chromium and lead) found at Screening Site 74.

Chromium has been reported from surface and subsurface soils at the DDMT in concentrations greater than the screening levels. Chromium occurs in two oxidation states: +3 and +6. The trivalent form readily combines with aqueous hydroxide to form insoluble chromium hydroxide and is of little risk. The hexavalent form is soluble and tends to stay in solution, unless some activated carbon material is present for it to sorb onto. Dissolved chromium is readily adsorbed onto sediments but may be bioaccumulated through aquatic organisms.

Lead is present at concentrations greater than background, or above screening criteria, in surface and subsurface soils, and in sediment at the DDMT. Lead is moderately soluble and potentially can be leached from any of these forms of occurrence, reaching concentrations in aqueous solution in both groundwater and surface water that would be of concern to both human and ecological receptors. Additionally, lead in surface soils and sediment potentially may move as suspended particulate matter in surface waters and impact aquatic organisms.

3.4 Additional Data Needs

No further characterization/investigations are suggested for this site.

4.0 Interpretation of Screening Criteria Comparisons

4.1 Methodology

The PRE was performed in accordance with the *Guidance on Preliminary Risk Evaluations for the Purpose of Reaching a Finding of Suitability to Lease (FOSL)* (EPA Region IV, 1994). A discussion of the PRE methodology is provided as Appendix A to this document.

4.2 Screening Site 74 Risk

Carcinogenic and noncarcinogenic risks for Screening Site 74 are presented in Table 4-31 of the draft PRE (USAESC, 1998), and detailed chemical-specific estimates are presented in Appendix A of the PRE.

There are no PRE carcinogenic risk ratios above 1 in a million for industrial and residential scenarios. The noncarcinogenic ratios were also below a value of 1.0 for both the industrial and residential scenarios.

5.0 Summary and Recommendations

5.1 Summary

There are no risks associated with Screening Site 74. The PRE carcinogenic risks are below 10^{-6} and noncarcinogenic ratios are less than one. No off-site runoff or groundwater impacts-related concerns are at the site.

5.2 Recommendations

No further action is recommended for Screening Site 74.

Screening Site 79—Fuels, Miscellaneous Liquids, Wood, and Paper

1.0 Introduction

The chart below presents the location and status information for this screening site.

Parcel	Building Number	RI/FS[1] OU	Site Number	CERCLA[2] Status
15	702	4	79	Screening

[1]RI/FS: Remedial Investigation/Feasibility Study
[2]CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act

Screening Site 79 (Figure 7) is located adjacent to Building 702, approximately 2,400 feet from the western boundary and 200 feet from the northern boundary of the Main Installation. Sample locations at this site were selected based on activities conducted at the building such as waste loading, unloading, and storage areas. Twenty-foot soil borings were selected to investigate potential leaching/percolation releases to surface soil.

2.0 Study Area Investigation

2.1 Previous Investigations

No previous sampling data exist for this site.

2.2 Screening Site Sampling Program

2.2.1 Sampling Strategy

The sampling strategy was developed to evaluate whether releases have occurred to surface and subsurface soils. Samples were analyzed for SVOCs, VOCs, pesticides and metals. At least one sample from each media was analyzed for TCL/TAL constituents in accordance with the *Screening Sites Field Sampling Plan* (CH2M HILL, 1995).

2.2.2 Sampling Procedures

Sections 2.2.2.1 and 2.2.2.2 describe the sampling procedures and laboratory analyses performed for surface soils and subsurface soils.

2.2.2.1 Surface Soil Sampling Procedures

With the approval of the TDEC and the EPA, surface soil samples were collected from six locations (SS79A, SS79B, SS79C, SB79A, SB79B, and SB79C) at this site (shown in Figure 7). The following details the sample locations:

- Sample SS79A was taken north of B Street and south of Building 702 just 1 foot west and 3 feet south of the southwest corner of the concrete pad extending south of the building.

- Sample SS79B was taken 23 feet north and 6 feet west from the northeast corner of Building 702.
- Sample SS79C was taken 7 feet west and 9 feet north from the northwest corner of Building 702.

The locations of surface soil samples associated with borings are described under Section 2.2.2.2.

The soil was removed from the ground using a standard stainless-steel hand auger. VOC samples were immediately collected from the top six inches before being mixed. Part of the VOC sample was placed into a sealable plastic bag and allowed to equilibrate. The head space in the plastic bag was measured for VOCs using a hand-held PID, and the results were used to determine which interval within each boring might be selected for Level 3 analyses. The soil was transferred to a stainless-steel bowl using stainless-steel trowels, mixed, and then placed into the appropriate sample jar.

All sampling tools were decontaminated before use at each sample location according to the procedures specified in the *Generic Quality Assurance Project Plan* (CH2M HILL, 1995) for the RI/FS currently being conducted at DDMT.

2.2.2.2 Subsurface Soil Sampling Procedures

With the approval of the TDEC and EPA, subsurface soil samples were collected from three locations (SB79A, SB79B, and SB79C) at this site. At each location, samples were collected at three depths: zero to 1 foot, 4 to 6 feet, and 8 to 10 feet. The following details the sample locations:

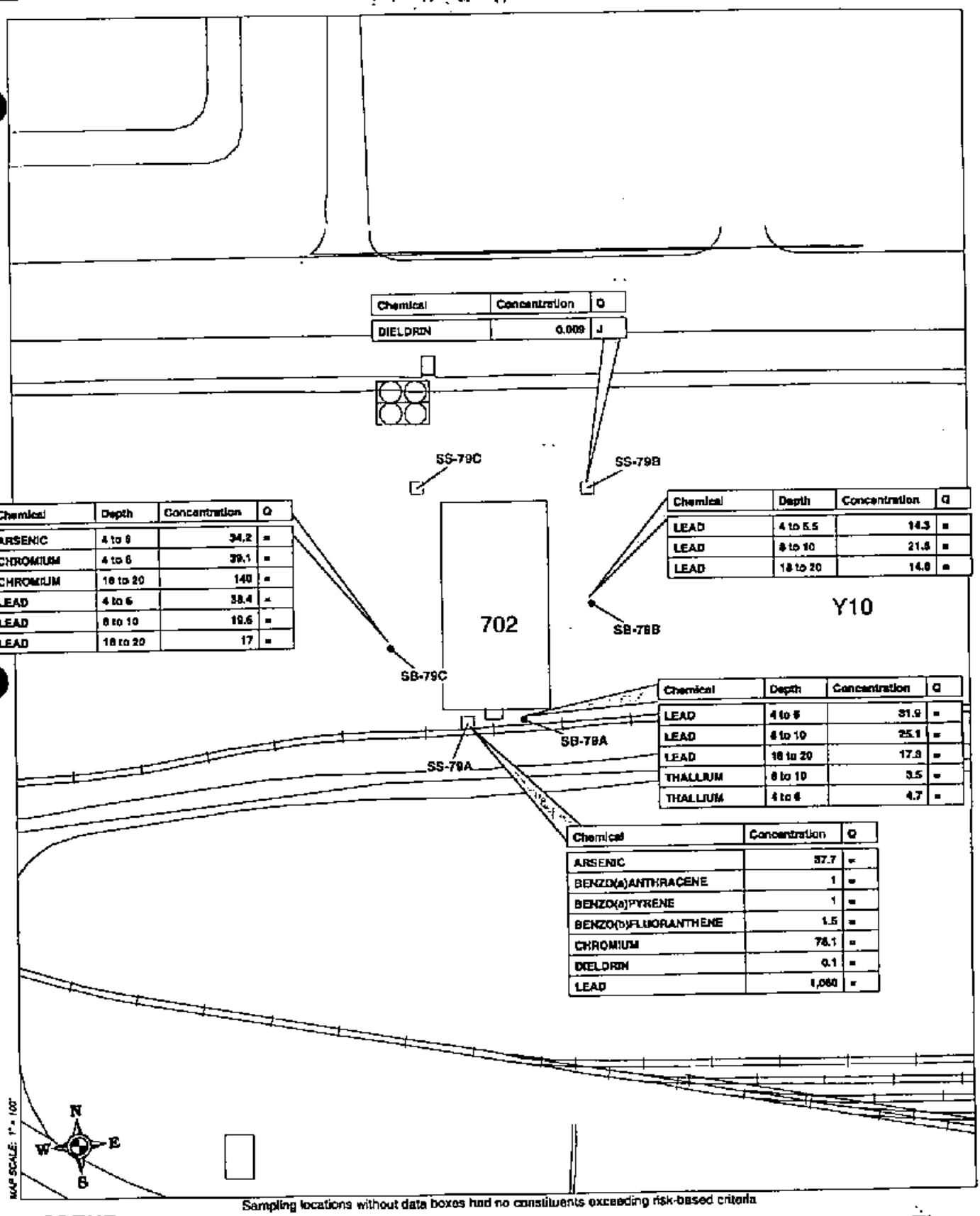
- Sample SB79A was taken just south of Building 702.
- Sample SB79B was taken 7 feet east and 57 feet south of the northeast corner of Building 702.
- Sample SB79C was taken 28 feet west and 72 feet north of the southwest corner of Building 702.

Samples were collected using a 2-inch-diameter, stainless-steel push sampler. Samples were collected at an interval of 18 to 20 feet using a 1-inch-diameter stainless-steel push sampler. VOC soil samples were collected directly from the continuous sampler using stainless-steel spoons. Part of the VOC sample was placed into a sealable plastic bag and allowed to equilibrate. The head space in the plastic bag was measured for VOCs using a hand-held PID, and the results were used to determine which interval within each boring might be selected for Level 3 analyses. The remaining soil was placed into a stainless steel bowl, mixed, and then transferred into the appropriate sample jar.

All sampling tools are decontaminated before use according to the *Generic Quality Assurance Project Plan* (CH2M HILL, 1995).

2.2.3 Analytical Procedures

All samples were sent to CH2M HILL's Analytical Services in Montgomery, Alabama for analyses. Three surface and 12 subsurface soil samples were analyzed for VOCs, SVOCs, pesticides, metals, and TCL/TAL. Samples received at the laboratory were analyzed in



Sampling locations without data boxes had no constituents exceeding risk-based criteria

LEGEND

- Surface Soil Sampling Location (mg/kg)
- Soil Boring Sampling Location (mg/kg)

(Q) Qualifier Definitions
= - indicates unqualified detection
J - indicates estimated value above detection limit, but below reporting limit.

Figure 7

Site 79, Fuels, Misc. Liquids, Wood & Paper Constituents Exceeding Risk-Based Criteria

Defense Distribution Depot Memphis, TN

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accordance with the procedures outlined in the *Generic Quality Assurance Project Plan* (CH2M HILL, 1995).

A DQE was performed to assess the effect of the overall analytical process on the usability of the data CH2M HILL collected in 1997. The DQE established that the detection of acetone and bis(2-ethylhexyl)phthalate can be attributed to field sampling and laboratory contamination rather than to environmental conditions at the site. Also, low concentrations of dioxins and furans can be attributed to background or instrument noise and are not indicative of environmental conditions. With the exception of the qualifications listed above, the DQE concluded that data can be used in the project decision-making process.

3.0 Interpretation of Sampling Results

3.1 Presentation of Results

Sections 3.1.1 through 3.1.2 present results of the Screening Sites Sampling Program for Screening Site 79. Data are presented separately for surface and subsurface soils and compared with appropriate screening criteria in three summary tables: Tables 79-A, 79-B, and 79-C. Data from the 1997 CH2M HILL investigation are presented along with historical data from the *Remedial Investigations at DDMT, Final Report* (Law Environmental, 1990). If a value from a sampling location exceeds one of the comparison criteria, that value and the comparison criterion are shown in **bold** on the summary table.

COPCs are parameters that exceed both background values and the screening criteria. Where concentrations exceed the selected background value, the concentration is compared with the observed range of background values as reviewed and established by the BCT.There are seven COPCs identified for Screening Site 79: arsenic, benzo(a)anthracene, benzo(a)pyrene, benzo(b)flouranthene, chromium, dieldrin and lead. Dieldrin and PAHs constituents, which have been identified by the BCT as sitewide COPCs, will be evaluated on a sitewide basis.

3.1.1 Surface Soil

Results of the surface soil analyses with values above detection limits are shown in Tables 79-A and 79-B.

3.1.1.1 BCT Screening Criteria

Table 79-A summarizes constituents for which the BCT has selected a screening criteria. Arsenic, benzo(a)anthracene, benzo(a)pyrene, benzo(b)flouranthene, chromium and lead were detected at concentrations exceeding the BCT criteria and background values.

Arsenic was detected in six surface soil samples at concentrations ranging from 7.6 mg/kg to 37.7 mg/kg. The highest concentration detected, 37.7 mg/kg in Sample SS79A, exceeds the BCT criteria (background) value of 20 mg/kg.

Benzo(a)anthracene was detected in Sample SS79A at 1 mg/kg, which exceeds the BCT criteria value of 0.88 mg/kg and the background value of 0.71 mg/kg. Benzo(a)pyrene and benzo(b)flouranthene were also detected in Sample SS79A. Benzo(a)pyrene was detected at 1 mg/kg, which exceeds the BCT criteria value of 0.088 mg/kg and the background value of 0.96 mg/kg. Benzo(b)flouranthene was detected in SS79A at 1.5 mg/kg, which exceeds the BCT

criteria value of 0.88 mg/kg and the background value of 0.78 mg/kg. This sample was collected adjacent to the railroad tracks.

Chromium was detected in six surface soil samples at concentrations ranging from 12.2 mg/kg to 78.1 mg/kg. The highest concentration detected, 78.1 mg/kg in Sample SS79A, exceeds the BCT criteria value of 39 mg/kg and the background value of 24.8 mg/kg.

Lead was detected in six surface soil samples ranging from 12.2 mg/kg to 1060 mg/kg. The highest concentration detected, 1060 mg/kg in Sample SS79A, exceeds the BCT criteria value of 400 mg/kg and the background value of 30 mg/kg.

All the constituents detected above criteria were from Sample SS79A, which was collected adjoining the railroad tracks; therefore, this sample does not represent site conditions.

3.1.1.2 Other Screening Criteria

Table 79-B compares the remaining constituents with the soil ingestion screening criteria for both residential and industrial exposure scenarios. Dieldrin was the only compound detected at concentrations exceeding the screening level values.

Dieldrin was detected in Sample SS79A at 0.1 mg/kg, which exceeds the background value of 0.086 mg/kg and the residential soil ingestion screening value of 0.04 mg/kg.

3.1.2 Subsurface Soil

Table 79-C summarizes subsurface soil sampling data. Arsenic, chromium, lead and thallium were detected at concentrations exceeding the groundwater protection criteria and background screening level values.

Arsenic was detected in all three boring locations at concentrations ranging from 7.7 mg/kg to 34. 2 mg/kg between depths of 4 to 20 feet. The highest concentration detected, 34.2 mg/kg in sample SB79C at the 4 to 6-foot depth, exceeds the background value of 17 mg/kg and the groundwater protection screening value of 29 mg/kg.

Chromium was detected in all three boring locations at concentrations ranging from 15.4 mg/kg to 140 mg/kg between depths of 4 to 20 feet. Chromium concentrations detected in Samples SB79A (39.9 mg/kg at the 18 to 20-foot depth) and SB79C (140 mg/kg at the 18 to 20-foot depth and 39.1 mg/kg at the 4 to 6-foot depth) exceed the background value of 26 mg/kg and the groundwater protection screening value of 38 mg/kg.

Lead was detected in all three boring locations at concentrations ranging from 14.3 mg/kg to 38.4 mg/kg between depths of 4 to 20 feet. Lead concentrations detected in Samples SB79A (31.9 mg/kg at the 4 to 6-foot depth and 25.1 mg/kg at the 8 to 10-foot depth) and SB79C (38.4 mg/kg at the 4 to 6-foot depth) exceed the background value of 24 mg/kg and the groundwater protection screening value of 1.5 mg/kg.

Thallium was detected in Sample SB79A at concentrations of 4.7 mg/kg (at the 4 to 6-foot depth) and 3.5 mg/kg (at the 8 to 10-foot depth), which exceed the groundwater protection screening value of 0.7 mg/kg. There is no background value for thallium in subsurface soils for comparison.

In summary, low levels metals exceeding background and groundwater protection levels were observed at two sampling locations, SB74A and SB74C. Of these, Sample SB74A does not

represent site conditions due to the railroad tracks. Chromium concentrations are relatively elevated at Sample SB74B at the 18- to 20-foot depth.

3.2 Vertical and Lateral Extent

Surface and subsurface soil samples were collected north, south, east, and west of Building 702. Elevated concentrations of metals, arsenic, PAHs and dieldrin were detected south and southwest of Building 702 (at Samples SS79A, SB79A, and SB79C). The following paragraphs discuss the possible extent of contamination for each COPC detected at Screening Site 79 based on the information gathered thus far.

Concentrations of metals (arsenic, chromium, lead, and thallium) were detected in surface and subsurface soils. Concentrations exceeding surface soil criteria for these constituents (excluding thallium) were observed in Sample SS79A, which is located 3 feet south of the southwest corner of Building 702 and just north of railroad tracks. Concentrations of these constituents detected in other surface soil sample locations were within the background range.

Metals (chromium, lead, and thallium) concentrations in the subsurface soils exceeded screening level values in boring Samples SB79A and SB79C, of which Sample SB79A is located south of Building 702 and Sample SB79C is located west of Building 702. (No exceedances of criteria were observed in Sample SB79B, located north of Building 702.) Chromium concentrations at Samples SB79A and SB79C were observed to increase with depth up to 20 feet. Lead concentrations at Samples SB79A and SB79C were observed to increase and decrease with depth up to 20 feet. Thallium concentrations were detected at Sample SB79A at depths of 4 to 6 feet and 8 to 10 feet, exceeding screening level values.

PAH and dieldrin concentrations were only detected in the surface soils at Sample SS79A, slightly exceeding screening level values. These are more representative of railroad operations than waste management activities at Screening Site 79.

3.3 Potential Migration Pathways

The following paragraphs provide a general discussion of potential migration pathways for COPCs found at Screening Site 79.

Arsenic is present at several sites on the DDMT in surface soils, at concentrations above screening levels. Arsenic's mobility and toxicity are tied to its complex geochemistry, and its ability to readily form soluble complexes. Arsenic may also readily be adsorbed onto clays, oxides, or humic organic material and migrate as suspended soil in surface water or as a sediment. Arsenic can exist in four common oxidation states, and these control its solubility. It readily transports through aquatic environments as a dissolved salt, or as a complex with an organic compound.

Chromium has been reported from surface and subsurface soils at the DDMT in concentrations greater than the screening levels. Chromium occurs in two oxidation states: +3 and +6. The trivalent form readily combines with aqueous hydroxide to form insoluble chromium hydroxide and is of little risk. The hexavalent form is soluble and tends to stay in solution, unless some activated carbon material is present for it to sorb onto. Dissolved chromium is readily adsorbed onto sediments but may be bioaccumulated through aquatic organisms.

Lead is present at concentrations greater than background, or above screening criteria, in surface and subsurface soils and in sediment at the DDMT. Lead is moderately soluble and potentially can be leached from any of these forms of occurrence, reaching concentrations in aqueous solution in both groundwater and surface water that would be of concern to both human and ecological receptors. Additionally, lead in surface soils and sediment potentially may move as suspended particulate matter in surface waters and impact aquatic organisms.

Benzo(a)anthracene, benzo(a)pyrene, and benzo(b)fluoranthene, a group of related, long-chain PAHs have similar chemical and physical characteristics and tend to migrate and behave in the environment in a similar manner. Generally, these compounds have low vapor pressures, are only marginally soluble in water, and have a high affinity for soils. All of these compounds have been detected at concentrations above screening values for surface soils at the DDMT. They would be expected to migrate as adsorbed components of the soils and would potentially be available to aquatic organisms in turbid surface water or to bottom feeders in areas with contaminated sediments. That none of these compounds was detected in sediments indicates this is not a major source of contaminant migration for these compounds at this site. These compounds do not bioaccumulate significantly due to their rapid metabolism and excretion by most aquatic organisms.

Dieldren exists at the DDMT in surface and subsurface soils. Since this compound is only minutely soluble in water, its most likely migration pathway at this site is via erosion as suspended soil particles in the surface water, where it potentially would be available to aquatic organisms. Dieldren in the subsurface soils should be relatively immobile and not impact groundwater quality.

3.4 Additional Data Needs

Additional subsurface soil sampling near Sample SB79C at the 18- to 20-foot interval is needed to confirm the anomalous elevated concentration of chromium at this depth. If the chromium remains elevated in this additional sample, groundwater sampling for metals may be necessary.

4.0 Interpretation of Screening Criteria Comparisons

4.1 Methodology

The PRE was performed in accordance with the *Guidance on Preliminary Risk Evaluations for the Purpose of Reaching a Finding of Suitability to Lease (FOSL)* (EPA Region IV, 1994). A discussion of the PRE methodology is provided as Appendix A to this document.

4.2 Screening Site 79 Risk

Carcinogenic and noncarcinogenic risks for Screening Site 79 are presented in Table 4-32 of the draft PRE (USAESC, 1998), and detailed chemical-specific estimates are presented in Appendix A of the PRE.

The PRE carcinogenic ratios were above a 1-in-a-million risk level for both industrial and residential scenarios due to the presence of PAHs and arsenic.

The noncarcinogenic PRE ratios were above a value of 1.0 for both scenarios due to the presence of PAHs and metals.

The PAHs and metals levels present a potential human health risk concern and may need to be further evaluated.

5.0 Summary and Recommendations

5.1 Summary

Screening Site 79 has been used for handling and storing fuels, waste oils, and other miscellaneous liquids. Possibly because of the historical nature of the site's operations, none of the fuel oils were detectable in the site media. Residual waste oils may contain PAHs; however, observed concentrations are similar to those found everywhere else at DDMT, and highest concentrations at the site were associated with sample from railroad tracks. According to Table 5-2, the PRE results indicate that the industrial and residential risks exceed $1x10^{-6}$ due to elevated concentrations of PAHs and arsenic. Noncarcinogenic ratios were above one due to PAHs and metals.

5.2 Recommendations

Based on BCT meeting minutes of September 1997, Building 702 is being demolished. It is recommended that a risk assessment be performed to determine that No Further Action is required at Screening Site 79. Confirmation of the elevated chromium concentration in subsurface soil is needed to establish if groundwater is potentially impacted by metals.

Table 35-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 35
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
CH2M HILL	ANTIMONY	SB35A	2.4	J	7	7	Bckg	MG/KG
CH2M HILL	ARSENIC	SB35A	9.2	J	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SB35B	15.9	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SB35C	17.3	=	20	20	Bckg	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	SB35A	0.11	J	.71	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	SB35B	0.16	J	.71	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(a)PYRENE	SB35A	0.12	J	.96	0.088	Residential RBC	MG/KG
CH2M HILL	BENZO(a)PYRENE	SB35B	0.15	J	.96	0.088	Residential RBC	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	SB35A	0.14	J	.78	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	SB35B	0.14	J	.78	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(g,h,i)PERYLENE	SB35A	0.093	J	.82	230	Residential RBC	MG/KG
CH2M HILL	BENZO(g,h,i)PERYLENE	SB35B	0.1	J	.82	230	Residential RBC	MG/KG
CH2M HILL	BENZO(k)FLUORANTHENE	SB35A	0.14	J	.78	8.8	Residential RBC	MG/KG
CH2M HILL	BERYLLIUM	SB35A	0.47	J	1.1	1.1	Bckg	MG/KG
CH2M HILL	BERYLLIUM	SB35B	0.95	=	1.1	1.1	Bckg	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB35A	14.6	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB35B	26.8	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB35C	24.3	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHRYSENE	SB35A	0.14	J	.94	88	Residential RBC	MG/KG
CH2M HILL	CHRYSENE	SB35B	0.2	J	.94	88	Residential RBC	MG/KG
CH2M HILL	FLUORANTHENE	SB35A	0.35	J	1.6	310	Residential RBC	MG/KG
CH2M HILL	FLUORANTHENE	SB35B	0.46	=	1.6	310	Residential RBC	MG/KG
CH2M HILL	INDENO(1,2,3-c,d)PYRENE	SB35A	0.094	J	.7	0.88	Residential RBC	MG/KG
CH2M HILL	INDENO(1,2,3-c,d)PYRENE	SB35B	0.094	J	.7	0.88	Residential RBC	MG/KG
CH2M HILL	LEAD	SB35A	10.6	J	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SB35B	22.4	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SB35C	20.3	=	30	400	CERCLA	MG/KG
CH2M HILL	PHENANTHRENE	SB35A	0.18	J	.61	2300	Residential RBC	MG/KG
CH2M HILL	PHENANTHRENE	SB35B	0.33	J	.61	2300	Residential RBC	MG/KG
CH2M HILL	PYRENE	SB35A	0.25	J	1.5	230	Residential RBC	MG/KG
CH2M HILL	PYRENE	SB35B	0.31	J	1.5	230	Residential RBC	MG/KG

Table 35-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 35
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
CH2M HILL	ZINC	SB35A	57.9	J	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SB35B	144	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SB35C	102	=	130	23000	Residential RBC	MG/KG
LAW	ARSENIC	SS4	33	=	20	20	Bckg	MG/KG
LAW	CHROMIUM, TOTAL	SS4	14	=	24.8	39	Residential RBC	MG/KG
LAW	FLUORANTHENE	SS4	0.1	J	1.6	310	Residential RBC	MG/KG
LAW	LEAD	SS4	22	=	30	400	CERCLA	MG/KG
LAW	PHENANTHRENE	SS4	0.1	J	.61	2300	Residential RBC	MG/KG
LAW	ZINC	SS4	80.7	=	130	23000	Residential RBC	MG/KG

Notes:

1. Detected values are obtained from the *Draft Parcel 15 Report-Screening Sites Sampling Program for Defense Depot* Memphis, TN, CH2M HILL, 1997, and the *Remedial Investigation at DDMT Final Report*, Law Environmental, August 1990.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. Based on values selected by the BRAC Cleanup Team in the August 1997 BCT meeting minutes, Memphis, Tennessee.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
J - indicates estimated value above the detection limit but below the reporting limit.
= - indicates unqualified detection
BCT - BRAC Cleanup Team

Table 35-B
Summary of Detected Compounds in Surface Soils
Compared to Non-BCT Screening Levels for Site 35
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	Risk-Based Concentrations Soil Ingestion[4]		Units
						Residential	Industrial	
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB35B	0.12	J	NA	46	410	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB35C	0.094	J	NA	46	410	MG/KG
CH2M HILL	COPPER	SB35A	18.2	J	33	310	8200	MG/KG
CH2M HILL	COPPER	SB35B	29.3	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SB35C	31	=	33	310	8200	MG/KG
CH2M HILL	DI-n-BUTYL PHTHALATE	SB35B	0.089	J	NA	780	20000	MG/KG
CH2M HILL	DI-n-BUTYL PHTHALATE	SB35C	0.11	J	NA	780	20000	MG/KG
CH2M HILL	NICKEL	SB35A	21	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SB35B	33.9	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SB35C	33.6	=	30	160	4100	MG/KG
CH2M HILL	p,p'-DDT	SB35A	0.0041	=	.074	1.9	17	MG/KG
LAW	ACETONE	SS4	0.008	J	NA	780	20000	MG/KG
LAW	BARIUM	SS4	97.8	=	234	550	14000	MG/KG
LAW	bis(2-ETHYLHEXYL) PHTHALATE	SS4	0.42	J	NA	46	410	MG/KG
LAW	CADMIUM	SS4	1	=	1.4	3.9	100	MG/KG
LAW	COPPER	SS4	26	=	33	310	8200	MG/KG
LAW	DIELDRIN	SS4	0.065	=	.086	.04	.36	MG/KG
LAW	MERCURY	SS4	0.05	=	.43	2.3	61	MG/KG
LAW	METHYLENE CHLORIDE	SS4	0.016	=	NA	85	760	MG/KG
LAW	NICKEL	SS4	14	=	30	160	4100	MG/KG
LAW	Total Polynuclear Aromatic Hydrocarbons	SS4	0.2	=	NA	NA	NA	MG/KG

Notes:
1. Detected values are obtained from the *Draft Parcel 15 Report-Screening Sites Sampling Program for Defense Depot Memphis, TN*, CH2M HILL, 1997, and the *Remedial Investigation at DDMT Final Report*, Law Environmental, August 1990.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. Risk-Based Concentrations are obtained from the *EPA Region III Risk-based Concentrations Table*, R.L. Smith, April, 1997.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
= - indicates unqualified detection.
J - indicates estimated value above the detection limit but below the reporting limit.

Table 35-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 35
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	ACETONE	SB28A	3 to 5	0.16	=	NA	16	MG/KG
CH2M HILL	ACETONE	SB35A	18 to 20	0.003	J	NA	16	MG/KG
CH2M HILL	ACETONE	SB35A	3 to 5	0.013	=	NA	16	MG/KG
CH2M HILL	ACETONE	SB35A	8 to 10	0.011	J	NA	16	MG/KG
CH2M HILL	ACETONE	SB35C	18 to 20	0.012	J	NA	16	MG/KG
CH2M HILL	ACETONE	SB35C	3 to 5	0.086	=	NA	16	MG/KG
CH2M HILL	ACETONE	SB35C	8 to 10	0.1	=	NA	16	MG/KG
CH2M HILL	ACETONE	SB35C	8 to 10	0.13	=	NA	16	MG/KG
CH2M HILL	ALUMINUM	SB35B	8 to 10	7850	=	21829	NA	MG/KG
CH2M HILL	ARSENIC	SB35A	18 to 20	8.4	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB35A	3 to 5	15.5	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB35A	8 to 10	23.9	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB35A	8 to 10	26.1	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB35B	18 to 20	12.4	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB35B	4 to 6	15.9	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB35B	8 to 10	4.3	J	17	29	MG/KG
CH2M HILL	ARSENIC	SB35C	18 to 20	8.4	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB35C	3 to 5	14	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB35C	8 to 10	11.9	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB35C	8 to 10	11.3	=	17	29	MG/KG
CH2M HILL	BARIUM	SB35B	8 to 10	208	=	300	1600	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	SB35B	4 to 6	0.042	J	NA	2	MG/KG
CH2M HILL	BENZO(a)PYRENE	SB35B	4 to 6	0.049	J	NA	8	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	SB35B	4 to 6	0.057	J	NA	5	MG/KG
CH2M HILL	BENZYL BUTYL PHTHALATE	SB35C	18 to 20	0.086	J	NA	930	MG/KG
CH2M HILL	BENZYL BUTYL PHTHALATE	SB35C	8 to 10	0.096	J	NA	930	MG/KG
CH2M HILL	BERYLLIUM	SB35A	8 to 10	1	=	1.2	63	MG/KG
CH2M HILL	BERYLLIUM	SB35B	18 to 20	1	=	1.2	63	MG/KG
CH2M HILL	BERYLLIUM	SB35B	8 to 10	0.63	J	1.2	63	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB35A	3 to 5	0.15	J	NA	3600	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB35A	8 to 10	1.8	=	NA	3600	MG/KG

Table 35-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 35
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB35A	8 to 10	1.6	=	NA	3600	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB35B	18 to 20	1.6	=	NA	3600	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB35B	4 to 6	1.2	=	NA	3600	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB35C	18 to 20	0.18	J	NA	3600	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB35C	3 to 5	0.25	J	NA	3600	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB35C	8 to 10	0.063	J	NA	3600	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB35C	8 to 10	0.1	J	NA	3600	MG/KG
CH2M HILL	CADMIUM	SB35B	8 to 10	0.45	J	1.4	8	MG/KG
CH2M HILL	CALCIUM	SB35B	8 to 10	715	=	2400	NA	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB35A	18 to 20	29.9	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB35A	3 to 5	24.9	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB35A	8 to 10	32.6	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB35A	8 to 10	32.6	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB35B	18 to 20	40.6	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB35B	4 to 6	25.1	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB35B	8 to 10	9.9	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB35C	18 to 20	31.5	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB35C	3 to 5	25.6	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB35C	8 to 10	19.3	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB35C	8 to 10	19.1	=	26	38	MG/KG
CH2M HILL	CHRYSENE	SB35B	4 to 6	0.066	J	NA	160	MG/KG
CH2M HILL	COBALT	SB35B	8 to 10	6.8	=	20	NA	MG/KG
CH2M HILL	COPPER	SB35A	18 to 20	19.5	=	33	NA	MG/KG
CH2M HILL	COPPER	SB35A	3 to 5	23.6	=	33	NA	MG/KG
CH2M HILL	COPPER	SB35A	8 to 10	36.9	=	33	NA	MG/KG
CH2M HILL	COPPER	SB35A	8 to 10	37	=	33	NA	MG/KG
CH2M HILL	COPPER	SB35B	18 to 20	25.1	=	33	NA	MG/KG
CH2M HILL	COPPER	SB35B	4 to 6	27.1	=	33	NA	MG/KG
CH2M HILL	COPPER	SB35B	8 to 10	8.6	J	33	NA	MG/KG
CH2M HILL	COPPER	SB35C	18 to 20	18.3	=	33	NA	MG/KG
CH2M HILL	COPPER	SB35C	3 to 5	25.3	=	33	NA	MG/KG

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Table 35-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 35
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[1]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	COPPER	SB35C	8 to 10	19.6	=	33	NA	MG/KG
CH2M HILL	COPPER	SB35C	8 to 10	16.6	=	33	NA	MG/KG
CH2M HILL	DI-n-BUTYL PHTHALATE	SB35A	18 to 20	0.078	J	NA	2300	MG/KG
CH2M HILL	DI-n-BUTYL PHTHALATE	SB35A	3 to 5	0.046	J	NA	2300	MG/KG
CH2M HILL	DI-n-BUTYL PHTHALATE	SB35A	8 to 10	0.24	J	NA	2300	MG/KG
CH2M HILL	DI-n-BUTYL PHTHALATE	SB35B	18 to 20	0.092	J	NA	2300	MG/KG
CH2M HILL	DI-n-BUTYL PHTHALATE	SB35B	4 to 6	0.13	J	NA	2300	MG/KG
CH2M HILL	DI-n-BUTYL PHTHALATE	SB35C	18 to 20	0.12	J	NA	2300	MG/KG
CH2M HILL	DI-n-BUTYL PHTHALATE	SB35C	8 to 10	0.15	J	NA	2300	MG/KG
CH2M HILL	DI-n-BUTYL PHTHALATE	SB35C	8 to 10	0.13	J	NA	2300	MG/KG
CH2M HILL	FLUORANTHENE	SB35B	4 to 6	0.12	J	.045	4300	MG/KG
CH2M HILL	IRON	SB35B	8 to 10	9010	=	38000	NA	MG/KG
CH2M HILL	LEAD	SB35A	18 to 20	12.4	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB35A	3 to 5	21.9	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB35A	8 to 10	29.2	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB35A	8 to 10	33.7	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB35B	18 to 20	30.6	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB35B	4 to 6	26.2	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB35B	8 to 10	7.9	J	24	1.5	MG/KG
CH2M HILL	LEAD	SB35C	18 to 20	17.3	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB35C	3 to 5	18.2	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB35C	8 to 10	14.9	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB35C	8 to 10	19.2	=	24	1.5	MG/KG
CH2M HILL	MAGNESIUM	SB35B	8 to 10	944	=	4900	NA	MG/KG
CH2M HILL	MANGANESE	SB35B	8 to 10	918	J	1500	NA	MG/KG
CH2M HILL	METHYL ETHYL KETONE (2-BUTANONE)	SB35C	3 to 5	0.018	=	NA	NA	MG/KG
CH2M HILL	METHYL ETHYL KETONE (2-BUTANONE)	SB35C	8 to 10	0.024	=	NA	NA	MG/KG

Table 35-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 35
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	METHYL ETHYL KETONE (2-BUTANONE)	SB35C	8 to 10	0.017	=	NA	NA	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SB35A	3 to 5	0.001	J	NA	.02	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SB35A	8 to 10	0.002	J	NA	.02	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SB35A	8 to 10	0.002	J	NA	.02	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SB35C	8 to 10	0.002	J	NA	.02	MG/KG
CH2M HILL	NICKEL	SB35A	18 to 20	27.6	=	37	130	MG/KG
CH2M HILL	NICKEL	SB35A	3 to 5	27.1	=	37	130	MG/KG
CH2M HILL	NICKEL	SB35A	8 to 10	39.7	=	37	130	MG/KG
CH2M HILL	NICKEL	SB35A	8 to 10	39.2	=	37	130	MG/KG
CH2M HILL	NICKEL	SB35B	18 to 20	37.1	=	37	130	MG/KG
CH2M HILL	NICKEL	SB35B	4 to 6	28.9	=	37	130	MG/KG
CH2M HILL	NICKEL	SB35B	8 to 10	15.5	=	37	130	MG/KG
CH2M HILL	NICKEL	SB35C	18 to 20	26.7	=	37	130	MG/KG
CH2M HILL	NICKEL	SB35C	3 to 5	28.7	=	37	130	MG/KG
CH2M HILL	NICKEL	SB35C	8 to 10	21.2	=	37	130	MG/KG
CH2M HILL	NICKEL	SB35C	8 to 10	22.6	=	37	130	MG/KG
CH2M HILL	p,p'-DDE	SB35A	18 to 20	0.002	J	.0015	54	MG/KG
CH2M HILL	p,p'-DDT	SB35A	18 to 20	0.019	=	.0072	32	MG/KG
CH2M HILL	p,p'-DDT	SB35A	3 to 5	0.0033	J	.0072	32	MG/KG
CH2M HILL	PHENANTHRENE	SB35B	4 to 6	0.068	J	NA	4300	MG/KG
CH2M HILL	PYRENE	SB35B	4 to 6	0.093	J	.042	2800	MG/KG
CH2M HILL	VANADIUM	SB35B	8 to 10	16.8	=	51	6000	MG/KG
CH2M HILL	ZINC	SB35A	18 to 20	65.5	=	110	12000	MG/KG
CH2M HILL	ZINC	SB35A	3 to 5	82.9	=	110	12000	MG/KG
CH2M HILL	ZINC	SB35A	8 to 10	122	=	110	12000	MG/KG
CH2M HILL	ZINC	SB35A	8 to 10	120	=	110	12000	MG/KG
CH2M HILL	ZINC	SB35B	18 to 20	74.7	=	110	12000	MG/KG
CH2M HILL	ZINC	SB35B	4 to 6	104	=	110	12000	MG/KG
CH2M HILL	ZINC	SB35B	8 to 10	34.5	J	110	12000	MG/KG
CH2M HILL	ZINC	SB35C	18 to 20	68	=	110	12000	MG/KG

Table 35-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 35
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	ZINC	SB35C	3 to 5	102	=	110	12000	MG/KG
CH2M HILL	ZINC	SB35C	8 to 10	67.6	=	110	12000	MG/KG
CH2M HILL	ZINC	SB35C	8 to 10	65	=	110	12000	MG/KG

Notes:
1. Detected values are obtained from the *Draft Parcel 15 Report-Screening Sites Sampling Program for Defense Depot Memphis, TN*, CH2M HILL, 1997.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. RBC-GWP values are obtained from the *EPA Region III Risk-based Concentrations Table*, R. L. Smith, April, 1997.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
= - indicates unqualified detection
J - indicates estimated value above the detection limit but below the reporting limit.
RBC-GWP - Risk-Based Concentrations - Groundwater Protection

Table 36-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 36
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
CH2M HILL	ANTIMONY	SB36D	2	J	7	7	Bckg	MG/KG
CH2M HILL	ANTIMONY	SB36H	18.2	=	7	7	Bckg	MG/KG
CH2M HILL	ANTIMONY	SB36J	8	=	7	7	Bckg	MG/KG
CH2M HILL	ARSENIC	SB36A	26.1	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SB36B	18.5	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SB36B	17.5	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SB36C	19.6	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SB36D	11.4	J	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SB36D	12.1	J	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SB36E	13.5	J	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SB36F	18.4	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SB36F	15.1	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SB36G	18.1	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SB36G	15.9	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SB36H	17.8	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SB36I	16.4	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SB36J	25.3	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SB36J	27.2	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SB36K	22.9	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SB36L	27.7	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SB36M	22.6	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SB36M	25.4	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SB36N	22.4	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SB36N	24.9	=	20	20	Bckg	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	SB36H	0.042	J	.71	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(a)PYRENE	SB36H	0.048	J	.96	0.088	Residential RBC	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	SB36H	0.056	J	.78	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(g,h,i)PERYLENE	SB36H	0.044	J	.82	230	Residential RBC	MG/KG

Table 36-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 36
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
CH2M HILL	BENZO(k)FLUORANTHENE	SB36H	0.061	J	.78	8.8	Residential RBC	MG/KG
CH2M HILL	BERYLLIUM	SB36C	1	=	1.1	1.1	Bckg	MG/KG
CH2M HILL	BERYLLIUM	SB36D	0.38	J	1.1	1.1	Bckg	MG/KG
CH2M HILL	BERYLLIUM	SB36D	0.39	J	1.1	1.1	Bckg	MG/KG
CH2M HILL	BERYLLIUM	SB36E	0.45	J	1.1	1.1	Bckg	MG/KG
CH2M HILL	BERYLLIUM	SB36M	1	=	1.1	1.1	Bckg	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB36A	27.7	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB36B	25.1	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB36B	26.9	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB36C	30.8	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB36D	12.4	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB36D	12.3	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB36E	18.9	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB36F	28.2	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB36F	27.2	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB36G	28.1	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB36G	25.8	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB36H	28.5	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB36I	24.9	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB36J	32	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB36J	33.5	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB36K	30.3	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB36L	25.2	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB36M	32	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB36M	34	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB36N	29.9	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB36N	28.1	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHRYSENE	SB36H	0.063	J	.94	88	Residential RBC	MG/KG
CH2M HILL	FLUORANTHENE	SB36H	0.11	J	1.6	310	Residential RBC	MG/KG
CH2M HILL	INDENO(1,2,3-c,d)PYRENE	SB36H	0.045	J	.7	0.88	Residential RBC	MG/KG
CH2M HILL	LEAD	SB36A	34.6	=	30	400	CERCLA	MG/KG

Table 36-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 36
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
CH2M HILL	LEAD	SB36B	23.8	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SB36B	20.7	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SB36C	24.4	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SB36D	13.6	J	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SB36D	15.1	J	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SB36E	13.1	J	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SB36F	21.2	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SB36F	25.5	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SB36G	24	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SB36G	27.2	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SB36H	131	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SB36I	20.5	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SB36J	26.7	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SB36J	34.9	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SB36K	25.9	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SB36L	33.6	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SB36M	26.1	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SB36M	25.8	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SB36N	24.5	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SB36N	26.6	=	30	400	CERCLA	MG/KG
CH2M HILL	PHENANTHRENE	SB36H	0.053	J	.61	2300	Residential RBC	MG/KG
CH2M HILL	PYRENE	SB36H	0.086	J	1.5	230	Residential RBC	MG/KG
CH2M HILL	ZINC	SB36A	130	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SB36B	112	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SB36B	122	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SB36C	123	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SB36D	64	J	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SB36D	67.5	J	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SB36E	57.2	J	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SB36F	183	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SB36F	107	=	130	23000	Residential RBC	MG/KG

Table 36-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 36
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
CH2M HILL	ZINC	SB36G	117	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SB36G	110	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SB36H	133	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SB36I	101	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SB36J	266	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SB36J	125	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SB36K	143	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SB36L	128	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SB36M	137	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SB36M	122	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SB36N	121	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SB36N	121	=	130	23000	Residential RBC	MG/KG
LAW	ACENAPHTHENE	SS5	0.65	J	NA	470	Residential RBC	MG/KG
LAW	ANTHRACENE	SS5	2	=	.096	2300	Residential RBC	MG/KG
LAW	ANTIMONY	SS5	22	=	7	7	Bckg	MG/KG
LAW	ARSENIC	SS5	20	=	20	20	Bckg	MG/KG
LAW	BENZO(a)ANTHRACENE	SS5	8.6	=	.71	0.88	Residential RBC	MG/KG
LAW	BENZO(a)PYRENE	SS5	6.2	=	.96	0.088	Residential RBC	MG/KG
LAW	BENZO(b)FLUORANTHENE	SS5	8.2	=	.78	0.88	Residential RBC	MG/KG
LAW	BENZO(g,h,i)PERYLENE	SS5	5	=	.82	230	Residential RBC	MG/KG
LAW	BENZO(k)FLUORANTHENE	SS5	7.6	=	.78	8.8	Residential RBC	MG/KG
LAW	BENZOIC ACID	SS5	0.23	J	NA	31000	Residential RBC	MG/KG
LAW	CHROMIUM, TOTAL	SS5	296	=	24.8	39	Residential RBC	MG/KG
LAW	CHRYSENE	SS5	7.4	=	.94	88	Residential RBC	MG/KG
LAW	DIBENZ(a,h)ANTHRACENE	SS5	2.6	=	.26	0.088	Residential RBC	MG/KG
LAW	DIBENZOFURAN	SS5	0.29	J	.647	31	Residential RBC	MG/KG
LAW	FLUORANTHENE	SS5	15	=	1.6	310	Residential RBC	MG/KG
LAW	FLUORENE	SS5	0.69	J	NA	310	Residential RBC	MG/KG
LAW	INDENO(1,2,3-c,d)PYRENE	SS5	4	=	.7	0.88	Residential RBC	MG/KG
LAW	LEAD	SS5	2420	=	30	400	CERCLA	MG/KG
LAW	PHENANTHRENE	SS5	7.7	=	.61	2300	Residential RBC	MG/KG

Table 36-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 36
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
LAW	PYRENE	SS5	17	=	1.5	230	Residential RBC	MG/KG
LAW	ZINC	SS5	2160	=	130	23000	Residential RBC	MG/KG

Notes:
1. Detected values are obtained from the *Draft Parcel 15 Report-Screening Sites Sampling Program for Defense Depot* Memphis, TN, CH2M HILL, 1997, and the *Remedial Investigation at DDMT Final Report*, Law Environmental, August 1990.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. Based on values selected by the BRAC Cleanup Team in the August 1997 BCT meeting minutes, Memphis, Tennessee.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
J - indicates estimated value above the detection limit but below the reporting limit.
= - indicates unqualified detection.
BCT - BRAC Cleanup Team

Table 36-B
Summary of Detected Compounds in Surface Soils
Compared to Non-BCT Screening Levels for Site 36
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	Risk-Based Concentrations Soil Ingestion[4]		Units
						Residential	Industrial	
CH2M HILL	1,1,2,2-TETRACHLOROETHANE	SB36K	0.004	J	NA	3.2	29	MG/KG
CH2M HILL	1,1,2,2-TETRACHLOROETHANE	SB36N	0.007	J	NA	3.2	29	MG/KG
CH2M HILL	1,1,2,2-TETRACHLOROETHANE	SB36N	0.005	J	NA	3.2	29	MG/KG
CH2M HILL	ACETONE	SB36F	0.007	J	NA	780	20000	MG/KG
CH2M HILL	ACETONE	SB36I	0.013	=	NA	780	20000	MG/KG
CH2M HILL	ACETONE	SB36J	0.007	J	NA	780	20000	MG/KG
CH2M HILL	ACETONE	SB36M	0.009	J	NA	780	20000	MG/KG
CH2M HILL	ACETONE	SB36N	0.01	J	NA	780	20000	MG/KG
CH2M HILL	ALPHA-CHLORDANE	SB36H	0.011	J	.029	.49	4.4	MG/KG
CH2M HILL	ALPHA-CHLORDANE	SB36K	0.0016	J	.029	.49	4.4	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB36B	0.066	J	NA	46	410	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB36C	3	=	NA	46	410	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB36F	0.07	J	NA	46	410	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB36F	0.25	J	NA	46	410	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB36G	0.065	J	NA	46	410	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB36G	2.1	=	NA	46	410	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB36H	0.36	J	NA	46	410	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB36I	0.5	=	NA	46	410	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB36J	0.051	J	NA	46	410	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB36J	1.8	=	NA	46	410	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB36K	0.14	J	NA	46	410	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB36N	0.082	J	NA	46	410	MG/KG
CH2M HILL	CADMIUM	SB36F	1.6	=	1.4	3.9	100	MG/KG
CH2M HILL	CADMIUM	SB36H	2.1	=	1.4	3.9	100	MG/KG
CH2M HILL	COPPER	SB36A	40.9	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SB36B	35.1	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SB36B	34.1	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SB36C	34.3	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SB36D	17.9	J	33	310	8200	MG/KG
CH2M HILL	COPPER	SB36D	19.9	J	33	310	8200	MG/KG
CH2M HILL	COPPER	SB36E	17.8	J	33	310	8200	MG/KG

Table 36-B
Summary of Detected Compounds in Surface Soils
Compared to Non-BCT Screening Levels for Site 36
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	Risk-Based Concentrations Soil Ingestion[4]		Units
						Residential	Industrial	
CH2M HILL	COPPER	SB36F	34.7	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SB36F	34.2	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SB36G	31.3	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SB36G	31.6	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SB36H	86	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SB36I	30.3	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SB36J	40.2	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SB36J	35	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SB36K	33.9	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SB36L	32.5	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SB36M	54.5	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SB36M	33.7	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SB36N	36	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SB36N	35	=	33	310	8200	MG/KG
CH2M HILL	DI-n-BUTYL PHTHALATE	SB36A	0.069	J	NA	780	20000	MG/KG
CH2M HILL	DI-n-BUTYL PHTHALATE	SB36J	0.11	J	NA	780	20000	MG/KG
CH2M HILL	DI-n-BUTYL PHTHALATE	SB36M	0.15	J	NA	780	20000	MG/KG
CH2M HILL	DI-n-BUTYL PHTHALATE	SB36N	0.12	J	NA	780	20000	MG/KG
CH2M HILL	DI-n-BUTYL PHTHALATE	SB36N	0.078	J	NA	780	20000	MG/KG
CH2M HILL	DIELDRIN	SB36B	0.0014	J	.086	.04	.36	MG/KG
CH2M HILL	DIELDRIN	SB36C	0.0012	J	.086	.04	.36	MG/KG
CH2M HILL	DIELDRIN	SB36F	0.0019	J	.086	.04	.36	MG/KG
CH2M HILL	DIELDRIN	SB36H	0.015	J	.086	.04	.36	MG/KG
CH2M HILL	GAMMA-CHLORDANE	SB36H	0.02	=	.026	.49	4.4	MG/KG
CH2M HILL	GAMMA-CHLORDANE	SB36K	0.0024	J	.026	.49	4.4	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SB36F	0.001	J	NA	85	760	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SB36I	0.01	J	NA	85	760	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SB36J	0.007	J	NA	85	760	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SB36N	0.004	J	NA	85	760	MG/KG
CH2M HILL	NICKEL	SB36A	41.3	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SB36B	39.9	=	30	160	4100	MG/KG

Table 36-B
Summary of Detected Compounds in Surface Soils
Compared to Non-BCT Screening Levels for Site 36
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	Risk-Based Concentrations Soil Ingestion[4]		Units
						Residential	Industrial	
CH2M HILL	NICKEL	SB36B	41.4	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SB36C	37.2	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SB36D	18.7	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SB36D	18.8	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SB36E	16.4	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SB36F	43.2	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SB36F	37	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SB36G	37	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SB36G	37.1	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SB36H	25.6	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SB36I	34.2	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SB36J	38	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SB36J	38.3	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SB36K	35.9	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SB36L	36	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SB36M	37.1	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SB36M	35.7	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SB36N	35.7	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SB36N	36.2	=	30	160	4100	MG/KG
CH2M HILL	p,p'-DDE	SB36E	0.0013	J	.16	1.9	17	MG/KG
CH2M HILL	p,p'-DDE	SB36H	0.038	J	.16	1.9	17	MG/KG
CH2M HILL	p,p'-DDT	SB36E	0.0039	J	.074	1.9	17	MG/KG
CH2M HILL	p,p'-DDT	SB36H	0.23	=	.074	1.9	17	MG/KG
CH2M HILL	p,p'-DDT	SB36K	0.037	=	.074	1.9	17	MG/KG
CH2M HILL	p,p'-DDT	SB36N	0.0052	=	.074	1.9	17	MG/KG
CH2M HILL	p,p'-DDT	SB36N	0.0055	=	.074	1.9	17	MG/KG
CH2M HILL	PENTACHLOROPHENOL	SB36H	0.11	J	NA	5.3	48	MG/KG
CH2M HILL	SELENIUM	SB36F	14.5	=	.81	39	1000	MG/KG
CH2M HILL	SELENIUM	SB36G	10.3	=	.81	39	1000	MG/KG
CH2M HILL	SELENIUM	SB36K	1.5	=	.81	39	1000	MG/KG
CH2M HILL	SELENIUM	SB36M	1.2	=	.81	39	1000	MG/KG

Table 36-B
Summary of Detected Compounds in Surface Soils
Compared to Non-BCT Screening Levels for Site 36
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	Risk-Based Concentrations Soil Ingestion[4]		Units
						Residential	Industrial	
CH2M HILL	SELENIUM	SB36N	1.7	=	.81	39	1000	MG/KG
CH2M HILL	SILVER	SB36D	0.63	J	2	39	1000	MG/KG
CH2M HILL	TRICHLOROETHYLENE (TCE)	SB36K	0.005	J	NA	58	520	MG/KG
LAW	ACENAPHTHYLENE	SS5	0.35	J	.19	NA	NA	MG/KG
LAW	ACETONE	SS5	0.004	J	NA	780	20000	MG/KG
LAW	BARIUM	SS5	273	=	234	550	14000	MG/KG
LAW	BENZYL BUTYL PHTHALATE	SS5	4.7	=	.645	1600	41000	MG/KG
LAW	bis(2-ETHYLHEXYL) PHTHALATE	SS5	2.9	=	NA	46	410	MG/KG
LAW	CADMIUM	SS5	159	=	1.4	3.9	100	MG/KG
LAW	COPPER	SS5	1590	=	33	310	8200	MG/KG
LAW	DDD	SS5	0.26	=	NA	2.7	24	MG/KG
LAW	DDE	SS5	1.1	=	.16	1.9	17	MG/KG
LAW	DDT	SS5	5.9	=	.074	1.9	17	MG/KG
LAW	ENDOSULFAN SULFATE	SS5	0.36	=	NA	NA	NA	MG/KG
LAW	MERCURY	SS5	0.46	=	.43	2.3	61	MG/KG
LAW	METHYLENE CHLORIDE	SS5	0.041	=	NA	85	760	MG/KG
LAW	NICKEL	SS5	146	=	30	160	4100	MG/KG
LAW	SILVER	SS5	2.5	=	2	39	1000	MG/KG
LAW	TOLUENE	SS5	0.002	J	.012	1600	41000	MG/KG
LAW	Total Polynuclear Aromatic Hydrocarbons	SS5	92.99	=	NA	NA	NA	MG/KG

Notes:
1. Detected values are obtained from the *Draft Parcel 15 Report-Screening Sites Sampling Program for Defense Depot Memphis, TN*, CH2M HILL, 1997, and the *Remedial Investigation at DDMT Final Report*, Law Environmental, August 1990.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. Risk-Based Concentrations are obtained from the *EPA Region III Risk-based Concentrations Table*, R.L. Smith, April, 1997.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
= - indicates unqualified detection.
J - indicates estimated value above the detection limit but below the reporting limit.

Table 36-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 36
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	1,1,2,2-TETRACHLOROETHANE	SB36K	18 to 20	0.005	J	NA	.003	MG/KG
CH2M HILL	1,1,2,2-TETRACHLOROETHANE	SB36K	4 to 6	0.012	J	NA	.003	MG/KG
CH2M HILL	1,1,2,2-TETRACHLOROETHANE	SB36K	8 to 10	0.02	=	NA	.003	MG/KG
CH2M HILL	1,1,2,2-TETRACHLOROETHANE	SB36N	4 to 6	0.019	=	NA	.003	MG/KG
CH2M HILL	1,1,2,2-TETRACHLOROETHANE	SB36N	8 to 10	0.006	J	NA	.003	MG/KG
CH2M HILL	1,1-DICHLOROETHENE	SB36M	18 to 20	0.009	J	NA	.06	MG/KG
CH2M HILL	ACETONE	SB36B	18 to 20	0.006	J	NA	16	MG/KG
CH2M HILL	ACETONE	SB36C	8 to 10	0.052	=	NA	16	MG/KG
CH2M HILL	ACETONE	SB36D	18 to 20	0.008	J	NA	16	MG/KG
CH2M HILL	ACETONE	SB36E	18 to 20	0.006	J	NA	16	MG/KG
CH2M HILL	ACETONE	SB36E	4 to 6	0.01	J	NA	16	MG/KG
CH2M HILL	ACETONE	SB36F	4 to 6	0.052	=	NA	16	MG/KG
CH2M HILL	ACETONE	SB36F	8 to 10	0.1	=	NA	16	MG/KG
CH2M HILL	ACETONE	SB36G	18 to 20	0.018	=	NA	16	MG/KG
CH2M HILL	ACETONE	SB36H	18 to 20	0.006	J	NA	16	MG/KG
CH2M HILL	ACETONE	SB36H	4 to 6	0.026	=	NA	16	MG/KG
CH2M HILL	ACETONE	SB36I	8 to 10	0.036	=	NA	16	MG/KG
CH2M HILL	ALUMINUM	SB36B	8 to 10	12300	=	21829	NA	MG/KG
CH2M HILL	ALUMINUM	SB36C	4 to 6	15400	=	21829	NA	MG/KG
CH2M HILL	ANTIMONY	SB36G	4 to 6	8.7	=	NA	5	MG/KG
CH2M HILL	ARSENIC	SB36A	18 to 20	6.9	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB36A	4 to 6	21.4	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB36A	8 to 10	18.4	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB36B	18 to 20	3.7	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB36B	4 to 6	9.2	J	17	29	MG/KG
CH2M HILL	ARSENIC	SB36B	8 to 10	12.4	J	17	29	MG/KG
CH2M HILL	ARSENIC	SB36C	18 to 20	14.3	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB36C	4 to 6	14.2	J	17	29	MG/KG
CH2M HILL	ARSENIC	SB36C	8 to 10	15.8	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB36D	18 to 20	9.5	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB36D	4 to 6	20.1	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB36D	8 to 10	8.3	J	17	29	MG/KG

Table 36-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 36
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	ARSENIC	SB36E	18 to 20	3.2	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB36E	4 to 6	26.7	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB36E	8 to 10	16.6	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB36F	18 to 20	10.3	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB36F	4 to 6	19.8	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB36F	8 to 10	13.6	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB36G	18 to 20	10.7	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB36G	4 to 6	26.7	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB36G	8 to 10	17	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB36H	18 to 20	10.8	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB36H	4 to 6	29.9	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB36H	8 to 10	22.7	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB36I	18 to 20	9	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB36I	4 to 6	17.1	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB36I	8 to 10	10.4	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB36J	18 to 20	10.1	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB36J	4 to 6	24	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB36J	8 to 10	18.4	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB36K	18 to 20	10.5	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB36K	4 to 6	25.1	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB36K	8 to 10	21.5	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB36L	18 to 20	10.7	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB36L	4 to 6	26.7	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB36L	8 to 10	18.5	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB36M	18 to 20	10.5	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB36M	4 to 6	26.8	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB36M	8 to 10	19.1	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB36N	18 to 20	8.4	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB36N	4 to 6	28.2	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB36N	8 to 10	17.2	=	17	29	MG/KG
CH2M HILL	BARIUM	SB36B	8 to 10	121	=	300	1600	MG/KG
CH2M HILL	BARIUM	SB36C	4 to 6	89.1	=	300	1600	MG/KG

Table 36-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 36
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	BENZENE	SB36C	4 to 6	0.001	J	NA	.03	MG/KG
CH2M HILL	BERYLLIUM	SB36B	4 to 6	0.36	J	1.2	63	MG/KG
CH2M HILL	BERYLLIUM	SB36B	8 to 10	0.46	J	1.2	63	MG/KG
CH2M HILL	BERYLLIUM	SB36C	18 to 20	1.4	=	1.2	63	MG/KG
CH2M HILL	BERYLLIUM	SB36C	4 to 6	0.39	J	1.2	63	MG/KG
CH2M HILL	BERYLLIUM	SB36D	4 to 6	0.97	=	1.2	63	MG/KG
CH2M HILL	BERYLLIUM	SB36D	8 to 10	0.39	J	1.2	63	MG/KG
CH2M HILL	BERYLLIUM	SB36E	18 to 20	1	=	1.2	63	MG/KG
CH2M HILL	BERYLLIUM	SB36E	4 to 6	1.1	=	1.2	63	MG/KG
CH2M HILL	BERYLLIUM	SB36G	18 to 20	1	=	1.2	63	MG/KG
CH2M HILL	BERYLLIUM	SB36J	18 to 20	0.99	=	1.2	63	MG/KG
CH2M HILL	BERYLLIUM	SB36K	18 to 20	1	=	1.2	63	MG/KG
CH2M HILL	BERYLLIUM	SB36L	4 to 6	1.1	=	1.2	63	MG/KG
CH2M HILL	BERYLLIUM	SB36M	4 to 6	0.99	=	1.2	63	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB36A	18 to 20	1.3	=	NA	3600	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB36A	4 to 6	0.042	J	NA	3600	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB36B	18 to 20	0.44	=	NA	3600	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB36C	18 to 20	0.061	J	NA	3600	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB36D	18 to 20	0.12	J	NA	3600	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB36D	4 to 6	0.66	=	NA	3600	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB36E	18 to 20	16	=	NA	3600	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB36E	4 to 6	0.15	J	NA	3600	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB36E	8 to 10	0.76	=	NA	3600	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB36F	18 to 20	0.052	J	NA	3600	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB36F	8 to 10	0.05	J	NA	3600	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB36G	18 to 20	0.054	J	NA	3600	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB36G	4 to 6	0.28	J	NA	3600	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB36G	8 to 10	0.18	J	NA	3600	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB36H	4 to 6	0.067	J	NA	3600	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB36I	18 to 20	2.5	=	NA	3600	MG/KG
CH2M HILL	CADMIUM	SB36C	4 to 6	0.44	J	1.4	8	MG/KG
CH2M HILL	CADMIUM	SB36H	18 to 20	1.8	=	1.4	8	MG/KG

Table 36-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 36
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	CALCIUM	SB36B	8 to 10	510	J	2400	NA	MG/KG
CH2M HILL	CALCIUM	SB36C	4 to 6	590	J	2400	NA	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB36A	18 to 20	32	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB36A	4 to 6	26.2	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB36A	8 to 10	26.9	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB36B	18 to 20	27.8	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB36B	4 to 6	10.3	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB36B	8 to 10	11.6	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB36C	18 to 20	45.3	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB36C	4 to 6	14	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB36C	8 to 10	26.6	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB36D	18 to 20	40.2	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB36D	4 to 6	28.9	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB36D	8 to 10	13.1	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB36E	18 to 20	39.7	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB36E	4 to 6	28.6	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB36E	8 to 10	26.5	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB36F	18 to 20	27.2	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB36F	4 to 6	25.1	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB36F	8 to 10	22.5	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB36G	18 to 20	43.6	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB36G	4 to 6	28.5	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB36G	8 to 10	24.7	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB36H	18 to 20	39.4	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB36H	4 to 6	31.8	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB36H	8 to 10	33.4	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB36I	18 to 20	31.2	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB36I	4 to 6	19.5	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB36I	8 to 10	17.3	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB36J	18 to 20	38.1	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB36J	4 to 6	30	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB36J	8 to 10	27.7	=	26	38	MG/KG

Table 36-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 36
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	CHROMIUM, TOTAL	SB36K	18 to 20	37.3	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB36K	4 to 6	28.6	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB36K	8 to 10	26.6	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB36L	18 to 20	33.6	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB36L	4 to 6	27.4	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB36L	8 to 10	26.9	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB36M	18 to 20	43.7	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB36M	4 to 6	25.2	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB36M	8 to 10	26.7	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB36N	18 to 20	27.8	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB36N	4 to 6	30.5	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB36N	8 to 10	21.1	=	26	38	MG/KG
CH2M HILL	COBALT	SB36B	8 to 10	9.3	=	20	NA	MG/KG
CH2M HILL	COBALT	SB36C	4 to 6	8.6	=	20	NA	MG/KG
CH2M HILL	COPPER	SB36A	18 to 20	15.6	=	33	NA	MG/KG
CH2M HILL	COPPER	SB36A	4 to 6	32.9	=	33	NA	MG/KG
CH2M HILL	COPPER	SB36A	8 to 10	33.6	=	33	NA	MG/KG
CH2M HILL	COPPER	SB36B	18 to 20	24.2	=	33	NA	MG/KG
CH2M HILL	COPPER	SB36B	4 to 6	17	J	33	NA	MG/KG
CH2M HILL	COPPER	SB36B	8 to 10	18.7	J	33	NA	MG/KG
CH2M HILL	COPPER	SB36C	18 to 20	25.3	=	33	NA	MG/KG
CH2M HILL	COPPER	SB36C	4 to 6	21.1	J	33	NA	MG/KG
CH2M HILL	COPPER	SB36C	8 to 10	32.7	=	33	NA	MG/KG
CH2M HILL	COPPER	SB36D	18 to 20	21	=	33	NA	MG/KG
CH2M HILL	COPPER	SB36D	4 to 6	35.6	=	33	NA	MG/KG
CH2M HILL	COPPER	SB36D	8 to 10	16.7	J	33	NA	MG/KG
CH2M HILL	COPPER	SB36E	18 to 20	19	=	33	NA	MG/KG
CH2M HILL	COPPER	SB36E	4 to 6	44.4	=	33	NA	MG/KG
CH2M HILL	COPPER	SB36E	8 to 10	32.4	=	33	NA	MG/KG
CH2M HILL	COPPER	SB36F	18 to 20	28.3	=	33	NA	MG/KG
CH2M HILL	COPPER	SB36F	4 to 6	36.8	=	33	NA	MG/KG
CH2M HILL	COPPER	SB36F	8 to 10	24.6	=	33	NA	MG/KG

Table 36-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 36
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	COPPER	SB36G	18 to 20	19	=	33	NA	MG/KG
CH2M HILL	COPPER	SB36G	4 to 6	44.1	=	33	NA	MG/KG
CH2M HILL	COPPER	SB36G	8 to 10	34	=	33	NA	MG/KG
CH2M HILL	COPPER	SB36H	18 to 20	31.7	=	33	NA	MG/KG
CH2M HILL	COPPER	SB36H	4 to 6	40.1	=	33	NA	MG/KG
CH2M HILL	COPPER	SB36H	8 to 10	38.6	=	33	NA	MG/KG
CH2M HILL	COPPER	SB36I	18 to 20	21.1	=	33	NA	MG/KG
CH2M HILL	COPPER	SB36I	4 to 6	28.3	=	33	NA	MG/KG
CH2M HILL	COPPER	SB36I	8 to 10	15.7	=	33	NA	MG/KG
CH2M HILL	COPPER	SB36J	18 to 20	21.1	=	33	NA	MG/KG
CH2M HILL	COPPER	SB36J	4 to 6	37.6	=	33	NA	MG/KG
CH2M HILL	COPPER	SB36J	8 to 10	31.7	=	33	NA	MG/KG
CH2M HILL	COPPER	SB36K	18 to 20	23.6	=	33	NA	MG/KG
CH2M HILL	COPPER	SB36K	4 to 6	38.2	=	33	NA	MG/KG
CH2M HILL	COPPER	SB36K	8 to 10	35	=	33	NA	MG/KG
CH2M HILL	COPPER	SB36L	18 to 20	21.1	=	33	NA	MG/KG
CH2M HILL	COPPER	SB36L	4 to 6	42.6	=	33	NA	MG/KG
CH2M HILL	COPPER	SB36L	8 to 10	34.2	=	33	NA	MG/KG
CH2M HILL	COPPER	SB36M	18 to 20	20.7	=	33	NA	MG/KG
CH2M HILL	COPPER	SB36M	4 to 6	41.7	=	33	NA	MG/KG
CH2M HILL	COPPER	SB36M	8 to 10	35.4	=	33	NA	MG/KG
CH2M HILL	COPPER	SB36N	18 to 20	23.2	=	33	NA	MG/KG
CH2M HILL	COPPER	SB36N	4 to 6	38.6	=	33	NA	MG/KG
CH2M HILL	COPPER	SB36N	8 to 10	28.6	=	33	NA	MG/KG
CH2M HILL	DI-n-BUTYL PHTHALATE	SB36A	18 to 20	0.056	J	NA	2300	MG/KG
CH2M HILL	DI-n-BUTYL PHTHALATE	SB36A	4 to 6	0.051	J	NA	2300	MG/KG
CH2M HILL	DI-n-BUTYL PHTHALATE	SB36B	18 to 20	0.067	J	NA	2300	MG/KG
CH2M HILL	DI-n-BUTYL PHTHALATE	SB36D	4 to 6	0.049	J	NA	2300	MG/KG
CH2M HILL	DI-n-BUTYL PHTHALATE	SB36J	18 to 20	0.065	J	NA	2300	MG/KG
CH2M HILL	DI-n-BUTYL PHTHALATE	SB36J	4 to 6	0.075	J	NA	2300	MG/KG
CH2M HILL	DI-n-BUTYL PHTHALATE	SB36J	8 to 10	0.041	J	NA	2300	MG/KG
CH2M HILL	IRON	SB36B	8 to 10	21800	=	38000	NA	MG/KG

Table 36-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 36
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	IRON	SB36C	4 to 6	26400	=	38000	NA	MG/KG
CH2M HILL	LEAD	SB36A	18 to 20	14.8	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB36A	4 to 6	23.2	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB36A	8 to 10	19.7	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB36B	18 to 20	7.6	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB36B	4 to 6	10.7	J	24	1.5	MG/KG
CH2M HILL	LEAD	SB36B	8 to 10	12	J	24	1.5	MG/KG
CH2M HILL	LEAD	SB36C	18 to 20	17.7	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB36C	4 to 6	15.4	J	24	1.5	MG/KG
CH2M HILL	LEAD	SB36C	8 to 10	19.9	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB36D	18 to 20	16.7	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB36D	4 to 6	21.8	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB36D	8 to 10	10.2	J	24	1.5	MG/KG
CH2M HILL	LEAD	SB36E	18 to 20	20.8	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB36E	4 to 6	29.1	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB36E	8 to 10	19.6	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB36F	18 to 20	16.2	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB36F	4 to 6	22.2	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB36F	8 to 10	24.5	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB36G	18 to 20	19.1	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB36G	4 to 6	28.7	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB36G	8 to 10	18.9	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB36H	18 to 20	19.9	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB36H	4 to 6	31.6	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB36H	8 to 10	21.3	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB36I	18 to 20	13.7	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB36I	4 to 6	17.3	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB36I	8 to 10	15.1	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB36J	18 to 20	15.7	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB36J	4 to 6	21.7	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB36J	8 to 10	18.6	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB36K	18 to 20	17.8	=	24	1.5	MG/KG

Table 36-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 36
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	LEAD	SB36K	4 to 6	26.9	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB36K	8 to 10	22.1	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB36L	18 to 20	15.1	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB36L	4 to 6	25.3	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB36L	8 to 10	18.6	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB36M	18 to 20	14.5	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB36M	4 to 6	27.3	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB36M	8 to 10	19.8	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB36N	18 to 20	18.5	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB36N	4 to 6	30.4	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB36N	8 to 10	17.3	=	24	1.5	MG/KG
CH2M HILL	MAGNESIUM	SB36B	8 to 10	2220	=	4900	NA	MG/KG
CH2M HILL	MAGNESIUM	SB36C	4 to 6	2570	=	4900	NA	MG/KG
CH2M HILL	MANGANESE	SB36B	8 to 10	882	J	1500	NA	MG/KG
CH2M HILL	MANGANESE	SB36C	4 to 6	1050	J	1500	NA	MG/KG
CH2M HILL	METHYL ETHYL KETONE (2-BUTANONE)	SB36C	4 to 6	0.014	=	NA	NA	MG/KG
CH2M HILL	METHYL ETHYL KETONE (2-BUTANONE)	SB36F	4 to 6	0.004	J	NA	NA	MG/KG
CH2M HILL	METHYL ETHYL KETONE (2-BUTANONE)	SB36F	8 to 10	0.017	=	NA	NA	MG/KG
CH2M HILL	METHYL ETHYL KETONE (2-BUTANONE)	SB36H	4 to 6	0.004	J	NA	NA	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SB36B	18 to 20	0.002	J	NA	.02	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SB36D	18 to 20	0.003	J	NA	.02	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SB36D	4 to 6	0.002	J	NA	.02	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SB36E	18 to 20	0.004	J	NA	.02	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SB36E	4 to 6	0.004	J	NA	.02	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SB36E	8 to 10	0.003	J	NA	.02	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SB36F	18 to 20	0.002	J	NA	.02	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SB36F	4 to 6	0.002	J	NA	.02	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SB36F	8 to 10	0.002	J	NA	.02	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SB36G	18 to 20	0.003	J	NA	.02	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SB36G	4 to 6	0.002	J	NA	.02	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SB36I	8 to 10	0.008	J	NA	.02	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SB36L	4 to 6	0.003	J	NA	.02	MG/KG

Table 36-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 36
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	NICKEL	SB36A	18 to 20	19.2	=	37	130	MG/KG
CH2M HILL	NICKEL	SB36A	4 to 6	38.9	=	37	130	MG/KG
CH2M HILL	NICKEL	SB36A	8 to 10	37.2	=	37	130	MG/KG
CH2M HILL	NICKEL	SB36B	18 to 20	32.5	=	37	130	MG/KG
CH2M HILL	NICKEL	SB36B	4 to 6	17.8	=	37	130	MG/KG
CH2M HILL	NICKEL	SB36B	8 to 10	18.6	=	37	130	MG/KG
CH2M HILL	NICKEL	SB36C	18 to 20	25.6	=	37	130	MG/KG
CH2M HILL	NICKEL	SB36C	4 to 6	21	=	37	130	MG/KG
CH2M HILL	NICKEL	SB36C	8 to 10	35.2	=	37	130	MG/KG
CH2M HILL	NICKEL	SB36D	18 to 20	25.5	=	37	130	MG/KG
CH2M HILL	NICKEL	SB36D	4 to 6	43	=	37	130	MG/KG
CH2M HILL	NICKEL	SB36D	8 to 10	19.9	=	37	130	MG/KG
CH2M HILL	NICKEL	SB36E	18 to 20	21.4	=	37	130	MG/KG
CH2M HILL	NICKEL	SB36E	4 to 6	47.3	=	37	130	MG/KG
CH2M HILL	NICKEL	SB36E	8 to 10	38	=	37	130	MG/KG
CH2M HILL	NICKEL	SB36F	18 to 20	34.8	=	37	130	MG/KG
CH2M HILL	NICKEL	SB36F	4 to 6	42.4	=	37	130	MG/KG
CH2M HILL	NICKEL	SB36F	8 to 10	25	=	37	130	MG/KG
CH2M HILL	NICKEL	SB36G	18 to 20	22.7	=	37	130	MG/KG
CH2M HILL	NICKEL	SB36G	4 to 6	41	=	37	130	MG/KG
CH2M HILL	NICKEL	SB36G	8 to 10	36.7	=	37	130	MG/KG
CH2M HILL	NICKEL	SB36H	18 to 20	42.5	=	37	130	MG/KG
CH2M HILL	NICKEL	SB36H	4 to 6	39.8	=	37	130	MG/KG
CH2M HILL	NICKEL	SB36H	8 to 10	37.5	=	37	130	MG/KG
CH2M HILL	NICKEL	SB36I	18 to 20	26.6	=	37	130	MG/KG
CH2M HILL	NICKEL	SB36I	4 to 6	33	=	37	130	MG/KG
CH2M HILL	NICKEL	SB36I	8 to 10	18.1	=	37	130	MG/KG
CH2M HILL	NICKEL	SB36J	18 to 20	30.4	=	37	130	MG/KG
CH2M HILL	NICKEL	SB36J	4 to 6	38.1	=	37	130	MG/KG
CH2M HILL	NICKEL	SB36J	8 to 10	38.7	=	37	130	MG/KG
CH2M HILL	NICKEL	SB36K	18 to 20	30.7	=	37	130	MG/KG
CH2M HILL	NICKEL	SB36K	4 to 6	37.1	=	37	130	MG/KG

Table 36-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 36
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	NICKEL	SB36K	8 to 10	40	=	37	130	MG/KG
CH2M HILL	NICKEL	SB36L	18 to 20	28.8	=	37	130	MG/KG
CH2M HILL	NICKEL	SB36L	4 to 6	43.9	=	37	130	MG/KG
CH2M HILL	NICKEL	SB36L	8 to 10	38.8	=	37	130	MG/KG
CH2M HILL	NICKEL	SB36M	18 to 20	25.1	=	37	130	MG/KG
CH2M HILL	NICKEL	SB36M	4 to 6	40.9	=	37	130	MG/KG
CH2M HILL	NICKEL	SB36M	8 to 10	37.9	=	37	130	MG/KG
CH2M HILL	NICKEL	SB36N	18 to 20	27.3	=	37	130	MG/KG
CH2M HILL	NICKEL	SB36N	4 to 6	33.1	=	37	130	MG/KG
CH2M HILL	NICKEL	SB36N	8 to 10	33.3	=	37	130	MG/KG
CH2M HILL	POTASSIUM	SB36B	8 to 10	755	=	1800	NA	MG/KG
CH2M HILL	POTASSIUM	SB36C	4 to 6	1010	=	1800	NA	MG/KG
CH2M HILL	SELENIUM	SB36E	4 to 6	1.3	=	.64	5	MG/KG
CH2M HILL	SELENIUM	SB36H	4 to 6	1.7	=	.64	5	MG/KG
CH2M HILL	SELENIUM	SB36M	4 to 6	1.7	=	.64	5	MG/KG
CH2M HILL	SODIUM	SB36B	8 to 10	110	J	NA	NA	MG/KG
CH2M HILL	TETRACHLOROETHYLENE(PCE)	SB36K	18 to 20	0.006	J	NA	.06	MG/KG
CH2M HILL	TETRACHLOROETHYLENE(PCE)	SB36M	18 to 20	0.004	J	NA	.06	MG/KG
CH2M HILL	TOTAL 1,2-DICHLOROETHENE	SB36I	18 to 20	0.095	=	NA	.4	MG/KG
CH2M HILL	TOTAL 1,2-DICHLOROETHENE	SB36I	4 to 6	0.042	=	NA	.4	MG/KG
CH2M HILL	TOTAL 1,2-DICHLOROETHENE	SB36I	8 to 10	0.11	=	NA	.4	MG/KG
CH2M HILL	TRICHLOROETHYLENE (TCE)	SB36H	18 to 20	0.002	J	NA	.06	MG/KG
CH2M HILL	TRICHLOROETHYLENE (TCE)	SB36I	18 to 20	0.14	=	NA	.06	MG/KG
CH2M HILL	TRICHLOROETHYLENE (TCE)	SB36I	4 to 6	0.015	=	NA	.06	MG/KG
CH2M HILL	TRICHLOROETHYLENE (TCE)	SB36I	8 to 10	0.057	=	NA	.06	MG/KG
CH2M HILL	TRICHLOROETHYLENE (TCE)	SB36K	18 to 20	0.32	=	NA	.06	MG/KG
CH2M HILL	TRICHLOROETHYLENE (TCE)	SB36K	4 to 6	0.013	=	NA	.06	MG/KG
CH2M HILL	TRICHLOROETHYLENE (TCE)	SB36K	8 to 10	0.002	J	NA	.06	MG/KG
CH2M HILL	TRICHLOROETHYLENE (TCE)	SB36N	4 to 6	0.001	J	NA	.06	MG/KG
CH2M HILL	VANADIUM	SB36B	8 to 10	25.4	=	51	6000	MG/KG
CH2M HILL	VANADIUM	SB36C	4 to 6	30.9	=	51	6000	MG/KG
CH2M HILL	ZINC	SB36A	18 to 20	51.4	=	110	12000	MG/KG

Table 36-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 36
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	ZINC	SB36A	4 to 6	118	=	110	12000	MG/KG
CH2M HILL	ZINC	SB36A	8 to 10	110	=	110	12000	MG/KG
CH2M HILL	ZINC	SB36B	18 to 20	72.4	=	110	12000	MG/KG
CH2M HILL	ZINC	SB36B	4 to 6	61.9	J	110	12000	MG/KG
CH2M HILL	ZINC	SB36B	8 to 10	65.7	J	110	12000	MG/KG
CH2M HILL	ZINC	SB36C	18 to 20	62.5	=	110	12000	MG/KG
CH2M HILL	ZINC	SB36C	4 to 6	67.1	J	110	12000	MG/KG
CH2M HILL	ZINC	SB36C	8 to 10	105	=	110	12000	MG/KG
CH2M HILL	ZINC	SB36D	18 to 20	58.7	=	110	12000	MG/KG
CH2M HILL	ZINC	SB36D	4 to 6	141	=	110	12000	MG/KG
CH2M HILL	ZINC	SB36D	8 to 10	55.9	J	110	12000	MG/KG
CH2M HILL	ZINC	SB36E	18 to 20	60	=	110	12000	MG/KG
CH2M HILL	ZINC	SB36E	4 to 6	149	=	110	12000	MG/KG
CH2M HILL	ZINC	SB36E	8 to 10	115	=	110	12000	MG/KG
CH2M HILL	ZINC	SB36F	18 to 20	89.4	=	110	12000	MG/KG
CH2M HILL	ZINC	SB36F	4 to 6	128	=	110	12000	MG/KG
CH2M HILL	ZINC	SB36F	8 to 10	87.4	=	110	12000	MG/KG
CH2M HILL	ZINC	SB36G	18 to 20	54.9	=	110	12000	MG/KG
CH2M HILL	ZINC	SB36G	4 to 6	157	=	110	12000	MG/KG
CH2M HILL	ZINC	SB36G	8 to 10	100	=	110	12000	MG/KG
CH2M HILL	ZINC	SB36H	18 to 20	118	=	110	12000	MG/KG
CH2M HILL	ZINC	SB36H	4 to 6	143	=	110	12000	MG/KG
CH2M HILL	ZINC	SB36H	8 to 10	143	=	110	12000	MG/KG
CH2M HILL	ZINC	SB36I	18 to 20	68.9	=	110	12000	MG/KG
CH2M HILL	ZINC	SB36I	4 to 6	111	=	110	12000	MG/KG
CH2M HILL	ZINC	SB36I	8 to 10	61	=	110	12000	MG/KG
CH2M HILL	ZINC	SB36J	18 to 20	67.9	=	110	12000	MG/KG
CH2M HILL	ZINC	SB36J	4 to 6	135	=	110	12000	MG/KG
CH2M HILL	ZINC	SB36J	8 to 10	115	=	110	12000	MG/KG
CH2M HILL	ZINC	SB36K	18 to 20	72.7	=	110	12000	MG/KG
CH2M HILL	ZINC	SB36K	4 to 6	132	=	110	12000	MG/KG
CH2M HILL	ZINC	SB36K	8 to 10	127	=	110	12000	MG/KG

Table 36-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 36
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	ZINC	SB36L	18 to 20	82.7	=	110	12000	MG/KG
CH2M HILL	ZINC	SB36L	4 to 6	151	=	110	12000	MG/KG
CH2M HILL	ZINC	SB36L	8 to 10	125	=	110	12000	MG/KG
CH2M HILL	ZINC	SB36M	18 to 20	85.5	=	110	12000	MG/KG
CH2M HILL	ZINC	SB36M	4 to 6	145	=	110	12000	MG/KG
CH2M HILL	ZINC	SB36M	8 to 10	128	=	110	12000	MG/KG
CH2M HILL	ZINC	SB36N	18 to 20	73.3	=	110	12000	MG/KG
CH2M HILL	ZINC	SB36N	4 to 6	125	=	110	12000	MG/KG
CH2M HILL	ZINC	SB36N	8 to 10	99.5	=	110	12000	MG/KG

Notes:
1. Detected values are obtained from the *Draft Parcel 15 Report-Screening Sites Sampling Program for Defense Depot Memphis, TN*, CH2M HILL, 1997.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. RBC-GWP values are obtained from the *EPA Region III Risk-based Concentrations Table*, R. L. Smith, April, 1997.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
= - indicates unqualified detection
J - indicates estimated value above the detection limit but below the reporting limit.
RBC-GWP - Risk-Based Concentrations - Groundwater Protection

Table 54-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 54
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
CH2M HILL	ARSENIC	SB54A	15.8	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SB54B	27.3	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SB54B	13.3	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SS54A	18.4	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SS54A	15.5	=	20	20	Bckg	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	SB54B	0.2	J	.71	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	SB54B	0.15	J	.71	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	SS54A	0.05	J	.71	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(a)PYRENE	SB54B	0.24	J	.96	0.088	Residential RBC	MG/KG
CH2M HILL	BENZO(a)PYRENE	SB54B	0.2	J	.96	0.088	Residential RBC	MG/KG
CH2M HILL	BENZO(a)PYRENE	SS54A	0.052	J	.96	0.088	Residential RBC	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	SB54B	0.3	J	.78	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	SB54B	0.25	J	.78	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	SS54A	0.059	J	.78	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(g,h,i)PERYLENE	SB54B	0.21	J	.82	230	Residential RBC	MG/KG
CH2M HILL	BENZO(g,h,i)PERYLENE	SB54B	0.14	J	.82	230	Residential RBC	MG/KG
CH2M HILL	BENZO(g,h,i)PERYLENE	SS54A	0.045	J	.82	230	Residential RBC	MG/KG
CH2M HILL	BENZO(k)FLUORANTHENE	SB54B	0.23	J	.78	8.8	Residential RBC	MG/KG
CH2M HILL	BENZO(k)FLUORANTHENE	SB54B	0.19	J	.78	8.8	Residential RBC	MG/KG
CH2M HILL	BENZO(k)FLUORANTHENE	SS54A	0.054	J	.78	8.8	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB54A	18.8	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB54B	27.1	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB54B	20.2	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS54A	32.5	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS54A	22.2	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHRYSENE	SB54B	0.29	J	.94	88	Residential RBC	MG/KG
CH2M HILL	CHRYSENE	SB54B	0.21	J	.94	88	Residential RBC	MG/KG
CH2M HILL	CHRYSENE	SS54A	0.064	J	.94	88	Residential RBC	MG/KG
CH2M HILL	DIBENZ(a,h)ANTHRACENE	SB54B	0.079	J	.26	0.088	Residential RBC	MG/KG
CH2M HILL	FLUORANTHENE	SB54B	0.56	=	1.6	310	Residential RBC	MG/KG
CH2M HILL	FLUORANTHENE	SB54B	0.29	J	1.6	310	Residential RBC	MG/KG
CH2M HILL	FLUORANTHENE	SS54A	0.15	J	1.6	310	Residential RBC	MG/KG
CH2M HILL	INDENO(1,2,3-c,d)PYRENE	SB54B	0.18	J	.7	0.88	Residential RBC	MG/KG
CH2M HILL	INDENO(1,2,3-c,d)PYRENE	SB54B	0.12	J	.7	0.88	Residential RBC	MG/KG

Table 54-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 54
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
CH2M HILL	LEAD	SB54A	26.1	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SB54B	213	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SB54B	20.8	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SS54A	62.5	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SS54A	57.9	=	30	400	CERCLA	MG/KG
CH2M HILL	PHENANTHRENE	SB54B	0.29	J	.61	2300	Residential RBC	MG/KG
CH2M HILL	PHENANTHRENE	SB54B	0.17	J	.61	2300	Residential RBC	MG/KG
CH2M HILL	PHENANTHRENE	SS54A	0.068	J	.61	2300	Residential RBC	MG/KG
CH2M HILL	PYRENE	SB54B	0.45	=	1.5	230	Residential RBC	MG/KG
CH2M HILL	PYRENE	SB54B	0.28	J	1.5	230	Residential RBC	MG/KG
CH2M HILL	PYRENE	SS54A	0.095	J	1.5	230	Residential RBC	MG/KG
CH2M HILL	TCDD Equivalent	SB54A	3.9746E-05	=	.000011	0.00001	Bckg	MG/KG
CH2M HILL	TCDD Equivalent	SB54B	0.00005996	=	.000011	0.00001	Bckg	MG/KG
CH2M HILL	TCDD Equivalent	SB54B	2.39E-07	=	.000011	0.00001	Bckg	MG/KG
CH2M HILL	TCDD Equivalent	SS54A	7.1358E-05	=	.000011	0.00001	Bckg	MG/KG
CH2M HILL	TCDD Equivalent	SS54A	2.3924E-05	=	.000011	0.00001	Bckg	MG/KG
CH2M HILL	ZINC	SB54A	151	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SB54B	203	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SB54B	83.5	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SS54A	118	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SS54A	103	=	130	23000	Residential RBC	MG/KG

Notes:
1. Detected values are obtained from the *Draft Parcel 15 Report-Screening Sites Sampling Program for Defense Depot* Memphis, TN, CH2M HILL, 1997.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. Based on values selected by the BRAC Cleanup Team in the August 1997 BCT meeting minutes, Memphis, Tennessee.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
J - indicates estimated value above the detection limit but below the reporting limit.
= - indicates unqualified detection
BCT - BRAC Cleanup Team

Table 54-B
Summary of Detected Compounds in Surface Soils
Compared to Non-BCT Screening Levels for Site 54
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	Risk-Based Concentrations Soil Ingestion[4]		Units
						Residential	Industrial	
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZO-p-DIOXIN	SB54A	0.009934	=	.00039	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZO-p-DIOXIN	SB54B	0.005241	=	.00039	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZO-p-DIOXIN	SS54A	0.007504	=	.00039	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZO-p-DIOXIN	SS54A	0.003118	=	.00039	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZOFURAN	SB54A	0.010206	=	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZOFURAN	SB54B	0.001094	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZOFURAN	SS54A	0.001691	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZOFURAN	SS54A	0.000753	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,7,8,9-HEPTACHLORODIBENZOFURAN	SS54A	0.000033	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,7,8,9-HEPTACHLORODIBENZOFURAN	SS54A	0.000017	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,7,8-HEXACHLORODIBENZO-p-DIOXIN	SS54A	0.000006	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,7,8-HEXACHLORODIBENZOFURAN	SS54A	0.000014	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,6,7,8-HEXACHLORODIBENZO-P-DIOXIN	SB54A	0.000097	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,6,7,8-HEXACHLORODIBENZO-P-DIOXIN	SB54B	0.000051	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,6,7,8-HEXACHLORODIBENZO-P-DIOXIN	SS54A	0.000087	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,6,7,8-HEXACHLORODIBENZO-P-DIOXIN	SS54A	0.000048	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,6,7,8-HEXACHLORODIBENZOFURAN	SS54A	0.000016	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,6,7,8-HEXACHLORODIBENZOFURAN	SS54A	0.000006	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,7,8,9-HEXACHLORODIBENZO-P-DIOXIN	SS54A	0.000018	J	NA	NA	NA	MG/KG
CH2M HILL	2,3,4,6,7,8-HEXACHLORODIBENZOFURAN	SB54B	0.000008	J	NA	NA	NA	MG/KG
CH2M HILL	2,3,4,6,7,8-HEXACHLORODIBENZOFURAN	SS54A	0.000009	J	NA	NA	NA	MG/KG
CH2M HILL	ACETONE	SS54A	0.31	=	NA	780	20000	MG/KG
CH2M HILL	ACETONE	SS54A	0.005	J	NA	780	20000	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB54B	1.4	=	NA	46	410	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SS54A	0.05	J	NA	46	410	MG/KG
CH2M HILL	CADMIUM	SB54B	2.4	=	1.4	3.9	100	MG/KG
CH2M HILL	COPPER	SB54A	27.9	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SB54B	78.8	=	33	310	8200	MG/KG

Table 54-B
Summary of Detected Compounds in Surface Soils
Compared to Non-BCT Screening Levels for Site 54
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	Risk-Based Concentrations Soil Ingestion[4]		Units
						Residential	Industrial	
CH2M HILL	COPPER	SB54B	25.1	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SS54A	34.6	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SS54A	32.6	=	33	310	8200	MG/KG
CH2M HILL	DIELDRIN	SB54B	0.12	=	.086	.04	.36	MG/KG
CH2M HILL	DIELDRIN	SB54B	0.12	=	.086	.04	.36	MG/KG
CH2M HILL	DIELDRIN	SS54A	0.0034	J	.086	.04	.36	MG/KG
CH2M HILL	DIELDRIN	SS54A	0.0036	J	.086	.04	.36	MG/KG
CH2M HILL	NICKEL	SB54A	29.4	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SB54B	19.2	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SB54B	24.8	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SS54A	29.3	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SS54A	28.8	=	30	160	4100	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SB54B	0.056155	=	.01	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SB54B	0.000239	J	.01	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SS54A	0.053754	=	.01	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SS54A	0.021742	=	.01	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	SB54A	0.039746	=	.00039	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	SB54B	0.003805	J	.00039	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	SS54A	0.017604	=	.00039	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	SS54A	0.002182	J	.00039	NA	NA	MG/KG
CH2M HILL	p,p'-DDE	SB54A	0.005	J	.16	1.9	17	MG/KG
CH2M HILL	p,p'-DDE	SB54B	0.014	J	.16	1.9	17	MG/KG
CH2M HILL	p,p'-DDE	SB54B	0.017	J	.16	1.9	17	MG/KG
CH2M HILL	p,p'-DDE	SS54A	0.0029	J	.16	1.9	17	MG/KG
CH2M HILL	p,p'-DDE	SS54A	0.0026	J	.16	1.9	17	MG/KG
CH2M HILL	p,p'-DDT	SB54A	0.0056	J	.074	1.9	17	MG/KG
CH2M HILL	p,p'-DDT	SS54A	0.0042	=	.074	1.9	17	MG/KG

Table 54-B
Summary of Detected Compounds in Surface Soils
Compared to Non-BCT Screening Levels for Site 54
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	Risk-Based Concentrations Soil Ingestion[4]		Units
						Residential	Industrial	
CH2M HILL	p,p'-DDT	SS54A	0.0039	J	.074	1.9	17	MG/KG
CH2M HILL	SELENIUM	SB54A	1.3	=	.81	39	1000	MG/KG

Notes:
1. Detected values are obtained from the *Draft Parcel 15 Report-Screening Sites Sampling Program for Defense Depot Memphis, TN*, CH2M HILL, 1997.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. Risk-Based Concentrations are obtained from the *EPA Region III Risk-based Concentrations Table*, R.L. Smith, April, 1997.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
= - indicates unqualified detection.
J - indicates estimated value above the detection limit but below the reporting limit.

Table 54-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 54
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZO-p-	SB54A	8 to 10	0.000161	J	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZO-p-	SB54B	5 to 7	0.000577	J	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZO-p-	SB54B	8 to 10	0.00232	J	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-	SB54A	5 to 7	0.000005	J	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-	SB54A	8 to 10	0.00009	J	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-	SB54B	5 to 7	0.000155	J	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-	SB54B	8 to 10	0.00048	J	NA	NA	MG/KG
CH2M HILL	1,2,3,4,7,8,9-	SB54B	8 to 10	0.000013	J	NA	NA	MG/KG
CH2M HILL	1,2,3,4,7,8-HEXACHLORODIBENZOFURAN	SB54B	8 to 10	0.00001	J	NA	NA	MG/KG
CH2M HILL	1,2,3,6,7,8-HEXACHLORODIBENZO-P-	SB54B	5 to 7	0.000006	J	NA	NA	MG/KG
CH2M HILL	1,2,3,6,7,8-HEXACHLORODIBENZO-P-	SB54B	8 to 10	0.000026	J	NA	NA	MG/KG
CH2M HILL	1,2,3,6,7,8-HEXACHLORODIBENZOFURAN	SB54B	8 to 10	0.000006	J	NA	NA	MG/KG
CH2M HILL	1,2,3,7,8,9-HEXACHLORODIBENZO-P-	SB54B	5 to 7	0.000003	J	NA	NA	MG/KG
CH2M HILL	1,2,3,7,8,9-HEXACHLORODIBENZO-P-	SB54B	8 to 10	0.000015	J	NA	NA	MG/KG
CH2M HILL	2,3,4,6,7,8-HEXACHLORODIBENZOFURAN	SB54A	5 to 7	0.000014	J	NA	NA	MG/KG
CH2M HILL	2,3,4,6,7,8-HEXACHLORODIBENZOFURAN	SB54B	5 to 7	0.000005	J	NA	NA	MG/KG
CH2M HILL	2,3,4,6,7,8-HEXACHLORODIBENZOFURAN	SB54B	8 to 10	0.000018	J	NA	NA	MG/KG
CH2M HILL	ACETONE	SB54B	5 to 7	0.035	=	NA	16	MG/KG
CH2M HILL	ACETONE	SB54B	8 to 10	0.01	J	NA	16	MG/KG
CH2M HILL	ARSENIC	SB54A	5 to 7	15	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB54A	8 to 10	8.6	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB54B	5 to 7	11.1	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB54B	8 to 10	13.6	=	17	29	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB54A	5 to 7	20.3	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB54A	8 to 10	26.1	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB54B	5 to 7	17.7	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB54B	8 to 10	17.4	=	26	38	MG/KG
CH2M HILL	COPPER	SB54A	5 to 7	33.4	=	33	NA	MG/KG
CH2M HILL	COPPER	SB54A	8 to 10	30.4	=	33	NA	MG/KG

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Table 54-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 54
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	COPPER	SB54B	5 to 7	23.8	=	33	NA	MG/KG
CH2M HILL	COPPER	SB54B	8 to 10	19.7	=	33	NA	MG/KG
CH2M HILL	DIELDRIN	SB54A	8 to 10	0.0025	J	.37	.004	MG/KG
CH2M HILL	DIELDRIN	SB54B	5 to 7	0.012	=	.37	.004	MG/KG
CH2M HILL	LEAD	SB54A	5 to 7	17.2	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB54A	8 to 10	16.8	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB54B	5 to 7	24.2	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB54B	8 to 10	21.8	=	24	1.5	MG/KG
CH2M HILL	NICKEL	SB54A	5 to 7	32.9	=	37	130	MG/KG
CH2M HILL	NICKEL	SB54A	8 to 10	35.2	=	37	130	MG/KG
CH2M HILL	NICKEL	SB54B	5 to 7	24.5	=	37	130	MG/KG
CH2M HILL	NICKEL	SB54B	8 to 10	22	=	37	130	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SB54A	5 to 7	0.000156	J	.009	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SB54A	8 to 10	0.001977	J	.009	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SB54B	5 to 7	0.009288	=	.009	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SB54B	8 to 10	0.016365	=	.009	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	SB54A	5 to 7	0.000007	J	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	SB54A	8 to 10	0.000179	J	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	SB54B	5 to 7	0.000361	J	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	SB54B	8 to 10	0.001065	J	NA	NA	MG/KG
CH2M HILL	p,p'-DDE	SB54A	8 to 10	0.0054	J	.0015	54	MG/KG
CH2M HILL	p,p'-DDT	SB54A	8 to 10	0.0039	J	.0072	32	MG/KG
CH2M HILL	TCDD Equivalent	SB54A	5 to 7	1.63E-07	=	.000006	NA	MG/KG
CH2M HILL	TCDD Equivalent	SB54A	8 to 10	2.156E-06	=	.000006	NA	MG/KG
CH2M HILL	TCDD Equivalent	SB54B	5 to 7	9.649E-06	=	.000006	NA	MG/KG
CH2M HILL	TCDD Equivalent	SB54B	8 to 10	0.00001743	=	.000006	NA	MG/KG
CH2M HILL	ZINC	SB54A	5 to 7	106	=	110	12000	MG/KG
CH2M HILL	ZINC	SB54A	8 to 10	71.8	=	110	12000	MG/KG
CH2M HILL	ZINC	SB54B	5 to 7	83.2	=	110	12000	MG/KG

Table 54-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 54
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	ZINC	SB54B	8 to 10	77.2	=	110	12000	MG/KG

Notes:
1. Detected values are obtained from the *Draft Parcel 15 Report-Screening Sites Sampling Program for Defense Depot Memphis, TN*, CH2M HILL, 1997.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. RBC-GWP values are obtained from the *EPA Region III Risk-based Concentrations Table*, R. L. Smith, April, 1997.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
= - indicates unqualified detection
J - indicates estimated value above the detection limit but below the reporting limit.
RBC-GWP - Risk-Based Concentrations - Groundwater Protection

Table 54-D
Summary of Detected Compounds in Surface Water
Compared to Screening Levels for Site 54
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	TN State[4]	AWQC-HH[5]	AWQC-AO[6]	Units
CH2M HILL	1,2,3,4,6,7,8-	SW54A	1.04E-07	J	NA	NA	NA	NA	MG/L
CH2M HILL	1,2,3,7,8,9-HEXACHLORODIBENZOFURAN	SW54C	0.00000006	J	NA	NA	NA	NA	MG/L
CH2M HILL	2,3,4,6,7,8-HEXACHLORODIBENZOFURAN	SW54C	1.931E-06	J	NA	NA	NA	NA	MG/L
CH2M HILL	ARSENIC	SW54A	0.0046	J	.018	.05	.000018	.19	MG/L
CH2M HILL	ARSENIC	SW54B	0.0058	J	.018	.05	.000018	.19	MG/L
CH2M HILL	ARSENIC	SW54C	0.0125	=	.018	.05	.000018	.19	MG/L
CH2M HILL	Arsenic, Dissolved	SW54A	0.0042	J	.012	.05	.000018	.19	MG/L
CH2M HILL	Arsenic, Dissolved	SW54B	0.0058	J	.012	.05	.000018	.19	MG/L
CH2M HILL	Arsenic, Dissolved	SW54C	0.0121	=	.012	.05	.000018	.19	MG/L
CH2M HILL	CHROMIUM, TOTAL	SW54A	0.0031	J	.036	.05	NA	.011	MG/L
CH2M HILL	CHROMIUM, TOTAL	SW54B	0.0029	J	.036	.05	NA	.011	MG/L
CH2M HILL	DIELDRIN	SW54A	0.00024	=	NA	NA	NA	NA	MG/L
CH2M HILL	DIELDRIN	SW54B	0.00023	=	NA	NA	NA	NA	MG/L
CH2M HILL	LEAD	SW54A	0.0114	=	.019	.05	NA	.0032	MG/L
CH2M HILL	LEAD	SW54B	0.0082	=	.019	.05	NA	.0032	MG/L
CH2M HILL	NICKEL	SW54A	0.0094	J	.023	.0134	.61	.16	MG/L
CH2M HILL	NICKEL	SW54B	0.0062	J	.023	.0134	.61	.16	MG/L
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SW54A	3.176E-06	J	.000001225	NA	NA	NA	MG/L
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SW54B	3.865E-06	J	.000001225	NA	NA	NA	MG/L
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SW54C	2.019E-06	J	.000001225	NA	NA	NA	MG/L
CH2M HILL	OCTACHLORODIBENZOFURAN	SW54A	1.33E-07	J	NA	NA	NA	NA	MG/L
CH2M HILL	OCTACHLORODIBENZOFURAN	SW54B	2.21E-07	J	NA	NA	NA	NA	MG/L
CH2M HILL	OCTACHLORODIBENZOFURAN	SW54C	8.1E-08	J	NA	NA	NA	NA	MG/L
CH2M HILL	p,p'-DDT	SW54A	0.000068	J	NA	.000000024	.00000059	.000001	MG/L
CH2M HILL	p,p'-DDT	SW54B	0.000066	J	NA	.000000024	.00000059	.000001	MG/L
CH2M HILL	p,p'-DDT	SW54C	0.000086	J	NA	.000000024	.00000059	.000001	MG/L
CH2M HILL	PENTACHLOROPHENOL	SW54A	0.007	=	NA	1.01	.00028	.013	MG/L
CH2M HILL	PENTACHLOROPHENOL	SW54B	0.006	=	NA	1.01	.00028	.013	MG/L
CH2M HILL	TCDD Equivalent	SW54A	3.309E-09	=	.0000000082	NA	NA	NA	MG/L
CH2M HILL	TCDD Equivalent	SW54B	4.086E-09	=	.0000000082	NA	NA	NA	MG/L
CH2M HILL	TCDD Equivalent	SW54C	2.1E-09	=	.0000000082	NA	NA	NA	MG/L
CH2M HILL	ZINC	SW54A	0.0475	J	.29	5	NA	.11	MG/L
CH2M HILL	ZINC	SW54B	0.0286	J	.29	5	NA	.11	MG/L

Table 54-D
Summary of Detected Compounds in Surface Water
Compared to Screening Levels for Site 54
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	TN State[4]	AWQC-HH[5]	AWQC-AO[6]	Units
CH2M HILL	ZINC	SW54C	0.0353	J	.29	5	NA	.11	MG/L

Notes:
1. Detected values are obtained from the *Draft Parcel 15 Report-Screening Sites Sampling Program for Defense Depot Memphis, TN*, CH2M HILL, 1997.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. Tennessee State values are from Table 3-8 of the *Generic Remedial Investigation/Feasibility Study Work Plan*, CH2M HILL, August 1995.
5. Federal Ambient Water Quality Criteria for the Protection of Human Health for the Ingestion of Organisms and Water (AWQC-HH) values are from Table 3-8 of the *Generic Remedial Investigation/Feasibility Study Work Plan*, CH2M HILL, August 1995.
6. Federal Ambient Water Quality Criteria, Chronic for the Protection of Freshwater Aquatic Life (AWQC-AO) values are from Table 3-8 of the *Generic Remedial Investigation/Feasibility Study Work Plan*, CH2M HILL, August 1995.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
= - indicates unqualified detection.
J - indicates estimated value above the detection limit but below the reporting limit.

Table 54-E
Summary of Detected Compounds in Sediment
Compared to Screening Levels for Site 54
Screening Sites Sampling Program
Defense Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	PRG-Sed[4]	NOAA-Sed[5]	Units
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZO-p-	SE54A	0.001253	J	.00058	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZO-p-	SE54B	0.0238	=	.00058	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZOFURAN	SE54A	0.000293	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZOFURAN	SE54B	0.006989	=	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZOFURAN	SE54C	0.000506	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,7,8,9-HEPTACHLORODIBENZOFURAN	SE54B	0.00011	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,7,8,9-HEPTACHLORODIBENZOFURAN	SE54C	0.000057	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,7,8-HEXACHLORODIBENZO-p-DIOXIN	SE54A	0.000008	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,7,8-HEXACHLORODIBENZO-p-DIOXIN	SE54C	0.000013	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,7,8-HEXACHLORODIBENZOFURAN	SE54A	0.00001	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,7,8-HEXACHLORODIBENZOFURAN	SE54B	0.000074	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,7,8-HEXACHLORODIBENZOFURAN	SE54C	0.000042	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,6,7,8-HEXACHLORODIBENZO-P-DIOXIN	SE54A	0.00002	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,6,7,8-HEXACHLORODIBENZO-P-DIOXIN	SE54B	0.00026	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,6,7,8-HEXACHLORODIBENZO-P-DIOXIN	SE54C	0.000044	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,6,7,8-HEXACHLORODIBENZOFURAN	SE54A	0.000004	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,6,7,8-HEXACHLORODIBENZOFURAN	SE54B	0.000079	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,6,7,8-HEXACHLORODIBENZOFURAN	SE54C	0.000014	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,7,8,9-HEXACHLORODIBENZO-P-DIOXIN	SE54A	0.000015	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,7,8,9-HEXACHLORODIBENZO-P-DIOXIN	SE54B	0.00015	J	NA	NA	NA	MG/KG
CH2M HILL	2,3,4,6,7,8-HEXACHLORODIBENZOFURAN	SE54C	0.000022	J	NA	NA	NA	MG/KG
CH2M HILL	ACENAPHTHENE	SE54B	0.061	J	.77	.022	.15	MG/KG
CH2M HILL	ALPHA-CHLORDANE	SE54B	0.53	J	2.4	NA	NA	MG/KG
CH2M HILL	ANTHRACENE	SE54B	0.13	J	1.6	.085	.085	MG/KG
CH2M HILL	ARSENIC	SE54A	4	J	12	8	3.3	MG/KG
CH2M HILL	ARSENIC	SE54B	7.6	J	12	8	3.3	MG/KG
CH2M HILL	ARSENIC	SE54C	7.3	=	12	8	3.3	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	SE54A	0.06	J	2.9	.16	.23	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	SE54B	0.33	J	2.9	.16	.23	MG/KG

Table 54-E
Summary of Detected Compounds in Sediment
Compared to Screening Levels for Site 54
Screening Sites Sampling Program
Defense Depot Memphis, Tennessee

Data	Parameter[2]	StationID	Detected	Project	Background	PRG-Sed[4]	NOAA-Sed[5]	Units
CH2M HILL	BENZO(a)ANTHRACENE	SE54C	0.14	J	2.9	.16	.23	MG/KG
CH2M HILL	BENZO(a)PYRENE	SE54A	0.085	J	2.5	.23	.4	MG/KG
CH2M HILL	BENZO(a)PYRENE	SE54B	0.35	J	2.5	.23	.4	MG/KG
CH2M HILL	BENZO(a)PYRENE	SE54C	0.23	J	2.5	.23	.4	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	SE54A	0.18	J	2.2	NA	NA	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	SE54B	0.46	=	2.2	NA	NA	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	SE54C	0.34	J	2.2	NA	NA	MG/KG
CH2M HILL	BENZO(g,h,i)PERYLENE	SE54A	0.11	J	1.8	NA	NA	MG/KG
CH2M HILL	BENZO(g,h,i)PERYLENE	SE54B	0.25	J	1.8	NA	NA	MG/KG
CH2M HILL	BENZO(g,h,i)PERYLENE	SE54C	0.095	J	1.8	NA	NA	MG/KG
CH2M HILL	BENZO(k)FLUORANTHENE	SE54A	0.12	J	2.3	NA	NA	MG/KG
CH2M HILL	BENZO(k)FLUORANTHENE	SE54B	0.38	=	2.3	NA	NA	MG/KG
CH2M HILL	BENZO(k)FLUORANTHENE	SE54C	0.28	J	2.3	NA	NA	MG/KG
CH2M HILL	BERYLLIUM	SE54A	0.09	J	1.3	NA	NA	MG/KG
CH2M HILL	BERYLLIUM	SE54B	0.09	J	1.3	NA	NA	MG/KG
CH2M HILL	CADMIUM	SE54B	1.3	=	29	1	5	MG/KG
CH2M HILL	CARBAZOLE	SE54B	0.1	J	1.1	NA	NA	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SE54A	68.5	J	20	33	80	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SE54B	16.5	J	20	33	80	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SE54C	6.6	J	20	33	80	MG/KG
CH2M HILL	CHRYSENE	SE54A	0.16	J	3.2	.22	.4	MG/KG
CH2M HILL	CHRYSENE	SE54B	0.47	=	3.2	.22	.4	MG/KG
CH2M HILL	CHRYSENE	SE54C	0.35	J	3.2	.22	.4	MG/KG
CH2M HILL	COPPER	SE54A	4.5	J	58	28	70	MG/KG
CH2M HILL	COPPER	SE54B	49.9	J	58	28	70	MG/KG
CH2M HILL	COPPER	SE54C	2.9	J	58	28	70	MG/KG
CH2M HILL	DIBENZ(a,h)ANTHRACENE	SE54B	0.09	J	.7	.031	.06	MG/KG
CH2M HILL	DIELDRIN	SE54A	0.04	=	.011	NA	NA	MG/KG
CH2M HILL	DIELDRIN	SE54B	0.29	J	.011	NA	NA	MG/KG
CH2M HILL	DIELDRIN	SE54C	0.11	J	.011	NA	NA	MG/KG
CH2M HILL	FLUORANTHENE	SE54A	0.16	J	7.1	.38	.6	MG/KG

Table 54-E
Summary of Detected Compounds in Sediment
Compared to Screening Levels for Site 54
Screening Sites Sampling Program
Defense Depot Memphis, Tennessee

Data	Parameter[3]	StationID	Detected	Project	Background	PRG-Sed[4]	NOAA-Sed[5]	Units
CH2M HILL	FLUORANTHENE	SE54B	0.64	=	7.1	.38	.6	MG/KG
CH2M HILL	FLUORANTHENE	SE54C	0.2	J	7.1	.38	.6	MG/KG
CH2M HILL	FLUORENE	SE54B	0.066	J	1.69	.018	.035	MG/KG
CH2M HILL	GAMMA-CHLORDANE	SE54B	0.65	J	2	NA	NA	MG/KG
CH2M HILL	INDENO(1,2,3-c,d)PYRENE	SE54A	0.1	J	1.7	NA	NA	MG/KG
CH2M HILL	INDENO(1,2,3-c,d)PYRENE	SE54B	0.24	J	1.7	NA	NA	MG/KG
CH2M HILL	INDENO(1,2,3-c,d)PYRENE	SE54C	0.11	J	1.7	NA	NA	MG/KG
CH2M HILL	LEAD	SE54A	13.8	J	35.2	21	35	MG/KG
CH2M HILL	LEAD	SE54B	63.9	J	35.2	21	35	MG/KG
CH2M HILL	LEAD	SE54C	7.2	J	35.2	21	35	MG/KG
CH2M HILL	MERCURY	SE54B	0.1	=	4	.1	.15	MG/KG
CH2M HILL	NICKEL	SE54A	4.8	=	30	NA	30	MG/KG
CH2M HILL	NICKEL	SE54B	4.6	=	30	NA	30	MG/KG
CH2M HILL	NICKEL	SE54C	3	J	30	NA	30	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SE54A	0.007954	=	.0086	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SE54B	0.114256	J	.0086	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SE54C	0.016838	=	.0086	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	SE54A	0.000707	J	NA	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	SE54B	0.014863	J	NA	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	SE54C	0.002252	J	NA	NA	NA	MG/KG
CH2M HILL	p,p'-DDD	SE54B	0.99	J	.0061	NA	.002	MG/KG
CH2M HILL	p,p'-DDD	SE54C	0.089	J	.0061	NA	.002	MG/KG
CH2M HILL	p,p'-DDE	SE54A	0.015	J	.0072	.0017	.002	MG/KG
CH2M HILL	p,p'-DDE	SE54B	0.12	J	.0072	.0017	.002	MG/KG
CH2M HILL	p,p'-DDE	SE54C	0.25	J	.0072	.0017	.002	MG/KG
CH2M HILL	p,p'-DDT	SE54A	0.022	=	NA	NA	.001	MG/KG
CH2M HILL	p,p'-DDT	SE54B	0.21	J	NA	NA	.001	MG/KG
CH2M HILL	p,p'-DDT	SE54C	0.27	J	NA	NA	.001	MG/KG
CH2M HILL	PENTACHLOROPHENOL	SE54B	0.26	=	NA	NA	NA	MG/KG
CH2M HILL	PHENANTHRENE	SE54A	0.068	J	6.9	.14	.225	MG/KG
CH2M HILL	PHENANTHRENE	SE54B	0.5	=	6.9	.14	.225	MG/KG

Table 54-E
Summary of Detected Compounds in Sediment
Compared to Screening Levels for Site 54
Screening Sites Sampling Program
Defense Depot Memphis, Tennessee

Data	Parameter[2]	StationID	Detected	Project	Background	PRG-Sed[4]	NOAA-Sed[5]	Units
CH2M HILL	PYRENE	SE54A	0.13	J	2.9	.29	NA	MG/KG
CH2M HILL	PYRENE	SE54B	**0.72**	=	2.9	.29	NA	MG/KG
CH2M HILL	PYRENE	SE54C	**0.41**	=	2.9	.29	NA	MG/KG
CH2M HILL	TCDD Equivalent	SE54A	8.66E-06	=	.0000054	NA	NA	MG/KG
CH2M HILL	TCDD Equivalent	SE54B	0.000129	=	.0000054	NA	NA	MG/KG
CH2M HILL	TCDD Equivalent	SE54C	1.91E-05	=	.0000054	NA	NA	MG/KG
CH2M HILL	ZINC	SE54A	36.5	J	797	68	120	MG/KG
CH2M HILL	ZINC	SE54B	68.4	J	797	68	120	MG/KG
CH2M HILL	ZINC	SE54C	16.2	J	797	68	120	MG/KG

Notes:

1. Detected values are obtained from the *Draft Parcel 15 Report-Screening Sites Sampling Program for Defense Depot Memphis, TN*, CH2M HILL, 1997.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. Sediment Preliminary Remediation Goal (PRG) values are from Table 3-10 of the *Generic Remedial Investigation/Feasibility Study Work Plan*, CH2M HILL, August 1995.
5. National Oceanic and Atmospheric Administration (NOAA) values are from Table 3-10 of the *Generic Remedial Investigation/Feasibility Study Work Plan*, CH2M HILL, August 1995.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
= - indicates unqualified detection
J - indicates estimated value above the detection limit but below the reporting limit.

Table 55-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 55
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
CH2M HILL	ALUMINUM	SB55A	6040	=	24000	24000	Bkgd	MG/KG
CH2M HILL	ARSENIC	SB55A	8.8	J	20	20	Bckg	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	SB55A	0.04	J	.71	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(a)PYRENE	SB55A	0.058	J	.96	0.088	Residential RBC	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	SB55A	0.093	J	.78	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(g,h,i)PERYLENE	SB55A	0.048	J	.82	230	Residential RBC	MG/KG
CH2M HILL	BENZO(k)FLUORANTHENE	SB55A	0.084	J	.78	8.8	Residential RBC	MG/KG
CH2M HILL	BERYLLIUM	SB55A	0.14	J	1.1	1.1	Bckg	MG/KG
CH2M HILL	CHROMIUM	SB55A	11.9	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHRYSENE	SB55A	0.064	J	.94	88	Residential RBC	MG/KG
CH2M HILL	FLUORANTHENE	SB55A	0.077	J	1.6	310	Residential RBC	MG/KG
CH2M HILL	IRON	SB55A	8330	=	37000	37000	Bckg	MG/KG
CH2M HILL	LEAD	SB55A	10.3	J	30	400	CERCLA	MG/KG
CH2M HILL	MANGANESE	SB55A	138	J	1300	1300	Bckg	MG/KG
CH2M HILL	PYRENE	SB55A	0.07	J	1.5	230	Residential RBC	MG/KG
CH2M HILL	TCDD Equivalent	SB55A	**0.0000114**	=	.000011	**0.00001**	Bckg	MG/KG
CH2M HILL	ZINC	SB55A	24.9	J	130	23000	Residential RBC	MG/KG

Notes:

1. Detected values are obtained from the *Draft Parcel 32 Report-Screening Sites Sampling Program for Defense Depot* Memphis, TN, CH2M HILL, 1997, or the *Remedial Investigation at DDMT Final Report*, Law Environmental, August 1990.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. Based on values selected by the BRAC Cleanup Team in the August 1997 BCT meeting minutes, Memphis, Tennessee.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
J - indicates estimated value above the detection limit but below the reporting limit.
BCT - BRAC Cleanup Team

Table 55-B
Summary of Detected Compounds in Surface Soils
Compared to Non-BCT Screening Levels for Site 55
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	Risk-Based Concentrations Soil Ingestion[4]		Units
						Residential	Industrial	
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZO-p-DIOXIN	SB55A	0.00165	J	.00039	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZOFURAN	SB55A	0.000378	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,6,7,8-HEXACHLORODIBENZO-P-DIOXIN	SB55A	0.000023	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,7,8,9-HEXACHLORODIBENZO-P-DIOXIN	SB55A	0.00005	J	NA	NA	NA	MG/KG
CH2M HILL	ALPHA-CHLORDANE	SB55A	0.00075	J	.029	.49	4.4	MG/KG
CH2M HILL	BARIUM	SB55A	50.4	=	234	550	14000	MG/KG
CH2M HILL	CADMIUM	SB55A	0.43	J	1.4	3.9	100	MG/KG
CH2M HILL	CALCIUM	SB55A	5050	=	5840	NA	NA	MG/KG
CH2M HILL	COBALT	SB55A	4.4	J	18.3	470	12000	MG/KG
CH2M HILL	COPPER	SB55A	11	J	33	310	8200	MG/KG
CH2M HILL	DIELDRIN	SB55A	0.0016	J	.086	.04	.36	MG/KG
CH2M HILL	GAMMA-CHLORDANE	SB55A	0.00097	J	.026	.49	4.4	MG/KG
CH2M HILL	MAGNESIUM	SB55A	554	J	4600	NA	NA	MG/KG
CH2M HILL	NICKEL	SB55A	6	=	30	160	4100	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SB55A	0.010859	=	.01	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	SB55A	0.000553	J	.00039	NA	NA	MG/KG
CH2M HILL	p,p'-DDE	SB55A	0.0031	J	.16	1.9	17	MG/KG
CH2M HILL	p,p'-DDT	SB55A	0.0088	=	.074	1.9	17	MG/KG
CH2M HILL	VANADIUM	SB55A	19.4	=	48.4	55	1400	MG/KG

Notes:
1. Detected values are obtained from the *Draft Parcel 15 Report-Screening Sites Sampling Program for Defense Depot Memphis, TN*, CH2M HILL, 1997.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. Risk-Based Concentrations are obtained from the *EPA Region III Risk-based Concentrations Table*, R.L. Smith, April, 1997.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
= - indicates unqualified detection.
J - indicates estimated value above the detection limit but below the reporting limit.

Table 55-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 55
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	2,3,4,6,7,8-HEXACHLORODIBENZOFURAN	SB55A	8 to 10	0.000015	J	NA	NA	MG/KG
CH2M HILL	ALUMINUM	SB55A	3 to 5	14400	=	21829	NA	MG/KG
CH2M HILL	ALUMINUM	SB55A	3 to 5	14700	=	21829	NA	MG/KG
CH2M HILL	ALUMINUM	SB55A	8 to 10	13200	=	21829	NA	MG/KG
CH2M HILL	ARSENIC	SB55A	3 to 5	11.6	J	17	29	MG/KG
CH2M HILL	ARSENIC	SB55A	3 to 5	10.8	J	17	29	MG/KG
CH2M HILL	ARSENIC	SB55A	8 to 10	10	J	17	29	MG/KG
CH2M HILL	BARIUM	SB55A	3 to 5	154	=	300	1600	MG/KG
CH2M HILL	BARIUM	SB55A	3 to 5	170	=	300	1600	MG/KG
CH2M HILL	BARIUM	SB55A	8 to 10	149	=	300	1600	MG/KG
CH2M HILL	BERYLLIUM	SB55A	3 to 5	0.58	J	1.2	63	MG/KG
CH2M HILL	BERYLLIUM	SB55A	3 to 5	0.58	J	1.2	63	MG/KG
CH2M HILL	BERYLLIUM	SB55A	8 to 10	0.5	J	1.2	63	MG/KG
CH2M HILL	CADMIUM	SB55A	8 to 10	0.43	J	1.4	8	MG/KG
CH2M HILL	CALCIUM	SB55A	3 to 5	2130	=	2400	NA	MG/KG
CH2M HILL	CALCIUM	SB55A	3 to 5	1710	=	2400	NA	MG/KG
CH2M HILL	CALCIUM	SB55A	8 to 10	1860	=	2400	NA	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB55A	3 to 5	13.7	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB55A	3 to 5	14.8	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB55A	8 to 10	14.9	=	26	38	MG/KG
CH2M HILL	COBALT	SB55A	3 to 5	11.6	=	20	NA	MG/KG
CH2M HILL	COBALT	SB55A	3 to 5	11.6	=	20	NA	MG/KG
CH2M HILL	COBALT	SB55A	8 to 10	11.4	=	20	NA	MG/KG
CH2M HILL	COPPER	SB55A	3 to 5	20.1	J	33	NA	MG/KG
CH2M HILL	COPPER	SB55A	3 to 5	20.1	J	33	NA	MG/KG
CH2M HILL	COPPER	SB55A	8 to 10	18.3	J	33	NA	MG/KG
CH2M HILL	IRON	SB55A	3 to 5	22300	=	38000	NA	MG/KG
CH2M HILL	IRON	SB55A	3 to 5	21500	=	38000	NA	MG/KG
CH2M HILL	IRON	SB55A	8 to 10	22100	=	38000	NA	MG/KG
CH2M HILL	LEAD	SB55A	3 to 5	13.2	J	24	1.5	MG/KG
CH2M HILL	LEAD	SB55A	3 to 5	13	J	24	1.5	MG/KG
CH2M HILL	LEAD	SB55A	8 to 10	11.4	J	24	1.5	MG/KG

Table 55-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 55
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	MAGNESIUM	SB55A	3 to 5	2760	=	4900	NA	MG/KG
CH2M HILL	MAGNESIUM	SB55A	3 to 5	2820	=	4900	NA	MG/KG
CH2M HILL	MAGNESIUM	SB55A	8 to 10	2880	=	4900	NA	MG/KG
CH2M HILL	MANGANESE	SB55A	3 to 5	1040	J	1500	NA	MG/KG
CH2M HILL	MANGANESE	SB55A	3 to 5	968	J	1500	NA	MG/KG
CH2M HILL	MANGANESE	SB55A	8 to 10	654	J	1500	NA	MG/KG
CH2M HILL	NICKEL	SB55A	3 to 5	21.7	=	37	130	MG/KG
CH2M HILL	NICKEL	SB55A	3 to 5	22.1	=	37	130	MG/KG
CH2M HILL	NICKEL	SB55A	8 to 10	21.2	=	37	130	MG/KG
CH2M HILL	POTASSIUM	SB55A	3 to 5	1180	=	1800	NA	MG/KG
CH2M HILL	POTASSIUM	SB55A	3 to 5	1180	=	1800	NA	MG/KG
CH2M HILL	POTASSIUM	SB55A	8 to 10	1230	=	1800	NA	MG/KG
CH2M HILL	VANADIUM	SB55A	3 to 5	29.3	=	51	6000	MG/KG
CH2M HILL	VANADIUM	SB55A	3 to 5	30.4	=	51	6000	MG/KG
CH2M HILL	VANADIUM	SB55A	8 to 10	29.8	=	51	6000	MG/KG
CH2M HILL	ZINC	SB55A	3 to 5	71.1	J	110	12000	MG/KG
CH2M HILL	ZINC	SB55A	3 to 5	68.4	J	110	12000	MG/KG
CH2M HILL	ZINC	SB55A	8 to 10	67.1	J	110	12000	MG/KG

Notes:

1. Detected values are obtained from the *Draft Parcel 15 Report-Screening Sites Sampling Program for Defense Depot Memphis, TN*, CH2M HILL, 1997.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. RBC-GWP values are obtained from the *EPA Region III Risk-based Concentrations Table*, R. L. Smith, April, 1997.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
= - indicates unqualified detection
J - indicates estimated value above the detection limit but below the reporting limit.
RBC-GWP - Risk-Based Concentrations - Groundwater Protection

Table 55-D
Summary of Detected Compounds in Surface Water
Compared to Screening Levels for Site 55
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID		Detected Value	Project Qualifier	Background Value[3]	TN State[4]	AWQC-HH[5]	AWQC-AO[6]	Units
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZOFURAN	SW55A	SGB018	7.07E-07	J	NA	NA	NA	NA	MG/L
CH2M HILL	1,2,3,7,8,9-HEXACHLORODIBENZOFURAN	SW55A	SGB018	7.5E-08	J	NA	NA	NA	NA	MG/L
CH2M HILL	2,3,4,6,7,8-HEXACHLORODIBENZOFURAN	SW55A	SGB018	1.532E-06	J	NA	NA	NA	NA	MG/L
CH2M HILL	ALUMINUM	SW55A	SGB018	1.7	=	5.1	NA	NA	.087	MG/L
CH2M HILL	Aluminum, Dissolved	SW55A	WSSGB01	0.32	=	.471	NA	NA	.087	MG/L
CH2M HILL	BARIUM	SW55A	SGB018	0.0339	J	.13	1	NA	NA	MG/L
CH2M HILL	Barium, Dissolved	SW55A	WSSGB01	0.0235	J	.876	1	NA	NA	MG/L
CH2M HILL	CALCIUM	SW55A	SGB018	30.3	=	32	NA	NA	NA	MG/L
CH2M HILL	Calcium, Dissolved	SW55A	WSSGB01	24.4	=	30	NA	NA	NA	MG/L
CH2M HILL	Chromium, Dissolved	SW55A	WSSGB01	0.0022	J	.033	.05	NA	.011	MG/L
CH2M HILL	CHROMIUM, TOTAL	SW55A	SGB018	0.0082	J	.036	.05	NA	.011	MG/L
CH2M HILL	COPPER	SW55A	SGB018	0.0593	=	.075	1	NA	.012	MG/L
CH2M HILL	Copper, Dissolved	SW55A	WSSGB01	0.0297	=	NA	1	NA	.012	MG/L
CH2M HILL	IRON	SW55A	SGB018	2.52	=	6.1	NA	NA	1	MG/L
CH2M HILL	Iron, Dissolved	SW55A	WSSGB01	0.445	J	.12	NA	NA	1	MG/L
CH2M HILL	LEAD	SW55A	SGB018	0.0387	=	.019	.05	NA	.0032	MG/L
CH2M HILL	Lead, Dissolved	SW55A	WSSGB01	0.0071	=	.023	.05	NA	.0032	MG/L
CH2M HILL	MAGNESIUM	SW55A	SGB018	2.41	J	7.7	NA	NA	NA	MG/L
CH2M HILL	Magnesium, Dissolved	SW55A	WSSGB01	1.84	J	6.9	NA	NA	NA	MG/L
CH2M HILL	MANGANESE	SW55A	SGB018	0.0492	=	.66	NA	NA	NA	MG/L
CH2M HILL	Manganese, Dissolved	SW55A	WSSGB01	0.0102	J	.35	NA	NA	NA	MG/L
CH2M HILL	NICKEL	SW55A	SGB018	0.006	J	.023	.0134	.61	.16	MG/L
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SW55A	SGB018	2.71E-05	J	.000001225	NA	NA	NA	MG/L
CH2M HILL	OCTACHLORODIBENZOFURAN	SW55A	SGB018	1.301E-06	J	NA	NA	NA	NA	MG/L
CH2M HILL	p,p'-DDT	SW55A	SGB018	0.00022	=	NA	.000000024	.00000059	.000001	MG/L
CH2M HILL	PENTACHLOROPHENOL	SW55A	SGB018	0.013	=	NA	1.01	.00028	.013	MG/L
CH2M HILL	POTASSIUM	SW55A	SGB018	3.02	J	7.3	NA	NA	NA	MG/L
CH2M HILL	Potassium, Dissolved	SW55A	WSSGB01	2.8	J	6.7	NA	NA	NA	MG/L
CH2M HILL	SODIUM	SW55A	SGB018	2.07	J	21	NA	NA	NA	MG/L
CH2M HILL	Sodium, Dissolved	SW55A	WSSGB01	2.11	J	22	NA	NA	NA	MG/L
CH2M HILL	TCDD Equivalent	SW55A	SGB018	2.8449E-08	=	.0000000082	NA	NA	NA	MG/L
CH2M HILL	VANADIUM	SW55A	SGB018	0.004	J	.039	NA	NA	NA	MG/L
CH2M HILL	Vanadium, Dissolved	SW55A	WSSGB01	0.0018	J	NA	NA	NA	NA	MG/L
CH2M HILL	ZINC	SW55A	SGB018	0.0536	J	.29	5	NA	.11	MG/L

Table 55-D
Summary of Detected Compounds in Surface Water
Compared to Screening Levels for Site 55
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID		Detected Value	Project Qualifier	Background Value[3]	TN State[4]	AWQC-HH[5]	AWQC-AO[6]	Units
CH2M HILL	Zinc, Dissolved	SW55A	WSSGB01	0.0188	J	.41	5	NA	.11	MG/L

Notes:
1. Detected values are obtained from the *Draft Parcel 15 Report-Screening Sites Sampling Program for Defense Depot Memphis, TN*, CH2M HILL, 1997.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. Tennessee State values are from Table 3-8 of the *Generic Remedial Investigation/Feasibility Study Work Plan*, CH2M HILL, August 1995.
5. Federal Ambient Water Quality Criteria for the Protection of Human Health for the Ingestion of Organisms and Water (AWQC-HH) values are from Table 3-8 of the *Generic Remedial Investigation/Feasibility Study Work Plan*, CH2M HILL, August 1995.
6. Federal Ambient Water Quality Criteria, Chronic for the Protection of Freshwater Aquatic Life (AWQC-AO) values are from Table 3-8 of the *Generic Remedial Investigation/Feasibility Study Work Plan*, CH2M HILL, August 1995.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
= - indicates unqualified detection.
J - indicates estimated value above the detection limit but below the reporting limit.

Table 55-E
Summary of Detected Compounds in Sediment
Compared to Screening Levels for Site 55
Screening Sites Sampling Program
Defense Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	PRG-Sed[4]	NOAA-Sed[5]	Units
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZO-p-	SE55A	0.002523	=	.00058	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZOFURAN	SE55A	0.000468	J	NA	NA	NA	MG/KG
CH2M HILL	4-METHYLPHENOL (p-CRESOL)	SE55A	0.17	J	NA	NA	NA	MG/KG
CH2M HILL	ALPHA-CHLORDANE	SE55A	0.0032	J	2.4	NA	NA	MG/KG
CH2M HILL	ALUMINUM	SE55A	1200	=	10000	NA	NA	MG/KG
CH2M HILL	ARSENIC	SE55A	0.26	J	12	8	3.3	MG/KG
CH2M HILL	BARIUM	SE55A	8.8	J	118	NA	NA	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	SE55A	0.11	J	2.9	.16	.23	MG/KG
CH2M HILL	BENZO(a)PYRENE	SE55A	0.13	J	2.5	.23	.4	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	SE55A	0.22	J	2.2	NA	NA	MG/KG
CH2M HILL	BENZO(g,h,i)PERYLENE	SE55A	0.11	J	1.8	NA	NA	MG/KG
CH2M HILL	BENZO(k)FLUORANTHENE	SE55A	0.2	J	2.3	NA	NA	MG/KG
CH2M HILL	CADMIUM	SE55A	2.7	=	29	1	5	MG/KG
CH2M HILL	CALCIUM	SE55A	232000	=	15000	NA	NA	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SE55A	13.5	=	20	33	80	MG/KG
CH2M HILL	CHRYSENE	SE55A	0.19	J	3.2	.22	.4	MG/KG
CH2M HILL	COBALT	SE55A	1.5	J	14	NA	NA	MG/KG
CH2M HILL	COPPER	SE55A	27.3	J	58	28	70	MG/KG
CH2M HILL	FLUORANTHENE	SE55A	0.21	J	7.1	.38	.6	MG/KG
CH2M HILL	GAMMA-CHLORDANE	SE55A	0.0038	J	2	NA	NA	MG/KG
CH2M HILL	INDENO(1,2,3-c,d)PYRENE	SE55A	0.11	J	1.7	NA	NA	MG/KG
CH2M HILL	IRON	SE55A	2960	=	23000	NA	NA	MG/KG
CH2M HILL	LEAD	SE55A	11.6	J	35.2	21	35	MG/KG
CH2M HILL	MAGNESIUM	SE55A	5170	=	2400	NA	NA	MG/KG
CH2M HILL	MANGANESE	SE55A	53.2	J	870	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SE55A	0.017694	=	.0086	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	SE55A	0.001063	J	NA	NA	NA	MG/KG
CH2M HILL	p,p'-DDD	SE55A	0.03	=	.0061	NA	.002	MG/KG
CH2M HILL	p,p'-DDE	SE55A	0.032	=	.0072	.0017	.002	MG/KG

Table 55-E
Summary of Detected Compounds in Sediment
Compared to Screening Levels for Site 55
Screening Sites Sampling Program
Defense Depot Memphis, Tennessee

Data	Parameter[2]	StationID	Detected	Project	Background	PRG-Sed[4]	NOAA-Sed[5]	Units
CH2M HILL	p,p'-DDT	SE55A	**0.068**	=	NA	NA	.001	MG/KG
CH2M HILL	PHENANTHRENE	SE55A	0.063	J	6.9	.14	.225	MG/KG
CH2M HILL	POTASSIUM	SE55A	222	J	1560	NA	NA	MG/KG
CH2M HILL	PYRENE	SE55A	0.18	J	2.9	.29	NA	MG/KG
CH2M HILL	SODIUM	SE55A	158	J	240	NA	NA	MG/KG
CH2M HILL	TCDD Equivalent	SE55A	**1.88E-05**	=	.0000054	NA	NA	MG/KG
CH2M HILL	VANADIUM	SE55A	4.5	J	30	NA	NA	MG/KG
CH2M HILL	ZINC	SE55A	47.6	J	797	68	120	MG/KG

Notes:

1. Detected values are obtained from the *Draft Parcel 15 Report-Screening Sites Sampling Program for Defense Depot Memphis, TN*, CH2M HILL, 1997.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. Sediment Preliminary Remediation Goal (PRG) values are from Table 3-10 of the *Generic Remedial Investigation/Feasibility Study Work Plan*, CH2M HILL, August 1995.
5. National Oceanic and Atmospheric Administration (NOAA) values are from Table 3-10 of the *Generic Remedial Investigation/Feasibility Study Work Plan*, CH2M HILL, August 1995.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
= - indicates unqualified detection
J - indicates estimated value above the detection limit but below the reporting limit.

Table 72-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 72
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
CH2M HILL	ALUMINUM	SS72C	17100	=	24000	24000	Bkgd	MG/KG
CH2M HILL	ARSENIC	SS72A	29	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SS72B	17.4	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SS72C	13.3	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SS72D	18.1	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SS72E	27.7	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SS72F	22.8	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SS72F	22.8	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SS72G	17.2	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SS72H	15.9	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SS72I	24	=	20	20	Bckg	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	SS72A	0.12	=	.71	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	SS72B	0.21	=	.71	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	SS72E	0.26	=	.71	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	SS72F	0.076	=	.71	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	SS72F	0.11	=	.71	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(a)PYRENE	SS72A	0.14	=	.96	0.088	Residential RBC	MG/KG
CH2M HILL	BENZO(a)PYRENE	SS72B	0.19	=	.96	0.088	Residential RBC	MG/KG
CH2M HILL	BENZO(a)PYRENE	SS72E	0.29	=	.96	0.088	Residential RBC	MG/KG
CH2M HILL	BENZO(a)PYRENE	SS72F	0.069	=	.96	0.088	Residential RBC	MG/KG
CH2M HILL	BENZO(a)PYRENE	SS72F	0.085	=	.96	0.088	Residential RBC	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	SS72A	0.2	=	.78	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	SS72B	0.18	=	.78	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	SS72E	0.32	=	.78	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	SS72F	0.079	=	.78	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	SS72F	0.12	=	.78	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(g,h,i)PERYLENE	SS72A	0.11	=	.82	230	Residential RBC	MG/KG
CH2M HILL	BENZO(g,h,i)PERYLENE	SS72B	0.14	=	.82	230	Residential RBC	MG/KG
CH2M HILL	BENZO(g,h,i)PERYLENE	SS72E	0.19	=	.82	230	Residential RBC	MG/KG
CH2M HILL	BENZO(g,h,i)PERYLENE	SS72F	0.064	=	.82	230	Residential RBC	MG/KG
CH2M HILL	BENZO(g,h,i)PERYLENE	SS72F	0.088	=	.82	230	Residential RBC	MG/KG
CH2M HILL	BENZO(k)FLUORANTHENE	SS72A	0.18	=	.78	8.8	Residential RBC	MG/KG
CH2M HILL	BENZO(k)FLUORANTHENE	SS72B	0.25	=	.78	8.8	Residential RBC	MG/KG
CH2M HILL	BENZO(k)FLUORANTHENE	SS72E	0.3	=	.78	8.8	Residential RBC	MG/KG

Table 72-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 72
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
CH2M HILL	BENZO(k)FLUORANTHENE	SS72F	0.087	=	.78	8.8	Residential RBC	MG/KG
CH2M HILL	BENZO(k)FLUORANTHENE	SS72F	0.15	=	.78	8.8	Residential RBC	MG/KG
CH2M HILL	BERYLLIUM	SS72C	0.56	J	1.1	1.1	Bckg	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS72A	31.5	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS72B	27.9	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS72C	15.8	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS72D	28.6	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS72E	29.6	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS72F	31	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS72F	32.9	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS72G	23.5	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS72H	24.9	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS72I	28.9	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHRYSENE	SS72A	0.17	=	.94	88	Residential RBC	MG/KG
CH2M HILL	CHRYSENE	SS72B	0.2	=	.94	88	Residential RBC	MG/KG
CH2M HILL	CHRYSENE	SS72E	0.28	=	.94	88	Residential RBC	MG/KG
CH2M HILL	CHRYSENE	SS72F	0.079	=	.94	88	Residential RBC	MG/KG
CH2M HILL	CHRYSENE	SS72F	0.12	=	.94	88	Residential RBC	MG/KG
CH2M HILL	FLUORANTHENE	SS72A	0.21	=	1.6	310	Residential RBC	MG/KG
CH2M HILL	FLUORANTHENE	SS72B	0.42	=	1.6	310	Residential RBC	MG/KG
CH2M HILL	FLUORANTHENE	SS72D	0.12	=	1.6	310	Residential RBC	MG/KG
CH2M HILL	FLUORANTHENE	SS72E	0.33	=	1.6	310	Residential RBC	MG/KG
CH2M HILL	FLUORANTHENE	SS72F	0.16	=	1.6	310	Residential RBC	MG/KG
CH2M HILL	FLUORANTHENE	SS72F	0.26	=	1.6	310	Residential RBC	MG/KG
CH2M HILL	INDENO(1,2,3-c,d)PYRENE	SS72A	0.083	=	.7	0.88	Residential RBC	MG/KG
CH2M HILL	INDENO(1,2,3-c,d)PYRENE	SS72B	0.17	=	.7	0.88	Residential RBC	MG/KG
CH2M HILL	INDENO(1,2,3-c,d)PYRENE	SS72E	0.26	=	.7	0.88	Residential RBC	MG/KG
CH2M HILL	INDENO(1,2,3-c,d)PYRENE	SS72F	0.075	=	.7	0.88	Residential RBC	MG/KG
CH2M HILL	INDENO(1,2,3-c,d)PYRENE	SS72F	0.15	=	.7	0.88	Residential RBC	MG/KG
CH2M HILL	IRON	SS72C	25300	J	37000	37000	Bckg	MG/KG
CH2M HILL	LEAD	SS72A	98.2	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SS72B	100	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SS72C	15.1	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SS72D	33.1	=	30	400	CERCLA	MG/KG

Table 72-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 72
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
CH2M HILL	LEAD	SS72E	46.5	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SS72F	33.5	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SS72F	33	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SS72G	28	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SS72H	45.9	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SS72I	31.3	=	30	400	CERCLA	MG/KG
CH2M HILL	MANGANESE	SS72C	950	=	1300	1300	Bckg	MG/KG
CH2M HILL	PHENANTHRENE	SS72A	0.094	=	.61	2300	Residential RBC	MG/KG
CH2M HILL	PHENANTHRENE	SS72B	0.23	=	.61	2300	Residential RBC	MG/KG
CH2M HILL	PHENANTHRENE	SS72D	0.064	=	.61	2300	Residential RBC	MG/KG
CH2M HILL	PHENANTHRENE	SS72F	0.087	=	.61	2300	Residential RBC	MG/KG
CH2M HILL	PHENANTHRENE	SS72F	0.16	=	.61	2300	Residential RBC	MG/KG
CH2M HILL	PYRENE	SS72A	0.16	=	1.5	230	Residential RBC	MG/KG
CH2M HILL	PYRENE	SS72B	0.37	=	1.5	230	Residential RBC	MG/KG
CH2M HILL	PYRENE	SS72D	0.079	=	1.5	230	Residential RBC	MG/KG
CH2M HILL	PYRENE	SS72E	0.32	=	1.5	230	Residential RBC	MG/KG
CH2M HILL	PYRENE	SS72F	0.11	=	1.5	230	Residential RBC	MG/KG
CH2M HILL	PYRENE	SS72F	0.19	=	1.5	230	Residential RBC	MG/KG
CH2M HILL	ZINC	SS72A	186	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SS72B	160	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SS72C	78	J	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SS72D	99.5	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SS72E	137	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SS72F	127	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SS72F	135	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SS72G	107	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SS72H	140	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SS72I	126	=	130	23000	Residential RBC	MG/KG
LAW	ANTHRACENE	SS1	6.1	=	.096	2300	Residential RBC	MG/KG
LAW	ARSENIC	SS1	4	=	20	20	Bckg	MG/KG
LAW	ARSENIC	SS2	18	=	20	20	Bckg	MG/KG
LAW	ARSENIC	SS3	26	=	20	20	Bckg	MG/KG
LAW	BENZO(a)ANTHRACENE	SS41	0.12	J	.71	0.88	Residential RBC	MG/KG
LAW	BENZO(b)FLUORANTHENE	SS41	0.21	J	.78	0.88	Residential RBC	MG/KG

Table 72-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 72
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
LAW	BENZOIC ACID	SS1	0.84	J	NA	31000	Residential RBC	MG/KG
LAW	CHROMIUM, TOTAL	SS1	15	=	24.8	39	Residential RBC	MG/KG
LAW	CHROMIUM, TOTAL	SS2	19	=	24.8	39	Residential RBC	MG/KG
LAW	CHROMIUM, TOTAL	SS3	17	=	24.8	39	Residential RBC	MG/KG
LAW	CHROMIUM, TOTAL	SS41	144	=	24.8	39	Residential RBC	MG/KG
LAW	CHRYSENE	SS1	0.49	J	.94	88	Residential RBC	MG/KG
LAW	CHRYSENE	SS41	0.17	J	.94	88	Residential RBC	MG/KG
LAW	FLUORANTHENE	SS41	0.37	J	1.6	310	Residential RBC	MG/KG
LAW	LEAD	SS1	66	=	30	400	CERCLA	MG/KG
LAW	LEAD	SS2	96	=	30	400	CERCLA	MG/KG
LAW	LEAD	SS3	129	=	30	400	CERCLA	MG/KG
LAW	LEAD	SS41	878	=	30	400	CERCLA	MG/KG
LAW	PHENANTHRENE	SS41	0.2	J	.61	2300	Residential RBC	MG/KG
LAW	PYRENE	SS1	3.1	=	1.5	230	Residential RBC	MG/KG
LAW	PYRENE	SS3	0.57	J	1.5	230	Residential RBC	MG/KG
LAW	PYRENE	SS41	0.29	J	1.5	230	Residential RBC	MG/KG
LAW	ZINC	SS1	22	=	130	23000	Residential RBC	MG/KG
LAW	ZINC	SS2	130	=	130	23000	Residential RBC	MG/KG
LAW	ZINC	SS3	92.4	=	130	23000	Residential RBC	MG/KG
LAW	ZINC	SS41	265	=	130	23000	Residential RBC	MG/KG

Notes:
1. Detected values are obtained from the *Draft Parcel 15 Report-Screening Sites Sampling Program for Defense Depot* Memphis, TN, CH2M HILL, 1997, and the *Remedial Investigation at DDMT Final Report*, Law Environmental, August 1990.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. Based on values selected by the BRAC Cleanup Team in the August 1997 BCT meeting minutes, Memphis, Tennessee.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
J - indicates estimated value above the detection limit but below the reporting limit.
= - indicates unqualified detection.
BCT - BRAC Cleanup Team

Table 72-B
Summary of Detected Compounds in Surface Soils
Compared to Non-BCT Screening Levels for Site 72
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	Risk-Based Concentrations Soil Ingestion[4]		Units
						Residential	Industrial	
CH2M HILL	BARIUM	SS72C	152	=	234	550	14000	MG/KG
CH2M HILL	CALCIUM	SS72C	1020	=	5840	NA	NA	MG/KG
CH2M HILL	COBALT	SS72C	12.2	=	18.3	470	12000	MG/KG
CH2M HILL	COPPER	SS72A	70.7	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SS72B	29.4	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SS72C	23.8	J	33	310	8200	MG/KG
CH2M HILL	COPPER	SS72D	30.1	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SS72E	47.6	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SS72F	34.7	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SS72F	37.4	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SS72G	26.7	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SS72H	25.1	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SS72I	34.9	=	33	310	8200	MG/KG
CH2M HILL	MAGNESIUM	SS72C	3180	=	4600	NA	NA	MG/KG
CH2M HILL	NICKEL	SS72A	40.2	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SS72B	30.4	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SS72C	22.9	J	30	160	4100	MG/KG
CH2M HILL	NICKEL	SS72D	29.3	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SS72E	39.2	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SS72F	37.2	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SS72F	40.4	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SS72G	27.6	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SS72H	29.7	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SS72I	40.9	=	30	160	4100	MG/KG
CH2M HILL	p,p'-DDE	SS72C	0.0036	J	.16	1.9	17	MG/KG
CH2M HILL	p,p'-DDT	SS72C	0.013	=	.074	1.9	17	MG/KG
CH2M HILL	POTASSIUM	SS72C	1460	=	1820	NA	NA	MG/KG
CH2M HILL	SELENIUM	SS72C	0.65	=	.81	39	1000	MG/KG
CH2M HILL	SELENIUM	SS72F	1.2	=	.81	39	1000	MG/KG
CH2M HILL	SELENIUM	SS72F	1.3	=	.81	39	1000	MG/KG

Table 72-B
Summary of Detected Compounds in Surface Soils
Compared to Non-BCT Screening Levels for Site 72
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	Risk-Based Concentrations Soil Ingestion[4]		Units
						Residential	Industrial	
CH2M HILL	SELENIUM	SS72G	1.2	=	.81	39	1000	MG/KG
CH2M HILL	SELENIUM	SS72H	1.3	=	.81	39	1000	MG/KG
CH2M HILL	SELENIUM	SS72I	1.5	=	.81	39	1000	MG/KG
CH2M HILL	VANADIUM	SS72C	33.8	=	48.4	55	1400	MG/KG
LAW	ACETONE	SS3	0.008	J	NA	780	20000	MG/KG
LAW	ACETONE	SS41	0.012	=	NA	780	20000	MG/KG
LAW	BARIUM	SS1	5.8	=	234	550	14000	MG/KG
LAW	BARIUM	SS2	43.4	=	234	550	14000	MG/KG
LAW	BARIUM	SS3	19.2	=	234	550	14000	MG/KG
LAW	BARIUM	SS41	311	=	234	550	14000	MG/KG
LAW	BETA BHC (BETA	SS41	0.01	=	NA	NA	NA	MG/KG
LAW	bis(2-ETHYLHEXYL) PHTHALATE	SS1	0.63	J	NA	46	410	MG/KG
LAW	bis(2-ETHYLHEXYL) PHTHALATE	SS41	0.29	J	NA	46	410	MG/KG
LAW	CADMIUM	SS2	4	=	1.4	3.9	100	MG/KG
LAW	CADMIUM	SS3	1.6	=	1.4	3.9	100	MG/KG
LAW	CADMIUM	SS41	0.8	=	1.4	3.9	100	MG/KG
LAW	COPPER	SS1	246	=	33	310	8200	MG/KG
LAW	COPPER	SS2	25	=	33	310	8200	MG/KG
LAW	COPPER	SS3	34	=	33	310	8200	MG/KG
LAW	COPPER	SS41	42	=	33	310	8200	MG/KG
LAW	DDE	SS2	0.29	=	.16	1.9	17	MG/KG
LAW	DDE	SS3	0.25	=	.16	1.9	17	MG/KG
LAW	DDE	SS41	0.021	=	.16	1.9	17	MG/KG
LAW	DDT	SS2	1.5	=	.074	1.9	17	MG/KG
LAW	DDT	SS3	1.4	=	.074	1.9	17	MG/KG
LAW	DDT	SS41	0.13	=	.074	1.9	17	MG/KG
LAW	MERCURY	SS2	0.03	=	.43	2.3	61	MG/KG
LAW	MERCURY	SS3	0.03	=	.43	2.3	61	MG/KG
LAW	METHYLENE CHLORIDE	SS1	7.1	=	NA	85	760	MG/KG
LAW	METHYLENE CHLORIDE	SS2	0.009	=	NA	85	760	MG/KG

Table 72-H
Summary of Detected Compounds in Surface Soils
Compared to Non-BCT Screening Levels for Site 72
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	Risk-Based Concentrations Soil Ingestion[4]		Units
						Residential	Industrial	
LAW	METHYLENE CHLORIDE	SS3	0.014	=	NA	85	760	MG/KG
LAW	METHYLENE CHLORIDE	SS41	0.015	=	NA	85	760	MG/KG
LAW	N-NITROSODIPHENYLAMINE	SS3	0.58	J	NA	130	1200	MG/KG
LAW	NICKEL	SS1	3	=	30	160	4100	MG/KG
LAW	NICKEL	SS2	6	=	30	160	4100	MG/KG
LAW	NICKEL	SS3	3	=	30	160	4100	MG/KG
LAW	NICKEL	SS41	6	=	30	160	4100	MG/KG
LAW	TOLUENE	SS2	0.008	=	.012	1600	41000	MG/KG
LAW	TOLUENE	SS3	0.017	=	.012	1600	41000	MG/KG
LAW	TOLUENE	SS41	0.013	=	.012	1600	41000	MG/KG
LAW	Total Polynuclear Aromatic Hydrocarbons	SS1	9.69	=	NA	NA	NA	MG/KG
LAW	Total Polynuclear Aromatic Hydrocarbons	SS3	0.57	=	NA	NA	NA	MG/KG
LAW	Total Polynuclear Aromatic Hydrocarbons	SS41	1.36	=	NA	NA	NA	MG/KG
LAW	Total Xylenes	SS2	0.004	J	.009	NA	NA	MG/KG
LAW	Total Xylenes	SS3	0.011	=	.009	NA	NA	MG/KG

Notes:
1. Detected values are obtained from the *Draft Parcel 15 Report-Screening Sites Sampling Program for Defense Depot Memphis, TN*, CH2M HILL, 1997, and the *Remedial Investigation at DDMT Final Report*, Law Environmental, August 1990.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. Risk-Based Concentrations are obtained from the *EPA Region III Risk-based Concentrations Table*, R.L. Smith, April, 1997.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
= - indicates unqualified detection.
J - indicates estimated value above the detection limit but below the reporting limit.

Table 72-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 72
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
LAW	ACETONE	STB-7-1	71 to 76	0.25	=	NA	16	MG/KG
LAW	ACETONE	STB-3-3	93.5 to 98.5	0.03	=	NA	16	MG/KG
LAW	bis(2-ETHYLHEXYL) PHTHALATE	STB-3-1	21 to 26	2	=	NA	3600	MG/KG
LAW	bis(2-ETHYLHEXYL) PHTHALATE	STB-3-2	26 to 31	0.67	=	NA	3600	MG/KG
LAW	bis(2-ETHYLHEXYL) PHTHALATE	STB-3-3	93.5 to 98.5	0.91	=	NA	3600	MG/KG
LAW	DI-n-BUTYL PHTHALATE	STB-3-1	21 to 26	0.14	J	NA	2300	MG/KG
LAW	DI-n-BUTYL PHTHALATE	STB-3-2	26 to 31	0.17	J	NA	2300	MG/KG
LAW	DI-n-BUTYL PHTHALATE	STB-3-3	93.5 to 98.5	0.12	J	NA	2300	MG/KG
LAW	METHYLENE CHLORIDE	STB-3-1	21 to 26	0.003	J	NA	.02	MG/KG
LAW	METHYLENE CHLORIDE	STB-3-2	26 to 31	0.003	J	NA	.02	MG/KG
LAW	METHYLENE CHLORIDE	STB-3-3	93.5 to 98.5	0.003	J	NA	.02	MG/KG

Notes:
1. Detected values are obtained from the *Remedial Investigation at DDMT Final Report,* Law Environmental, August 1990.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. RBC-GWP values are obtained from the *EPA Region III Risk-based Concentrations Table*, R. L. Smith, April, 1997.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
= - indicates unqualified detection
J - indicates estimated value above the detection limit but below the reporting limit.
RBC-GWP - Risk-Based Concenurations - Groundwater Protection

Table 74-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 74
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
CH2M HILL	ANTHRACENE	SB74B	0.048	J	.096	2300	Residential RBC	MG/KG
CH2M HILL	ANTIMONY	SB74A	2.1	J	7	7	Bckg	MG/KG
CH2M HILL	ARSENIC	SB74A	11.9	J	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SB74B	13.7	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SB74C	13.5	=	20	20	Bckg	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	SB74B	0.17	J	.71	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(a)PYRENE	SB74B	0.13	J	.96	0.088	Residential RBC	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	SB74B	0.17	J	.78	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(g,h,i)PERYLENE	SB74B	0.11	J	.82	230	Residential RBC	MG/KG
CH2M HILL	BENZO(k)FLUORANTHENE	SB74B	0.16	J	.78	8.8	Residential RBC	MG/KG
CH2M HILL	BERYLLIUM	SB74A	0.42	J	1.1	1.1	Bckg	MG/KG
CH2M HILL	CARBAZOLE	SB74B	0.078	J	.067	32	Residential RBC	MG/KG
CH2M HILL	CHROMIUM	SB74A	16.9	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM	SB74B	25.5	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM	SB74C	26.6	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHRYSENE	SB74B	0.25	J	.94	88	Residential RBC	MG/KG
CH2M HILL	FLUORANTHENE	SB74B	0.48	=	1.6	310	Residential RBC	MG/KG
CH2M HILL	INDENO(1,2,3-c,d)PYRENE	SB74B	0.1	J	.7	0.88	Residential RBC	MG/KG
CH2M HILL	LEAD	SB74A	13.6	J	30	400	CERCLA Removal	MG/KG
CH2M HILL	LEAD	SB74B	26	=	30	400	CERCLA Removal	MG/KG
CH2M HILL	LEAD	SB74C	32.5	=	30	400	CERCLA Removal	MG/KG
CH2M HILL	PHENANTHRENE	SB74B	0.37	J	.61	2300	Residential RBC	MG/KG
CH2M HILL	PYRENE	SB74B	0.31	J	1.5	230	Residential RBC	MG/KG
CH2M HILL	ZINC	SB74A	61.7	J	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SB74B	110	=	130	23000	Residential RBC	MG/KG

Table 74-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 74
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
CH2M HILL	ZINC	SB74C	174	=	130	23000	Residential RBC	MG/KG

Notes:
1. Detected values are obtained from the *Draft Parcel 15 Report-Screening Sites Sampling Program for Defense Depot* Memphis, TN, CH2M HILL, 1997.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. Based on values selected by the BRAC Cleanup Team in the August 1997 BCT meeting minutes, Memphis, Tennessee.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
J - indicates estimated value above the detection limit but below the reporting limit.
BCT - BRAC Cleanup Team

Table 74-H
Summary of Detected Compounds in Surface Soils
Compared to Non-BCT Screening Levels for Site 74
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	Risk-Based Concentrations Soil Ingestion[4]		Units
						Residential	Industrial	
CH2M HILL	ACETONE	SB74B	0.004	J	NA	780	20000	MG/KG
CH2M HILL	ACETONE	SB74C	0.005	J	NA	780	20000	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB74B	0.13	J	NA	46	410	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB74C	0.063	J	NA	46	410	MG/KG
CH2M HILL	COPPER	SB74A	17.7	J	33	310	8200	MG/KG
CH2M HILL	COPPER	SB74B	24.7	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SB74C	25.2	=	33	310	8200	MG/KG
CH2M HILL	DI-n-BUTYL PHTHALATE	SB74A	0.052	J	NA	780	20000	MG/KG
CH2M HILL	DI-n-BUTYL PHTHALATE	SB74B	0.1	J	NA	780	20000	MG/KG
CH2M HILL	DI-n-BUTYL PHTHALATE	SB74C	0.13	J	NA	780	20000	MG/KG
CH2M HILL	DIELDRIN	SB74B	0.0031	J	.086	.04	.36	MG/KG
CH2M HILL	DIELDRIN	SB74C	0.0015	J	.086	.04	.36	MG/KG
CH2M HILL	DIETHYL PHTHALATE	SB74C	0.18	J	NA	6300	100000	MG/KG
CH2M HILL	NICKEL	SB74A	20.2	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SB74B	29.9	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SB74C	22.7	=	30	160	4100	MG/KG

Notes:
1. Detected values are obtained from the *Draft Parcel 15 Report-Screening Sites Sampling Program for Defense Depot Memphis, TN*, CH2M HILL, 1997.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. Risk-Based Concentrations are obtained from the *EPA Region III Risk-based Concentrations Table*, R.L. Smith, April, 1997.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
= - indicates unqualified detection.
J - indicates estimated value above the detection limit but below the reporting limit.

Table 74-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 74
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	ACETONE	SB74A	18 to 20	0.005	J	NA	16	MG/KG
CH2M HILL	ACETONE	SB74A	3 to 5	0.004	J	NA	16	MG/KG
CH2M HILL	ACETONE	SB74A	8 to 10	0.005	J	NA	16	MG/KG
CH2M HILL	ACETONE	SB74B	18 to 20	0.005	J	NA	16	MG/KG
CH2M HILL	ACETONE	SB74B	3 to 5	0.004	J	NA	16	MG/KG
CH2M HILL	ACETONE	SB74C	18 to 20	0.003	J	NA	16	MG/KG
CH2M HILL	ACETONE	SB74C	8 to 10	0.012	J	NA	16	MG/KG
CH2M HILL	ACETONE	SB74C	8 to 10	0.007	J	NA	16	MG/KG
CH2M HILL	ALUMINUM	SB74B	8 to 10	15400	=	21829	NA	MG/KG
CH2M HILL	ALUMINUM	SB74B	8 to 10	13900	=	21829	NA	MG/KG
CH2M HILL	ANTHRACENE	SB74C	8 to 10	0.054	J	NA	12000	MG/KG
CH2M HILL	ANTIMONY	SB74B	8 to 10	2.9	J	NA	5	MG/KG
CH2M HILL	ANTIMONY	SB74B	8 to 10	2.6	J	NA	5	MG/KG
CH2M HILL	ANTIMONY	SB74C	3 to 5	3.9	J	NA	5	MG/KG
CH2M HILL	ARSENIC	SB74A	18 to 20	1.4	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB74A	3 to 5	23.5	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB74A	8 to 10	26.4	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB74B	18 to 20	16.9	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB74B	3 to 5	25.4	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB74B	8 to 10	11.3	J	17	29	MG/KG
CH2M HILL	ARSENIC	SB74B	8 to 10	11.5	J	17	29	MG/KG
CH2M HILL	ARSENIC	SB74C	18 to 20	10.2	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB74C	3 to 5	17.1	J	17	29	MG/KG
CH2M HILL	ARSENIC	SB74C	8 to 10	22.4	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB74C	8 to 10	28.3	=	17	29	MG/KG
CH2M HILL	BARIUM	SB74B	8 to 10	129	=	300	1600	MG/KG
CH2M HILL	BARIUM	SB74B	8 to 10	134	=	300	1600	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	SB74C	8 to 10	0.18	J	NA	2	MG/KG
CH2M HILL	BENZO(a)PYRENE	SB74C	8 to 10	0.16	J	NA	8	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	SB74C	8 to 10	0.21	J	NA	5	MG/KG
CH2M HILL	BENZO(g,h,i)PERYLENE	SB74C	8 to 10	0.14	J	NA	1400	MG/KG

Table 74-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 74
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	BENZO(k)FLUORANTHENE	SB74C	8 to 10	0.18	J	NA	49	MG/KG
CH2M HILL	BERYLLIUM	SB74B	8 to 10	0.52	J	1.2	63	MG/KG
CH2M HILL	BERYLLIUM	SB74B	8 to 10	0.43	J	1.2	63	MG/KG
CH2M HILL	BERYLLIUM	SB74C	3 to 5	0.6	J	1.2	63	MG/KG
CH2M HILL	BERYLLIUM	SB74C	8 to 10	1.1	=	1.2	63	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB74A	18 to 20	0.18	J	NA	3600	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB74A	3 to 5	0.66	=	NA	3600	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB74A	8 to 10	0.098	J	NA	3600	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB74B	18 to 20	1.2	=	NA	3600	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB74B	3 to 5	0.074	J	NA	3600	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB74C	18 to 20	0.088	J	NA	3600	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB74C	8 to 10	0.86	=	NA	3600	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB74C	8 to 10	0.11	J	NA	3600	MG/KG
CH2M HILL	CADMIUM	SB74B	8 to 10	0.5	J	1.4	8	MG/KG
CH2M HILL	CADMIUM	SB74C	3 to 5	0.59	J	1.4	8	MG/KG
CH2M HILL	CALCIUM	SB74B	8 to 10	1000	=	2400	NA	MG/KG
CH2M HILL	CALCIUM	SB74B	8 to 10	1010	=	2400	NA	MG/KG
CH2M HILL	CARBAZOLE	SB74C	8 to 10	0.07	J	NA	.6	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB74A	18 to 20	46.3	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB74A	3 to 5	22.4	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB74A	8 to 10	25.3	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB74B	18 to 20	29.3	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB74B	3 to 5	34.9	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB74B	8 to 10	17.7	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB74B	8 to 10	18.9	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB74C	18 to 20	33.5	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB74C	3 to 5	16.8	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB74C	8 to 10	26.9	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB74C	8 to 10	28.2	=	26	38	MG/KG
CH2M HILL	CHRYSENE	SB74C	8 to 10	0.27	J	NA	160	MG/KG
CH2M HILL	COBALT	SB74B	8 to 10	9.4	=	20	NA	MG/KG

Table 74-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 74
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	COBALT	SB74B	8 to 10	10.5	=	20	NA	MG/KG
CH2M HILL	COPPER	SB74A	18 to 20	22	=	33	NA	MG/KG
CH2M HILL	COPPER	SB74A	3 to 5	39.7	=	33	NA	MG/KG
CH2M HILL	COPPER	SB74A	8 to 10	42.8	=	33	NA	MG/KG
CH2M HILL	COPPER	SB74B	18 to 20	35.2	=	33	NA	MG/KG
CH2M HILL	COPPER	SB74B	3 to 5	30.8	=	33	NA	MG/KG
CH2M HILL	COPPER	SB74B	8 to 10	21.5	J	33	NA	MG/KG
CH2M HILL	COPPER	SB74B	8 to 10	20.4	J	33	NA	MG/KG
CH2M HILL	COPPER	SB74C	18 to 20	22.4	=	33	NA	MG/KG
CH2M HILL	COPPER	SB74C	3 to 5	21	J	33	NA	MG/KG
CH2M HILL	COPPER	SB74C	8 to 10	36.6	=	33	NA	MG/KG
CH2M HILL	COPPER	SB74C	8 to 10	44.3	=	33	NA	MG/KG
CH2M HILL	DI-n-BUTYL PHTHALATE	SB74A	18 to 20	0.74	=	NA	2300	MG/KG
CH2M HILL	DI-n-BUTYL PHTHALATE	SB74A	3 to 5	0.21	J	NA	2300	MG/KG
CH2M HILL	DI-n-BUTYL PHTHALATE	SB74A	8 to 10	0.09	J	NA	2300	MG/KG
CH2M HILL	DI-n-BUTYL PHTHALATE	SB74B	18 to 20	0.14	J	NA	2300	MG/KG
CH2M HILL	DI-n-BUTYL PHTHALATE	SB74B	3 to 5	0.083	J	NA	2300	MG/KG
CH2M HILL	DI-n-BUTYL PHTHALATE	SB74C	18 to 20	0.15	J	NA	2300	MG/KG
CH2M HILL	DI-n-BUTYL PHTHALATE	SB74C	8 to 10	0.16	J	NA	2300	MG/KG
CH2M HILL	DI-n-BUTYL PHTHALATE	SB74C	8 to 10	0.13	J	NA	2300	MG/KG
CH2M HILL	DIELDRIN	SB74A	8 to 10	0.0014	J	.37	.004	MG/KG
CH2M HILL	DIELDRIN	SB74C	8 to 10	**0.039**	=	.37	**.004**	MG/KG
CH2M HILL	DIELDRIN	SB74C	8 to 10	**0.018**	=	.37	**.004**	MG/KG
CH2M HILL	FLUORANTHENE	SB74C	3 to 5	0.09	J	.045	4300	MG/KG
CH2M HILL	FLUORANTHENE	SB74C	8 to 10	0.54	=	.045	4300	MG/KG
CH2M HILL	INDENO(1,2,3-c,d)PYRENE	SB74C	8 to 10	0.14	J	NA	14	MG/KG
CH2M HILL	IRON	SB74B	8 to 10	22600	=	38000	NA	MG/KG
CH2M HILL	IRON	SB74B	8 to 10	23800	=	38000	NA	MG/KG
CH2M HILL	LEAD	SB74A	18 to 20	**1.8**	=	24	**1.5**	MG/KG
CH2M HILL	LEAD	SB74A	3 to 5	**25.6**	=	24	**1.5**	MG/KG
CH2M HILL	LEAD	SB74A	8 to 10	**38.3**	=	24	**1.5**	MG/KG

Table 74-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 74
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	LEAD	SB74B	18 to 20	20.3	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB74B	3 to 5	28	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB74B	8 to 10	12.8	J	24	1.5	MG/KG
CH2M HILL	LEAD	SB74B	8 to 10	12.2	J	24	1.5	MG/KG
CH2M HILL	LEAD	SB74C	18 to 20	16.8	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB74C	3 to 5	14.9	J	24	1.5	MG/KG
CH2M HILL	LEAD	SB74C	8 to 10	25.6	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB74C	8 to 10	33.9	=	24	1.5	MG/KG
CH2M HILL	MAGNESIUM	SB74B	8 to 10	2850	=	4900	NA	MG/KG
CH2M HILL	MAGNESIUM	SB74B	8 to 10	3110	=	4900	NA	MG/KG
CH2M HILL	MANGANESE	SB74B	8 to 10	725	J	1500	NA	MG/KG
CH2M HILL	MANGANESE	SB74B	8 to 10	598	J	1500	NA	MG/KG
CH2M HILL	METHYL ETHYL KETONE (2-BUTANONE)	SB74C	3 to 5	0.006	J	NA	NA	MG/KG
CH2M HILL	NICKEL	SB74A	18 to 20	24.9	=	37	130	MG/KG
CH2M HILL	NICKEL	SB74A	3 to 5	40.5	=	37	130	MG/KG
CH2M HILL	NICKEL	SB74A	8 to 10	39.2	=	37	130	MG/KG
CH2M HILL	NICKEL	SB74B	18 to 20	38.2	=	37	130	MG/KG
CH2M HILL	NICKEL	SB74B	3 to 5	30.6	=	37	130	MG/KG
CH2M HILL	NICKEL	SB74B	8 to 10	19.2	=	37	130	MG/KG
CH2M HILL	NICKEL	SB74B	8 to 10	21	=	37	130	MG/KG
CH2M HILL	NICKEL	SB74C	18 to 20	28.5	=	37	130	MG/KG
CH2M HILL	NICKEL	SB74C	3 to 5	22.3	=	37	130	MG/KG
CH2M HILL	NICKEL	SB74C	8 to 10	43.2	=	37	130	MG/KG
CH2M HILL	NICKEL	SB74C	8 to 10	41.1	=	37	130	MG/KG
CH2M HILL	p,p'-DDE	SB74A	8 to 10	0.0023	J	.0015	54	MG/KG
CH2M HILL	p,p'-DDE	SB74C	8 to 10	0.024	=	.0015	54	MG/KG
CH2M HILL	p,p'-DDE	SB74C	8 to 10	0.011	=	.0015	54	MG/KG
CH2M HILL	p,p'-DDT	SB74A	8 to 10	0.0064	=	.0072	32	MG/KG
CH2M HILL	p,p'-DDT	SB74C	8 to 10	0.011	J	.0072	32	MG/KG
CH2M HILL	p,p'-DDT	SB74C	8 to 10	0.0051	J	.0072	32	MG/KG
CH2M HILL	PHENANTHRENE	SB74C	3 to 5	0.059	J	NA	4300	MG/KG

Table 74-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 74
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	PHENANTHRENE	SB74C	8 to 10	0.35	J	NA	4300	MG/KG
CH2M HILL	POTASSIUM	SB74B	8 to 10	1060	=	1800	NA	MG/KG
CH2M HILL	POTASSIUM	SB74B	8 to 10	1350	=	1800	NA	MG/KG
CH2M HILL	PYRENE	SB74C	3 to 5	0.066	J	.042	2800	MG/KG
CH2M HILL	PYRENE	SB74C	8 to 10	0.37	J	.042	2800	MG/KG
CH2M HILL	VANADIUM	SB74B	8 to 10	27.6	=	51	6000	MG/KG
CH2M HILL	VANADIUM	SB74B	8 to 10	33	=	51	6000	MG/KG
CH2M HILL	ZINC	SB74A	18 to 20	76.6	=	110	12000	MG/KG
CH2M HILL	ZINC	SB74A	3 to 5	133	=	110	12000	MG/KG
CH2M HILL	ZINC	SB74A	8 to 10	135	=	110	12000	MG/KG
CH2M HILL	ZINC	SB74B	18 to 20	94.7	=	110	12000	MG/KG
CH2M HILL	ZINC	SB74B	3 to 5	109	=	110	12000	MG/KG
CH2M HILL	ZINC	SB74B	8 to 10	69.2	J	110	12000	MG/KG
CH2M HILL	ZINC	SB74B	8 to 10	67.8	J	110	12000	MG/KG
CH2M HILL	ZINC	SB74C	18 to 20	67	=	110	12000	MG/KG
CH2M HILL	ZINC	SB74C	3 to 5	72.3	J	110	12000	MG/KG
CH2M HILL	ZINC	SB74C	8 to 10	123	=	110	12000	MG/KG
CH2M HILL	ZINC	SB74C	8 to 10	135	=	110	12000	MG/KG

Notes:

1. Detected values are obtained from the *Draft Parcel 15 Report-Screening Sites Sampling Program for Defense Depot Memphis, TN*, CH2M HILL, 1997.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. RBC-GWP values are obtained from the *EPA Region III Risk-based Concentrations Table*, R. L. Smith, April, 1997.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
= - indicates unqualified detection
J - indicates estimated value above the detection limit but below the reporting limit.

Table 74-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 74
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
RBC-GWP - Risk-Based Concentrations - Groundwater Protection								

Table 79-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 79
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
CH2M HILL	ALUMINUM	SS79C	12000	=	24000	24000	Bkgd	MG/KG
CH2M HILL	ANTHRACENE	SS79A	0.12	J	.096	2300	Residential RBC	MG/KG
CH2M HILL	ANTIMONY	SS79C	2.3	J	7	7	Bckg	MG/KG
CH2M HILL	ARSENIC	SB79A	15.8	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SB79B	7.6	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SB79C	8.5	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SS79A	37.7	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SS79B	10.5	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SS79C	10.6	=	20	20	Bckg	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	SS79A	1	=	.71	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	SS79B	0.057	J	.71	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(a)PYRENE	SS79A	1	=	.96	0.088	Residential RBC	MG/KG
CH2M HILL	BENZO(a)PYRENE	SS79B	0.067	J	.96	0.088	Residential RBC	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	SB79A	0.063	J	.78	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	SS79A	1.5	=	.78	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	SS79B	0.073	J	.78	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(g,h,i)PERYLENE	SS79A	0.54	=	.82	230	Residential RBC	MG/KG
CH2M HILL	BENZO(g,h,i)PERYLENE	SS79B	0.064	J	.82	230	Residential RBC	MG/KG
CH2M HILL	BENZO(k)FLUORANTHENE	SS79A	1.4	=	.78	8.8	Residential RBC	MG/KG
CH2M HILL	BENZO(k)FLUORANTHENE	SS79B	0.05	J	.78	8.8	Residential RBC	MG/KG
CH2M HILL	BERYLLIUM	SB79B	0.34	J	1.1	1.1	Bckg	MG/KG
CH2M HILL	BERYLLIUM	SS79C	0.37	J	1.1	1.1	Bckg	MG/KG
CH2M HILL	CARBAZOLE	SS79A	0.074	J	.067	32	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB79A	23.9	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB79B	28	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB79C	23.8	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS79A	78.1	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS79B	27.7	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS79C	12.2	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHRYSENE	SS79A	1.7	=	.94	88	Residential RBC	MG/KG
CH2M HILL	CHRYSENE	SS79B	0.088	J	.94	88	Residential RBC	MG/KG
CH2M HILL	DIBENZ(a,h)ANTHRACENE	SS79A	0.23	J	.26	0.088	Residential RBC	MG/KG
CH2M HILL	FLUORANTHENE	SS79A	1.8	=	1.6	310	Residential RBC	MG/KG
CH2M HILL	FLUORANTHENE	SS79B	0.09	J	1.6	310	Residential RBC	MG/KG
CH2M HILL	INDENO(1,2,3-c,d)PYRENE	SS79A	0.6	=	.7	0.88	Residential RBC	MG/KG

Table 79-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 79
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
CH2M HILL	INDENO(1,2,3-c,d)PYRENE	SS79B	0.053	J	.7	0.88	Residential RBC	MG/KG
CH2M HILL	IRON	SS79C	20700	J	37000	37000	Bckg	MG/KG
CH2M HILL	LEAD	SB79A	32.9	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SB79B	208	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SB79C	27.1	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SS79A	1060	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SS79B	105	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SS79C	12.2	=	30	400	CERCLA	MG/KG
CH2M HILL	MANGANESE	SS79C	609	=	1300	1300	Bckg	MG/KG
CH2M HILL	PHENANTHRENE	SS79A	0.24	J	.61	2300	Residential RBC	MG/KG
CH2M HILL	PHENANTHRENE	SS79B	0.049	J	.61	2300	Residential RBC	MG/KG
CH2M HILL	PYRENE	SS79A	1.9	=	1.5	230	Residential RBC	MG/KG
CH2M HILL	PYRENE	SS79B	0.15	J	1.5	230	Residential RBC	MG/KG
CH2M HILL	ZINC	SB79A	117	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SB79B	82.4	J	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SB79C	46.4	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SS79A	331	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SS79B	78.8	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SS79C	55.3	J	130	23000	Residential RBC	MG/KG

Notes:
1. Detected values are obtained from the *Draft Parcel 15 Report-Screening Sites Sampling Program for Defense Depot* Memphis, TN, CH2M HILL, 1997.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. Based on values selected by the BRAC Cleanup Team in the August 1997 BCT meeting minutes, Memphis, Tennessee.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
J - indicates estimated value above the detection limit but below the reporting limit.
= - indicates unqualified detection
BCT - BRAC Cleanup Team

Table 79-B
Summary of Detected Compounds in Surface Soils
Compared to Non-BCT Screening Levels for Site 79
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	Risk-Based Concentrations Soil Ingestion[4]		Units
						Residential	Industrial	
CH2M HILL	ACENAPHTHYLENE	SS79A	0.2	J	.19	NA	NA	MG/KG
CH2M HILL	ALPHA-CHLORDANE	SB79B	0.0025	=	.029	.49	4.4	MG/KG
CH2M HILL	ALPHA-CHLORDANE	SS79A	0.098	=	.029	.49	4.4	MG/KG
CH2M HILL	BARIUM	SS79C	78.6	=	234	550	14000	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SS79B	0.045	J	NA	46	410	MG/KG
CH2M HILL	CADMIUM	SB79B	0.88	=	1.4	3.9	100	MG/KG
CH2M HILL	CADMIUM	SS79A	1.6	=	1.4	3.9	100	MG/KG
CH2M HILL	CALCIUM	SS79C	725	=	5840	NA	NA	MG/KG
CH2M HILL	COBALT	SS79C	10.2	=	18.3	470	12000	MG/KG
CH2M HILL	COPPER	SB79A	35.7	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SB79B	15.8	J	33	310	8200	MG/KG
CH2M HILL	COPPER	SB79C	15.4	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SS79A	65.6	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SS79B	18.7	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SS79C	16.8	J	33	310	8200	MG/KG
CH2M HILL	DIELDRIN	SS79A	0.1	=	.086	.04	.36	MG/KG
CH2M HILL	DIELDRIN	SS79B	0.009	J	.086	.04	.36	MG/KG
CH2M HILL	GAMMA-CHLORDANE	SB79B	0.0028	=	.026	.49	4.4	MG/KG
CH2M HILL	GAMMA-CHLORDANE	SS79A	0.12	=	.026	.49	4.4	MG/KG
CH2M HILL	MAGNESIUM	SS79C	2340	=	4600	NA	NA	MG/KG
CH2M HILL	NICKEL	SB79A	25.3	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SB79B	15.2	J	30	160	4100	MG/KG
CH2M HILL	NICKEL	SB79C	5.3	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SS79A	30.4	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SS79B	22.6	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SS79C	17	J	30	160	4100	MG/KG
CH2M HILL	p,p'-DDT	SB79B	0.005	=	.074	1.9	17	MG/KG
CH2M HILL	p,p'-DDT	SS79A	0.063	=	.074	1.9	17	MG/KG
CH2M HILL	p,p'-DDT	SS79B	0.0081	J	.074	1.9	17	MG/KG
CH2M HILL	PENTACHLOROPHENOL	SS79A	0.3	=	NA	5.3	48	MG/KG

Table 79-B
Summary of Detected Compounds in Surface Soils
Compared to Non-BCT Screening Levels for Site 79
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	Risk-Based Concentrations Soil Ingestion[4]		Units
						Residential	Industrial	
CH2M HILL	POTASSIUM	SS79C	852	=	1820	NA	NA	MG/KG
CH2M HILL	SELENIUM	SS79A	2.3	=	.81	39	1000	MG/KG
CH2M HILL	SILVER	SS79C	0.45	J	2	39	1000	MG/KG
CH2M HILL	SODIUM	SS79C	104	J	NA	NA	NA	MG/KG
CH2M HILL	TETRACHLOROETHYLENE(PCE)	SS79A	0.008	J	NA	NA	NA	MG/KG
CH2M HILL	THALLIUM	SB79B	2.8	=	NA	NA	NA	MG/KG
CH2M HILL	VANADIUM	SS79C	25.5	=	48.4	55	1400	MG/KG

Notes:
1. Detected values are obtained from the *Draft Parcel 15 Report-Screening Sites Sampling Program for Defense Depot Memphis, TN*, CH2M HILL, 1997.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. Risk-Based Concentrations are obtained from the *EPA Region III Risk-based Concentrations Table*, R.L. Smith, April, 1997.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
= - indicates unqualified detection.
J - indicates estimated value above the detection limit but below the reporting limit.

Table 79-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 79
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	ALPHA-CHLORDANE	SB79B	4 to 5.5	0.022	=	.0026	10	MG/KG
CH2M HILL	ARSENIC	SB79A	18 to 20	9.9	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB79A	4 to 6	27.6	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB79A	8 to 10	20	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB79B	18 to 20	8.2	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB79B	4 to 5.5	7.7	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB79B	8 to 10	28.7	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB79C	18 to 20	15.8	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB79C	4 to 6	34.2	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB79C	8 to 10	16.1	=	17	29	MG/KG
CH2M HILL	BERYLLIUM	SB79A	4 to 6	1	=	1.2	63	MG/KG
CH2M HILL	BERYLLIUM	SB79B	4 to 5.5	0.35	J	1.2	63	MG/KG
CH2M HILL	BERYLLIUM	SB79B	8 to 10	1.1	=	1.2	63	MG/KG
CH2M HILL	BERYLLIUM	SB79C	18 to 20	1.8	=	1.2	63	MG/KG
CH2M HILL	BERYLLIUM	SB79C	4 to 6	1.5	=	1.2	63	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB79A	18 to 20	39.9	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB79A	4 to 6	27.1	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB79A	8 to 10	25.9	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB79B	18 to 20	32	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB79B	4 to 5.5	15.4	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB79B	8 to 10	32.3	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB79C	18 to 20	140	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB79C	4 to 6	39.1	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB79C	8 to 10	24.2	=	26	38	MG/KG
CH2M HILL	COPPER	SB79A	18 to 20	20.3	=	33	NA	MG/KG
CH2M HILL	COPPER	SB79A	4 to 6	47.2	=	33	NA	MG/KG
CH2M HILL	COPPER	SB79A	8 to 10	39.3	=	33	NA	MG/KG
CH2M HILL	COPPER	SB79B	18 to 20	20.5	=	33	NA	MG/KG
CH2M HILL	COPPER	SB79B	4 to 5.5	10.5	J	33	NA	MG/KG
CH2M HILL	COPPER	SB79B	8 to 10	40.7	=	33	NA	MG/KG
CH2M HILL	COPPER	SB79C	18 to 20	20.5	=	33	NA	MG/KG

Table 79-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 79
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	COPPER	SB79C	4 to 6	56.8	=	33	NA	MG/KG
CH2M HILL	COPPER	SB79C	8 to 10	31	=	33	NA	MG/KG
CH2M HILL	DDT	SB79C	18 to 20	0.0048	=	.0072	32	MG/KG
CH2M HILL	GAMMA-CHLORDANE	SB79B	4 to 5.5	0.024	=	.0022	10	MG/KG
CH2M HILL	LEAD	SB79A	18 to 20	17.3	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB79A	4 to 6	31.9	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB79A	8 to 10	25.1	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB79B	18 to 20	14.8	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB79B	4 to 5.5	14.3	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB79B	8 to 10	21.5	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB79C	18 to 20	17	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB79C	4 to 6	38.4	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB79C	8 to 10	19.6	=	24	1.5	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SB79A	4 to 6	0.002	J	NA	.02	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SB79A	8 to 10	0.002	J	NA	.02	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SB79C	18 to 20	0.001	J	NA	.02	MG/KG
CH2M HILL	NICKEL	SB79A	18 to 20	24.4	=	37	130	MG/KG
CH2M HILL	NICKEL	SB79A	4 to 6	50	=	37	130	MG/KG
CH2M HILL	NICKEL	SB79A	8 to 10	59.3	=	37	130	MG/KG
CH2M HILL	NICKEL	SB79B	18 to 20	21.3	=	37	130	MG/KG
CH2M HILL	NICKEL	SB79B	4 to 5.5	14.5	J	37	130	MG/KG
CH2M HILL	NICKEL	SB79B	8 to 10	40.2	=	37	130	MG/KG
CH2M HILL	NICKEL	SB79C	18 to 20	28.3	=	37	130	MG/KG
CH2M HILL	NICKEL	SB79C	4 to 6	64.8	=	37	130	MG/KG
CH2M HILL	NICKEL	SB79C	8 to 10	39.5	=	37	130	MG/KG
CH2M HILL	p,p'-DDT	SB79B	4 to 5.5	0.018	=	.0072	32	MG/KG
CH2M HILL	SELENIUM	SB79A	4 to 6	2	=	.64	5	MG/KG
CH2M HILL	SELENIUM	SB79A	8 to 10	1.4	=	.64	5	MG/KG
CH2M HILL	THALLIUM	SB79A	4 to 6	4.7	=	NA	.7	MG/KG
CH2M HILL	THALLIUM	SB79A	8 to 10	3.5	=	NA	.7	MG/KG
CH2M HILL	ZINC	SB79A	18 to 20	65.4	=	110	12000	MG/KG

Table 79-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 79
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	ZINC	SB79A	4 to 6	182	=	110	12000	MG/KG
CH2M HILL	ZINC	SB79A	8 to 10	177	=	110	12000	MG/KG
CH2M HILL	ZINC	SB79B	18 to 20	58.1	=	110	12000	MG/KG
CH2M HILL	ZINC	SB79B	4 to 5.5	54.6	J	110	12000	MG/KG
CH2M HILL	ZINC	SB79B	8 to 10	132	=	110	12000	MG/KG
CH2M HILL	ZINC	SB79C	18 to 20	57.2	=	110	12000	MG/KG
CH2M HILL	ZINC	SB79C	4 to 6	223	=	110	12000	MG/KG
CH2M HILL	ZINC	SB79C	8 to 10	111	=	110	12000	MG/KG

Notes:

1. Detected values are obtained from the *Draft Parcel 15 Report-Screening Sites Sampling Program for Defense Depot Memphis, TN,* CH2M HILL, 1997.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. RBC-GWP values are obtained from the *EPA Region III Risk-based Concentrations Table*, R. L. Smith, April, 1997.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
= - indicates unqualified detection
J - indicates estimated value above the detection limit but below the reporting limit.
RBC-GWP - Risk-Based Concentrations - Groundwater Protection

TAB

Parcel 21

Parcel 21

Screening Sites Sampling Program

for

Defense Distribution Depot Memphis, Tennessee

March 1998

Prepared for

U.S. Army Engineering and Support Center, Huntsville

Prepared by

CH2M HILL

2567 Fairlane Drive

Montgomery, Alabama 36116

137449.RR.ZZ

Parcel 21
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Parcel 21 is a 7,906-square-foot (ft^2) parcel in the south central part of the Main Installation in Operable Unit (OU)-3 (shown on Figure 1). Parcel 21 consists of Buildings 490, 685, 689, and 690.

The screening sites in this document have been identified by the Defense Distribution Depot Memphis, Tennessee (DDMT) through a review of existing documents, interviews with facility personnel, and knowledge of the facility's operations. Screening sites are locations at DDMT where there is a potential for materials to have been released to the environment from past operations. Screening sites in Parcel 21 include the following:

- Screening Site 75 – Unknown Wastes near Building 689
- Screening Site 76 – Unknown Wastes near Building 690
- Screening Site 78 – Alcohol, Acetone, Toluene, and Hydrofluoric Acid Area, Building 689

Sites where there is a confirmed presence of contaminants from past operations are addressed in the Remedial Investigation Sampling Program. Other facilities have been addressed in the Base Realignment and Closure (BRAC) Sampling Program. Results of these programs are addressed in separate reports.

The purpose of the Screening Sites Sampling Program is to identify whether past activities at these sites have resulted in releases from the site that would require further investigation. The intent is not necessarily to fully delineate the extent of soil or groundwater contamination, but to conduct technically based screening analyses sufficient to identify the nature of contamination.

The purpose of this letter report is to evaluate the results of the Screening Sites Sampling Program and sampling from previous investigations and to recommend No Further Action or further investigation at screening sites in this parcel. The remainder of this report presents the results of past investigations; Screening Sites Sampling Program strategy, procedures, and results; and recommendations for each site.

Surface soils, subsurface soils, surface water, and sediments were investigated as part of the Screening Sites Sampling Program. Surface soil samples (any sample whose lowest depth is two feet or less) were taken both as independent samples and as the upper interval of a soil boring profile. Thus, surface soil samples taken as part of a soil boring may have an "SB" designation and are initially discussed under Subsurface Soil Sampling Procedure (Section 2.2.2.2). However, the results from that upper interval are presented in the surface soils tables and discussions in Section 3.0.

Screening Site 75—Unknown Wastes near Building 689

1.0 Introduction

The chart below presents the location and status information for this screening site:

Parcel	Building Number	RI/FS[1] OU	Site Number	CERCLA[2] Status
21	689	3	75	Screening

[1]RI/FS: Remedial Investigation/Feasibility Study
[2]CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act

Screening Site 75 is situated in the southern portion of the Main Installation between Buildings 689 and 670 off K Street (shown in Figure 1). Building 689 was a temporary storage facility for flammable liquids such as alcohol, ketones, aromatics, and esters. The area was not bermed and is adjacent to a storm sewer inlet.

2.0 Study Area Investigation

2.1 Previous Investigations

No past sampling data exist specifically for Screening Site 75. The sample locations were selected based on the loading and unloading areas around the building and on the stormwater drainage pathways. These locations are most likely to show the presence of contamination if present.

2.2 Screening Site Sampling Program

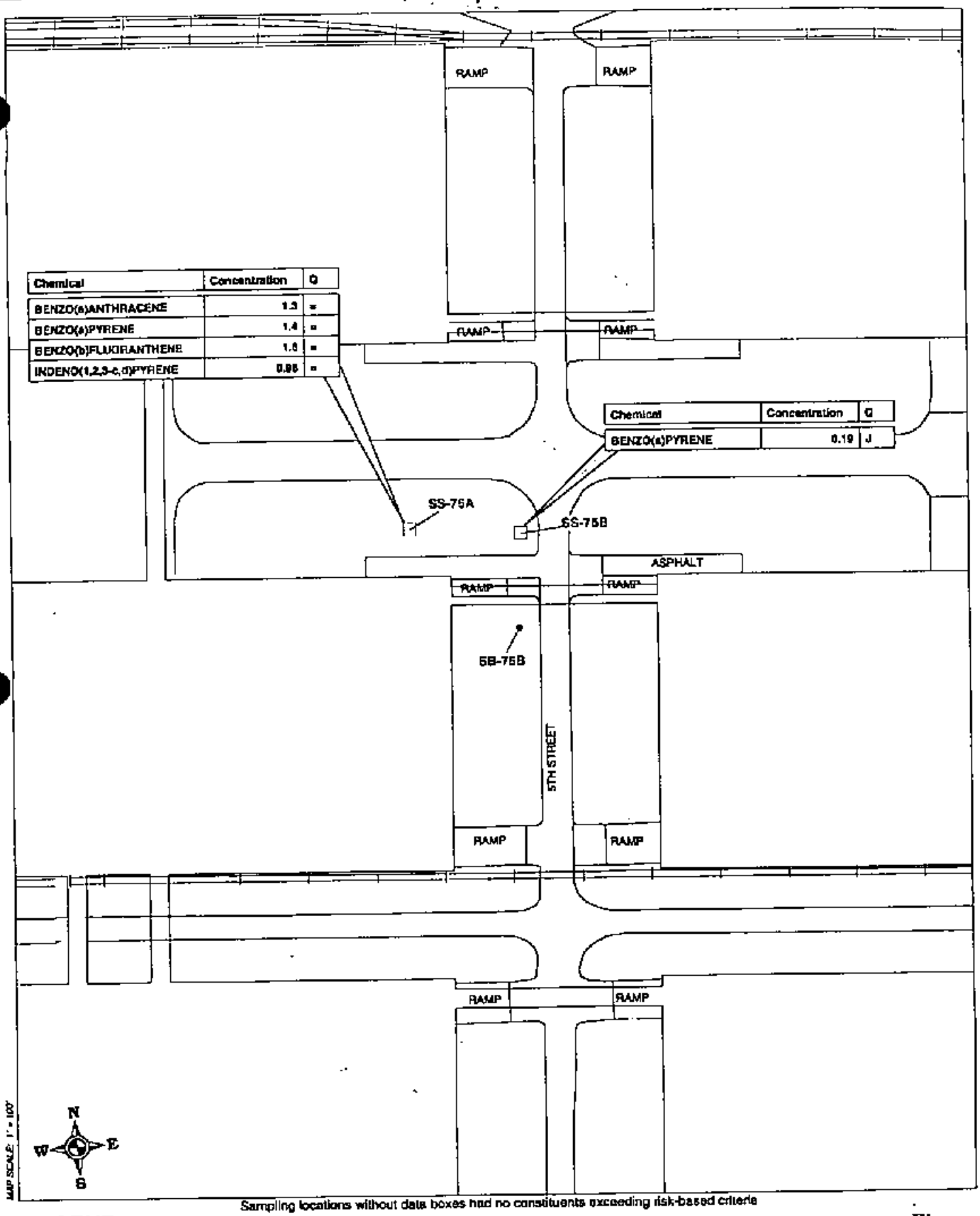
2.2.1 Sampling Strategy

The sampling strategy was developed to evaluate whether releases have occurred to surface soils and subsurface soils. Three biased soil borings were used to evaluate whether potential contaminants exist at the site. Samples were collected at the surface (zero to 12 inches) and at approximate 5-foot, 10-foot and 20-foot depths. Two additional surface soil samples were collected. A boring depth of 20 feet was selected because surface and shallow soil contamination is the probable condition due to possible surface spills during loading and unloading operations.

At least one sample for each media was analyzed for target compound list/target analyte list (TCL/TAL) constituents in accordance with the *Screening Sites Field Sampling Plan* (CH2M HILL, 1995). The following sections present the sampling procedures and laboratory analyses performed for surface and subsurface soils.

2.2.2 Sampling Procedures

Sections 2.2.2.1 through 2.2.2.3 describe the sampling procedures and laboratory analyses performed for surface and subsurface soils.



Chemical	Concentration	Q
BENZO(a)ANTHRACENE	1.3	=
BENZO(a)PYRENE	1.4	=
BENZO(b)FLUORANTHENE	1.8	=
INDENO(1,2,3-c,d)PYRENE	0.95	=

Chemical	Concentration	Q
BENZO(a)PYRENE	0.19	J

Sampling locations without data boxes had no constituents exceeding risk-based criteria

LEGEND

- Surface Soil Sampling Location (mg/kg)
- Soil Boring Sampling Location (mg/kg)

(Q) Qualifier Definitions

= - indicates unqualified detection

J - indicates estimated value above detection limit, but below reporting limit

Figure 1

Site 75, Unknown Wastes near Building 689
Constituents Exceeding Risk-Based Criteria

Defense Distribution Depot Memphis, TN

CH2MHILL

SITE75.WOR

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2.2.2.1 Surface Soil Sampling Procedures

With the approval of the Tennessee Department of Environment and Conservation (TDEC) and the U. S. Environmental Protection Agency (EPA), surface soil samples were collected from two locations (SS75A and SS75B) at this site (shown in Figure 1). The following describes the location of the samples:

- Sample SS75A was taken 17 feet east of a telephone pole located north of Building 689.
- Sample SS75B was taken northeast of Building 689, 20 feet north of the asphalt and 16 feet west of the K Street curb in this area.

The soil was removed from the ground using a standard stainless-steel hand auger. Volatile organic compound (VOC) samples were immediately collected from the top six inches of soil before being mixed. Part of the VOC sample was placed into a sealable plastic bag and allowed to equilibrate. The head space in the plastic bag was measured for VOCs using a hand-held photoionization detector (PID), and the results were used to determine which sample location was selected for Level 3 TCL/TAL analyses. The soils was transferred to a stainless-steel bowl using stainless-steel trowels, mixed, and then placed into the appropriate sample jars. All sampling tools were decontaminated before being used at each sample location according to the procedures specified in the *Generic Quality Assurance Project Plan* (CH2M HILL, 1995) for the RI/FS currently being conducted at the DDMT.

The locations of the surface soil samples associated with borings are addressed in Section 2.2.2.2.

2.2.2.2 Subsurface Soil Sampling Procedures

With the approval of the TDEC and EPA, subsurface soil samples were collected from two locations (SB75A and SB75B) at this site. At both locations, samples were collected at three depths: zero to 1 foot, 4 to 6 feet, and 8 to 10 feet. The following describes the location of the samples:

- Sample SB75A was taken north of Building 689 and just east of a conveyor that runs from the north side of Building 689 to K Street. The sample was taken 1 foot east of the asphalt parallel to the conveyor and 10 feet south of the concrete support on the conveyor.
- Sample SB75B was taken east of the northeast corner of Building 689, just 8 feet south of the conveyor column and 14 feet west of 5th Street.

The samples were collected using a 2-inch-diameter, stainless-steel push sampler. Samples were also collected at an interval of 18 to 20 feet using a 1-inch-diameter stainless-steel push sampler. VOC soil samples were collected directly from the continuous sampler using stainless-steel spoons. Part of the VOC sample was placed into a sealable plastic bag and allowed to equilibrate. The head space in the plastic bag was measured for VOCs using a hand-held PID, and the results were used to determine which interval within each boring was selected for Level 3 TCL/TAL analyses. The remaining soil was placed into a stainless-steel bowl, mixed, and then transferred into the appropriate sample jars.

All sampling tools were decontaminated before being used at each sample location according to the procedures specified in the *Generic Quality Assurance Project Plan* (CH2M HILL, 1995).

2.2.3 Analytical Procedures

Two surface and eight subsurface soil samples were sent to CH2M HILL's Analytical Services in Montgomery, Alabama for VOC, semivolatile organic compound (SVOC), and TCL/TAL analyses. Samples received at the laboratory were analyzed in accordance with the procedures outlined in the *Generic Quality Assurance Project Plan* (CH2M HILL, 1995).

A data quality evaluation (DQE) was performed to assess the effect of the overall analytical process on the usability of the data. The DQE established that the detection of acetone and bis(2-ethylhexyl)phthalate can be attributed to field sampling and laboratory contamination rather than environmental conditions at the site. Also, low concentrations of dioxins and furans can be attributed to background or instrument noise and are not indicative of environmental conditions. With exception to the qualifications listed above, the DQE concluded that data can be used in the project decision-making process.

3.0 Interpretation of Sampling Results

3.1 Presentation of Results

Sections 3.1.1 through 3.1.4 present results of the Screening Sites Sampling Program for Screening Site 75. Data for each media (surface soil and subsurface soil) are presented separately. Data are compared with appropriate screening criteria in three tables: Table 75-A, 75-B, and 75-C. Data from the 1997 CH2M HILL investigation are presented along with historical data from the *Remedial Investigations at DDMT, Final Report* (Law Environmental, 1990). If a value from a sampling location exceeds one of the comparison criteria, that value and the comparison criterion are shown in bold on the summary table.

Constituents of potential concern (COPCs) are parameters that exceed both background values and the screening criteria. Where concentrations exceed the selected background value, the concentration is compared with the observed range of background values as reviewed and established by the BRAC Cleanup Team (BCT).

3.1.1 Surface Soil

Results of the surface soil analyses with values above detection limits are shown in Tables 75-A and 75-B.

3.1.1.1 BCT Screening Criteria

Table 75-A summarizes constituents for which the BCT has selected screening criteria. Polycyclic aromatic hydrocarbon (PAH) compounds—including benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and indo(1,2,3,c,d)pyrene—were found at concentrations exceeding the screening criteria. Concentrations in Sample SS75A were approximately an order of magnitude higher than concentrations in Sample SS75B. For example, benzo(a)pyrene was found at 1.4 milligrams per kilogram (mg/kg) in Sample SS75A and at 0.19 mg/kg in Sample SS75B. PAH compounds, because they are found sitewide at DDMT due to railroad operations, asphalt paved roads, and other such sources, will be addressed in an upcoming risk evaluation.

3.1.1.2 Other Screening Criteria

Table 75-B compares the remaining constituents with the soil ingestion screening criteria for both residential and industrial exposure scenarios. There were no constituents that exceeded background and the screening criteria.

3.1.2 Subsurface Soils

Table 75-C summarizes subsurface soil sampling data. Lead was found in Sample SB75B (at the 4- to 6-foot depth) at 7.5 mg/kg; this concentration is below the background concentration but exceeds the groundwater protection standard. There were no other results that exceeded the background value or the groundwater protection criteria for this site.

3.2 Vertical and Lateral Extent

Based on the data collected so far, it appears that there are no COPCs that persist uniformly across several media that are attributed to Screening Site 75. Other naturally occurring constituents that were detected are at concentrations similar to background levels. There are no subsurface compounds that exceed background levels, indicating that subsurface transport has not occurred from Screening Site 75.

PAH concentrations found in surface soil at Screening Site 75 are found sitewide at DDMT and are attributed to railroad operations and other sources, including roof drainage and creosote from utility poles. PAH compounds will be addressed in an upcoming risk evaluation. PAH compounds did not exceed the groundwater protection criteria in the subsurface soil samples.

3.3 Potential Migration Pathways

The following paragraphs provide a general discussion of potential migration pathways for several constituents found at Screening Site 75.

Benzo(a)anthracene, benzo(a)pyrene, benzo(k)fluoranthene, benzo(b)fluoranthene, indeno(1,2,3-c,d)pyrene are a group of related, long-chain PAHs that have similar chemical and physical characteristics and tend to migrate and behave in the environment in a similar manner. Generally, these compounds have low vapor pressures, are only marginally soluble in water, and have a high affinity for soils. All of these compounds have been detected at concentrations above screening values for surface soils at the DDMT. They would be expected to migrate as adsorbed components of the soils and would potentially be available to aquatic organisms in turbid surface water or to bottom feeders in areas with contaminated sediments. That none of these compounds was detected in sediments indicates this is not a major source of contaminant migration for these compounds at this site. These compounds do not bioaccumulate significantly due to their rapid metabolism and excretion by most aquatic organisms.

3.4 Additional Data Needs

Further risk evaluation is recommended to evaluate PAHs in surface soil. Sufficient data is available for sitewide surface soils at DDMT for this evaluation, and additional sampling should not be required.

4.0 Interpretation of Screening Criteria Comparisons

4.1 Methodology

The Preliminary Risk Evaluation (PRE) was performed in accordance with the *Guidance on Preliminary Risk Evaluations for the Purpose of Reaching a Finding of Suitability to Lease (FOSL)* (EPA Region IV, 1994). A discussion of the PRE methodology is provided as Appendix A to this document.

4.2 Screening Site 75 Risk

Carcinogenic and noncarcinogenic risks for Screening Site 75 are presented in Table 4-38 of the draft PRE (USAESC, 1998), and detailed chemical-specific estimates are presented in Appendix A of the PRE.

The PRE carcinogenic risk ration is exceeded for both industrial and residential scenarios due to the presence of PAHs in Sample SS75A. The noncarcinogenic ratios were not exceeded for either the industrial or residential scenario.

Thus, PAHs are the only COPCs that may require further analysis to better characterize the human health risks from PAHs in surface soil.

5.0 Summary and Recommendations

5.1 Summary

PAH concentrations found in surface soil at Screening Site 75 are found sitewide at DDMT and are attributed to railroad operations and other sources, including roof drainage and creosote from utility poles. PAH compounds will be addressed in an upcoming risk evaluation. PAH compounds did not exceed the groundwater protection criteria in the subsurface soil samples.

5.2 Recommendations

Additional data collection at Screening Site 75 should not be required, and no further action specific for Screening Site 75 is anticipated.

Screening Site 76—Unknown Wastes near Building 690

1.0 Introduction

The chart below presents the location and status information for this screening site:

Parcel	Building Number	RI/FS[1] OU	Site Number	CERCLA[2] Status
21	690	3	76	Screening

[1]RI/FS: Remedial Investigation/Feasibility Study
[2]CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act

In the past, this warehouse (see Figure 2) has been used to store hazardous materials before shipment. Building 690 is located in the southwestern portion of OU-3, near 5th and M Streets.

2.0 Study Area Investigation

2.1 Previous Investigations

No previous sampling data exist for this site. The sample locations were selected based on activities conducted around the building such as loading and unloading operations and on stormwater drainage areas.

2.2 Screening Site Sampling Program

2.2.1 Sampling Strategy

The sampling strategy included sample collection from biased locations to detect any potential release that may have occurred from past site activities. At least one sample for each media was analyzed for TCL/TAL constituents in accordance with the *Screening Sites Field Sampling Plan* (CH2M HILL, 1995). The following sections present the sampling procedures and laboratory analyses performed for surface and subsurface soils.

2.2.2 Sampling Procedures

Sections 2.2.2.1 through 2.2.2.3 describe the sampling procedures and laboratory analyses performed for surface and subsurface soils.

2.2.2.1 Surface Soil Sampling Procedures

Surface soil sample were collected during installation of soil borings as discussed in Section 2.2.2.2.

2.2.2.2 Subsurface Soil Sampling Procedures

With the approval of the TDEC and EPA, subsurface samples were collected from three locations (SB76A, SB76B, and SB76C) at this site (shown in Figure 2). At each location, samples were collected at two depths: zero to 1 foot and 4 to 6 feet. The following describes the location of the samples:

- Sample SB76A was taken in a grassy area 43 feet south of the southeastern part of Building 690 and 26 feet north of M Street.
- Sample SB76B was taken east of Sample SB76A, just 25 feet north and 13 feet west of the curb of M Street.
- Sample SB76C was taken in the area between the southeast corner of Building 690 and 5th Street. The sample was taken 6 feet west of 5th Street that extends north and south and 5 feet north of 5th Street that extends east to west in this area.

Samples were collected using a 2-inch-diameter, stainless-steel push sampler. Samples were also collected at an interval of 18 to 20 feet using a 1-inch-diameter, stainless-steel push sampler. VOC soil samples were collected directly from the continuous sampler using stainless-steel spoons. Part of the VOC sample was placed into a sealable plastic bag and allowed to equilibrate. The head space in the plastic bag was measured for VOCs using a hand-held PID, and the results were used to determine which interval within each boring was selected for Level 3 TCL/TAL analyses. The remaining soil was placed into a stainless-steel bowl, mixed, and then transferred into the appropriate sample jars.

All sampling tools were decontaminated before being used at each sample location according to the procedures specified in the *Generic Quality Assurance Project Plan* (CH2M HILL, 1995) for the RI/FS currently being conducted at DDMT.

2.2.3 Analytical Procedures

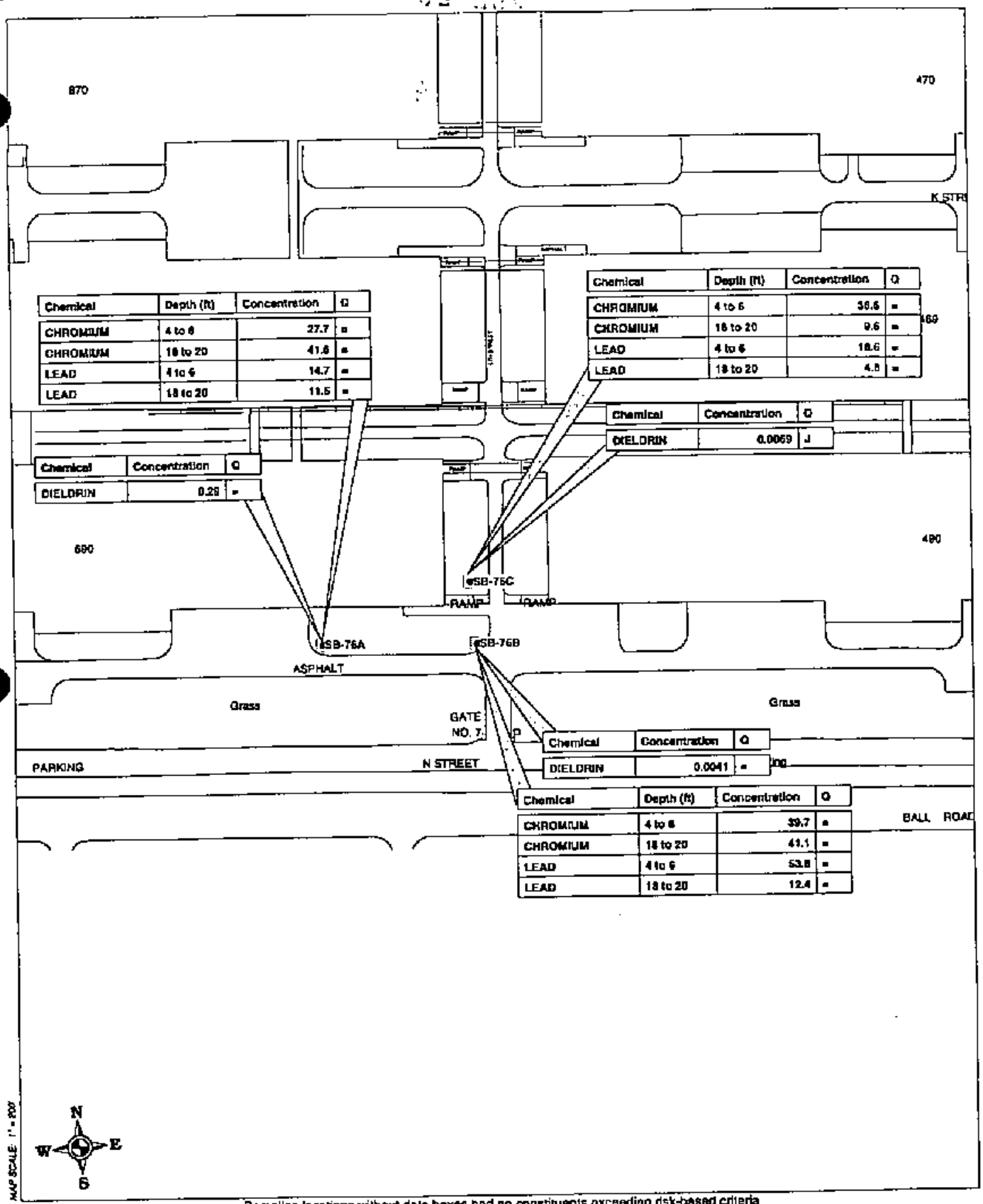
Nine subsurface soil samples were sent to CH2M HILL's Analytical Services in Montgomery, Alabama for VOC, SVOC, pesticide, metal, and TCL/TAL analyses. Samples received at the laboratory were analyzed in accordance with the procedures outlined in the *Generic Quality Assurance Project Plan* (CH2M HILL, 1995).

A DQE was performed to assess the effect of the overall analytical process on the usability of the data. The DQE established that the detection of acetone and bis(2-ethylhexyl)phthalate can be attributed to field sampling and laboratory contamination rather than environmental conditions at the site. Also, low concentrations of dioxins and furans can be attributed to background or instrument noise and are not indicative of environmental conditions. With exception to the qualifications listed above, the DQE concluded that data can be used in the project decision-making process.

3.0 Interpretation of Sampling Results

3.1 Presentation of Results

Sections 3.1.1 through 3.1.4 present results of the Screening Sites Sampling Program for Screening Site 76. Data are presented by media for surface and subsurface soil. Data are compared with appropriate screening criteria in three summary tables: Tables 76-A, 76-B, and 76-C. Data from the 1997 CH2M HILL investigation are presented along with historical data from the *Remedial Investigations at DDMT, Final Report* (Law Environmental, 1990). If a value from a sampling location exceeds one of the comparison criteria, that value and the comparison criterion are shown in bold on the summary table.



Sampling locations without data boxes had no constituents exceeding risk-based criteria

LEGEND

Surface Soil Sampling Location (mg/kg)

Soil Boring Sampling Location (mg/kg)

(Q) Qualifer Definitions

= - indicates unqualified detection

J - indicates estimated value above detection limit, but below reporting limit.

Figure 2

Site 76, Unknown Wastes near Building 690
Constituents Exceeding Risk-Based Criteria

Defense Distribution Depot Memphis, TN

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COPCs are parameters that exceed both background values and the screening criteria. Where concentrations exceed the selected background value, the concentration is compared with the observed range of background values as reviewed and established by the BCT.

Subsurface soil sampling locations with values above detection limits are shown in Table 76-A, which also contains the two types of comparison criteria. If a value from a sampling location exceeds one of the comparison criteria, that value and the comparison criteria are shown in bold.

3.1.1 Surface Soils

Tables 76-A and 76-B include the detected concentrations compared with background and BCT selected criteria. The surface soil samples from the site did not have any chemicals detected above background or BCT criteria.

Only dieldrin was detected in one of the three samples slightly above the background level of 0.086mg/kg in Sample SB76B. Dieldrin will be addressed as part of dieldrin risk evalaution.

3.1.2 Subsurface Soils

Table 76-C summarizes subsurface soil sampling data. Chromium was found in Sample SB76A (at 18 to 20 feet) at 41.6 mg/kg and in Sample SB76B (at 18 to 20 feet) at 41.1 mg/kg; these values exceed the groundwater protection criteria of 38 mg/kg and the selected background value of 26 mg/kg. However, the chromium concentration was nearly identical in the two samples at the 18- to 20-foot depth approximately 250 feet apart. Therefore, these concentrations may simply be naturally occurring chromium in soil at this depth, as observed elsewhere at these depths within DDMT.

Lead was found in Sample SB76B (at 4 to 6 feet) at 53.8 mg/kg, which is more than twice the selected background value of 24 mg/kg; this value also exceeds the groundwater protection criterion of 1.5 mg/kg. The lead concentration in the underlying 18- to 20-foot interval sample is below the subsurface background concentration. Other subsurface sample lead concentrations were below the background value.

There were no other chemicals that exceeded the background value or the groundwater protection criteria for this site.

3.2 Vertical and Lateral Extent

Based on the biased sampling at the site, none of the surface soils indicated detection of releases at the site. Many of the constituents that were found are at concentrations similar to background levels. Near uniform concentrations of chromium and elevated concentrations of lead in one subsurface soil sample most likely represent natural conditions and not vertical transport of metals from the site.

3.3 Potential Migration Pathways

The following paragraphs provide a general discussion of potential migration pathways for several constituents found at Screening Site 76.

Lead exists at concentrations greater than background, or above screening criteria, in surface soils, subsurface soils, and sediment at the DDMT. Lead is moderately soluble and potentially can be leached from any of these forms of occurrence, reaching concentrations in aqueous solution in both groundwater and surface water that would be of concern to both human and ecological receptors. Additionally, lead in surface soils and sediment potentially may move as suspended particulate matter in surface waters and impact aquatic organisms.

Chromium has been reported from surface and subsurface soils at the DDMT in concentrations greater than the screening levels. Chromium occurs in two oxidation states: +3 and +6. The trivalent form readily combines with aqueous hydroxide to form insoluble chromium hydroxide and is of little risk. The hexavalent form is soluble tends to stay in solution, unless some activated carbon material is present for it to sorb onto. Dissolved chromium is readily adsorbed onto sediments but may be bioaccumulated through aquatic organisms. Chromium found in subsurface soils at Screening Site 76 may be naturally occurring.

3.4 Additional Data Needs

There are no additional data needs for this site.

4.0 Interpretation of Screening Criteria Comparisons

4.1 Methodology

The PRE was performed in accordance with the *Guidance on Preliminary Risk Evaluations for the Purpose of Reaching a Finding of Suitability to Lease (FOSL)* (EPA Region IV, 1994). A discussion of the PRE methodology is provided as Appendix A to this document.

4.2 Screening Site 76 Risk

Carcinogenic and noncarcinogenic risks for Screening Site 76 are presented in Table 4-39 of the draft PRE (USAESC, 1998), and detailed chemical-specific estimates are presented in Appendix A of the PRE.

The PRE carcinogenic risk ratios for an industrial worker and for a residential scenario are both within a risk range of one in a million. The noncarcinogenic PRE ratios were within the acceptable value of 1.0.

In accordance with the PRE, there are no human health risks of concern from this site. No Further Action is recommended for Screening Site 76.

5.0 Summary and Recommendations

5.1 Summary

In accordance with the PRE, there are no human health risks of concern from this site. Diedrin will be addressed as part of sitewide evaluations.

5.2 Recommendations

No Further Action is recommended for Screening Site 76.

Screening Site 78—Alcohol, Acetone, Toluene, and Hydrofluoric Acid Area, Building 689

1.0 Introduction

The chart below presents the location and status information for this screening site:

Parcel	Building Number	RI/FS[1] OU	Site Number	CERCLA[2] Status
21	689	3	78	Screening

[1]RI/FS: Remedial Investigation/Feasibility Study
[2]CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act

Figure 3 shows Building 689, which historically has stored alcohol, acetone, toluene, and hydrofluoric acid before transport. Screening Site 78 is located on the eastern side of OU-3 at the intersection of 6th and K Streets.

2.0 Study Area Investigation

2.1 Previous Investigations

No previous sampling data exist for this site. The sample locations were selected based on activities conducted around the building such as loading and unloading operations and on stormwater drainage areas.

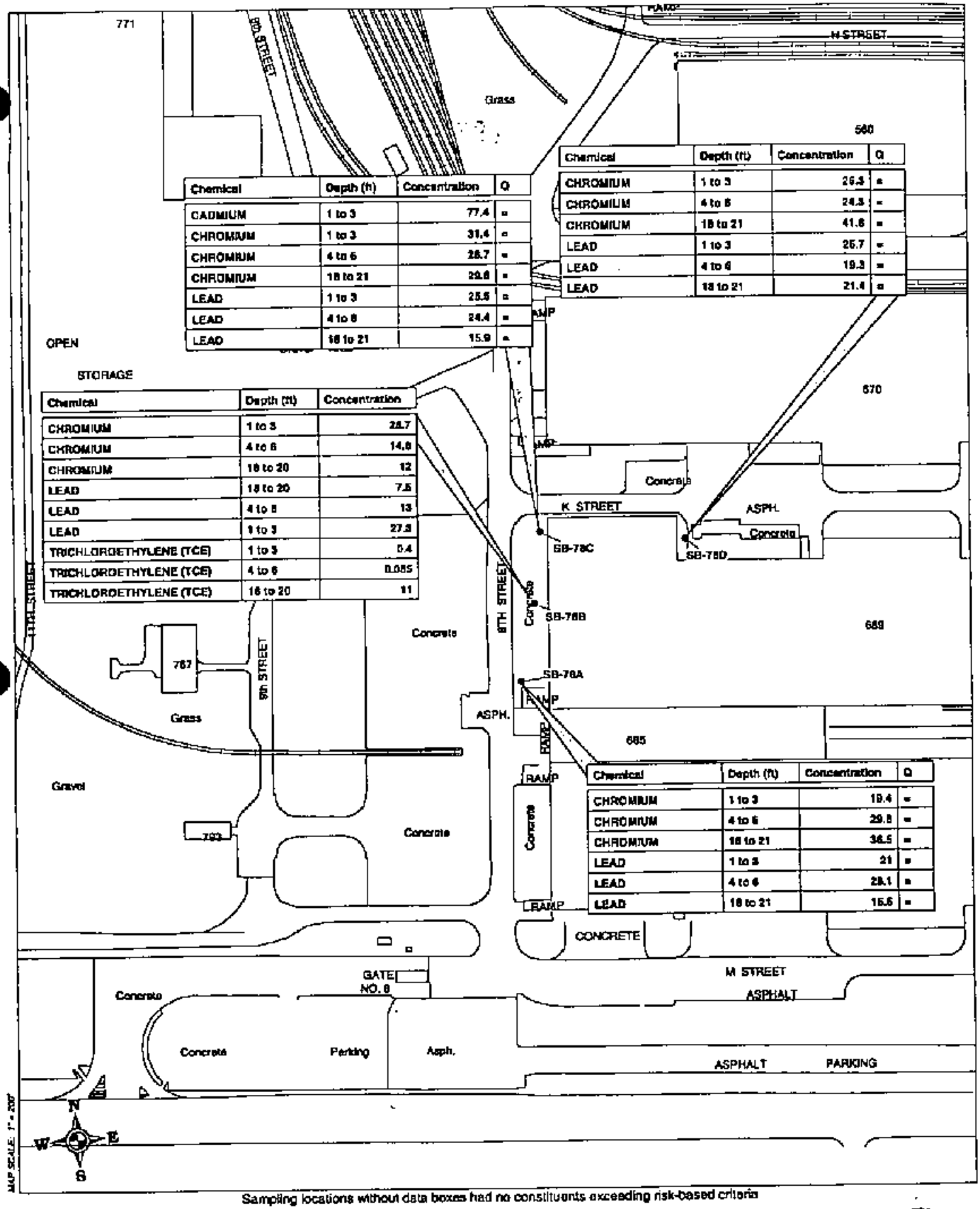
Because no sampling data have previously been collected specifically for this site, a biased sampling approach was developed. Based on past practices conducted at this site and the known potential for contamination at the facility, the COPCs are VOCs, SVOCs, fluoride, pH, and metals.

2.2 Screening Site Sampling Program

2.2.1 Sampling Strategy

The sampling strategy was developed to evaluate whether releases have occurred to surface and subsurface soils. Four soil borings were used to evaluate whether contamination exists at the site. The samples were collected at three depths: 1 to 3 feet, 4 to 6 feet, and 18 to 20 feet. Sample locations were selected based on the operations conducted at the building (loading and unloading activities) and stormwater drainage pathways; thus, the locations were biased. A boring depth of 20 feet was selected because surface and shallow soil contamination is the probable condition.

At least one sample for each media was analyzed for TCL/TAL constituents in accordance with the *Screening Sites Field Sampling Plan* (CH2M HILL, 1995). The following sections present the sampling procedures and laboratory analyses performed for surface and subsurface soils.



Sampling locations without data boxes had no constituents exceeding risk-based criteria

LEGEND

Surface Soil Sampling Location (mg/kg)

Soil Boring Sampling Location (mg/kg)

(Q) Qualifier Definitions

= - indicates unqualified detection

J - indicates estimated value above detection limit, but below reporting limit.

Figure 3
Site 78, Building 689
Constituents Exceeding Risk-Based Criteria
Defense Distribution Depot Memphis, TN

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2.2.2 Sampling Procedures

Sections 2.2.2.1 through 2.2.2.3 describe the sampling procedures and laboratory analyses performed for surface and subsurface soils.

2.2.2.1 Surface Soil Sampling Procedures

No surface samples were collected at this site during this sampling event. The uppermost interval samples taken at the borings (see Section 2.2.2.2) are from the 1- to.3-foot interval; therefore, these are not considered surface soil samples.

2.2.2.2 Subsurface Soil Sampling Procedures

With the approval of the TDEC and EPA, subsurface soil samples were collected from four locations (SB78A, SB78B, SB78C, and SB78D) at this site (shown in Figure 3). At each location, samples were collected at two depths: zero to 2 feet and 4 to 6 feet. The following describes the sample locations:

- Sample SB78A was taken north of the northwest corner of the ramp extending from the northwest side of Building 685, just 4 feet north of a nearby drain.
- Sample SB78B was taken 3 feet west of the 10th loading dock from the south of Building 689.
- Sample SB78C was taken north of Sample SB78B, just south of K Street and 11 feet west of the building.
- Sample SB78D was taken east of the northeast corner of Building 689, just 51 feet west of the nearby loading dock.

The samples were collected using a 2-inch-diameter, stainless-steel push sampler. Samples were also collected at an interval of 18 to 20 feet using a 1-inch-diameter, stainless-steel push sampler. VOC soil samples were collected directly from the continuous sampler using stainless-steel spoons. Part of the VOC sample was placed into a sealable plastic bag and allowed to equilibrate. The head space in the plastic bag was measured for VOCs using a hand-held PID, and the results were used to determine which interval within each boring was selected for Level 3 COPC or TCL/TAL analyses. The remaining soil was placed into a stainless-steel bowl, mixed, and then transferred into the appropriate sample jars.

All sampling tools were decontaminated before being used at each sample location according to the procedures specified in the *Generic Quality Assurance Project Plan* (CH2M HILL, 1995) for the RI/FS currently being conducted at DDMT.

2.2.3 Analytical Procedures

Twelve soil samples from the borings were sent to CH2M HILL's Analytical Services in Montgomery, Alabama for VOC, SVOC, fluoride, metals, pH, and TCL/TAL analyses. Samples received at the laboratory were analyzed in accordance with the procedures outlined in the *Generic Quality Assurance Project Plan* (CH2M HILL, 1995).

3.0 Interpretation of Sampling Results

3.1 Presentation of Results

Sections 3.1.1 through 3.1.4 present results of the Screening Sites Sampling Program for Screening Site 78. Data are presented by media for subsurface soil and compared with appropriate screening criteria in Table 78-A. Data from the 1997 CH2M HILL investigation are presented along with historical data from the *Remedial Investigations at DDMT, Final Report* (Law Environmental, 1990). If a value from a sampling location exceeds one of the comparison criteria, that value and the comparison criterion are shown in **bold** on the summary table.

COPCs are parameters that exceed both background values and the screening criteria. Where concentrations exceed the selected background value, the concentration is compared with the observed range of background values as reviewed and established by the BCT.

Subsurface soil sampling locations with values above detection limits are shown in Table 78-A, which also contains the two types of comparison criteria. If a value from a sampling location exceeds one of the comparison criteria, that value and the comparison criteria are shown in **bold**.

3.1.1 Surface Soil

The area around Screening Site 78 is covered by concrete pavement, and no surface soil samples were collected.

3.1.2 Subsurface Soils

Table 78-A summarizes subsurface soil sampling data. Constituents found at concentrations above the screening criteria include trichloroethylene (TCE), cadmium, chromium, and lead.

Trichloroethylene (TCE) was detected in Sample in SB78B as indicated in the table below. This indicates that a release of TCE may have occurred near Sample SB78B.

Boring	Depth (feet)	TCE (mg/kg)	Background (mg/kg)	RBC GWP[1]
SB78B	1 to 3	0.4	NA	0.06
SB78B	4 to 6	0.085	NA	0.06
SB78B	18 to 20	11.0	NA	0.06

[1]Risk Based Criteria -- Groundwater Protection Criteria

Lead was found in all 12 soil samples at concentrations up to 28.1 mg/kg, which slightly exceeds the selected background value of 24 mg/kg and the 1.5 mg/kg groundwater transfer criteria. The lead concentrations are considered representative of background values.

Cadmium was found in Sample SB78C (1 to 3 feet) at 77.4 mg/kg, which exceeds the groundwater protection criteria of 8 mg/kg and the background value of 1.4 mg/kg. However, cadmium was not found in deeper subsurface soil samples for this boring or from Samples SB78A or SB78B.

Chromium was found in all 12 samples at concentrations ranging from 12 to 41.8 mg/kg. Sample SB78D (18 to 21 feet) had chromium at 41.8 mg/kg, which exceeds the groundwater protection criteria of 38 mg/kg and the background value of 28.1 mg/kg. However, chromium is found at nearly identical concentrations in samples at the 18- to 20-foot depth in Samples SB76A and SB76B and is considered to be representative of naturally occurring conditions.

3.2 Vertical and Lateral Extent

The surface soil at the site did not have site-related contamination. Based on the data collected, subsurface soil has chlorinated solvents, possibly from historical releases. Many of the constituents that were found are at concentrations similar to background levels.

TCE found in Sample SB78B was not found in Sample SB78A (approximately 150 feet to the south) or in Sample SB78C (approximately 150 feet to the north). Building 689 is to the east of SB78B. There are no other soil borings in the vicinity.

Metals, including lead and chromium, found in soil appear to be naturally occurring. Cadmium, found in Sample SB78C at 1 to 3 feet, appears to be an isolated occurrence. Cadmium was not found in other subsurface soil samples below 3 feet at the site; as a result, cadmium is not a concern for groundwater impact.

3.3 Potential Migration Pathways

The following paragraphs discuss potential migration pathways for several constituents found at Screening Site 78. TCE was detected in subsurface soil at concentrations exceeding screening levels at Screening Site 78. TCE is readily soluble in water and readily mobilized via infiltrating precipitation from subsurface soils and can be mobilized to the groundwater in significant amounts. Subsurface soils containing significant mass of TCE may be significant secondary sources of large groundwater plumes. If present as a nonaqueous phase liquid, TCE is denser than water and may migrate downward to the bottom of the water table then travel along the top of confining soils or rock collecting in pools or migrating downward into rock fissures. TCE is volatile in addition to being readily soluble, and may migrate as a vapor through the vadose zone. Distance to downgradient receptors is critical to assessing risk from TCE in this migration pathway. Further evaluation of the groundwater is needed to determine nature and extent of TCE in the area soils and groundwater.

3.4 Additional Data Needs

Additional subsurface soil sampling is needed to evaluate the lateral and vertical extent of TCE at Screening Site 78. Groundwater monitoring at the site and/or downgradient of the site may be needed if TCE is found at depth in the soil.

4.0 Interpretation of Screening Criteria Comparisons

Surface soil sampling was not performed since the site is covered by concrete pavement. Therefore no risk calculations were performed during the PRE.

4.1 Methodology

The PRE was performed in accordance with the *Guidance on Preliminary Risk Evaluations for the Purpose of Reaching a Finding of Suitability to Lease (FOSL)* (EPA Region IV, 1994). A discussion of the PRE methodology is provided as Appendix A to this document.

No PRE values were calculated because there were no COPCs in surface soil and no exposures to the subsurface soil.

5.0 Summary and Recommendations

5.1 Summary

Surface soils at this site are clean. TCE was found in Sample SB78B at concentrations up to 11 mg/kg at the 18- to 20-foot depth. This indicates that a release may have occurred to the deeper soil and possibly to groundwater at this site.

5.2 Recommendations

Additional subsurface soil sampling is needed to evaluate the vertical and lateral extent of TCE in the vicinity of Sample SB78B. Groundwater may need to be sampled at the site if TCE concentrations persist at depth in the soil.

Table 75-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 75
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
CH2M HILL	ACENAPHTHENE	SS75A	0.23	J	NA	470	Residential RBC	MG/KG
CH2M HILL	ALUMINUM	SB75A	9110	=	24000	24000	Bkgd	MG/KG
CH2M HILL	ANTHRACENE	SS75A	0.36	J	.096	2300	Residential RBC	MG/KG
CH2M HILL	ARSENIC	SB75A	10.5	=	20	20	Bckg	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	SS75A	1.3	=	.71	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	SS75B	0.15	J	.71	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(a)PYRENE	SS75A	1.4	=	.96	0.088	Residential RBC	MG/KG
CH2M HILL	BENZO(a)PYRENE	SS75B	0.19	J	.96	0.088	Residential RBC	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	SS75A	1.6	=	.78	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	SS75B	0.21	J	.78	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(g,h,i)PERYLENE	SS75A	1	=	.82	230	Residential RBC	MG/KG
CH2M HILL	BENZO(g,h,i)PERYLENE	SS75B	0.14	J	.82	230	Residential RBC	MG/KG
CH2M HILL	BENZO(k)FLUORANTHENE	SS75A	1.2	=	.78	8.8	Residential RBC	MG/KG
CH2M HILL	BENZO(k)FLUORANTHENE	SS75B	0.16	J	.78	8.8	Residential RBC	MG/KG
CH2M HILL	BERYLLIUM	SB75A	0.35	J	1.1	1.1	Bckg	MG/KG
CH2M HILL	CARBAZOLE	SS75A	0.43	J	.067	32	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB75A	13	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHRYSENE	SS75A	1.9	=	.94	88	Residential RBC	MG/KG
CH2M HILL	CHRYSENE	SS75B	0.21	J	.94	88	Residential RBC	MG/KG
CH2M HILL	DIBENZOFURAN	SS75A	0.11	J	.647	31	Residential RBC	MG/KG
CH2M HILL	FLUORANTHENE	SB75A	0.068	J	1.6	310	Residential RBC	MG/KG
CH2M HILL	FLUORANTHENE	SB75B	0.059	J	1.6	310	Residential RBC	MG/KG
CH2M HILL	FLUORANTHENE	SS75A	4.2	=	1.6	310	Residential RBC	MG/KG
CH2M HILL	FLUORANTHENE	SS75B	0.45	=	1.6	310	Residential RBC	MG/KG
CH2M HILL	FLUORENE	SS75A	0.19	J	NA	310	Residential RBC	MG/KG
CH2M HILL	INDENO(1,2,3-c,d)PYRENE	SS75A	0.98	=	.7	0.88	Residential RBC	MG/KG
CH2M HILL	INDENO(1,2,3-c,d)PYRENE	SS75B	0.13	J	.7	0.88	Residential RBC	MG/KG
CH2M HILL	IRON	SB75A	16000	J	37000	37000	Bckg	MG/KG
CH2M HILL	LEAD	SB75A	9.7	=	30	400	CERCLA	MG/KG
CH2M HILL	MANGANESE	SB75A	386	=	1300	1300	Bckg	MG/KG
CH2M HILL	PHENANTHRENE	SB75A	0.055	J	.61	2300	Residential RBC	MG/KG

Table 75-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 75
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
CH2M HILL	PHENANTHRENE	SS75A	3	=	.61	2300	Residential RBC	MG/KG
CH2M HILL	PHENANTHRENE	SS75B	0.23	J	.61	2300	Residential RBC	MG/KG
CH2M HILL	PYRENE	SB75A	0.06	J	1.5	230	Residential RBC	MG/KG
CH2M HILL	PYRENE	SB75B	0.046	J	1.5	230	Residential RBC	MG/KG
CH2M HILL	PYRENE	SS75A	3.6	=	1.5	230	Residential RBC	MG/KG
CH2M HILL	PYRENE	SS75B	0.33	J	1.5	230	Residential RBC	MG/KG
CH2M HILL	ZINC	SB75A	49.8	J	130	23000	Residential RBC	MG/KG

Notes:
1. Detected values are obtained from the *Draft Parcel 22 Report-Screening Sites Sampling Program for Defense Depot* Memphis, TN, CH2M HILL, 1997.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum* , CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. Based on values selected by the BRAC Cleanup Team in the August 1997 BCT meeting minutes, Memphis, Tennessee.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
J - indicates estimated value above the detection limit but below the reporting limit.
= - indicates unqualified detection
BCT - BRAC Cleanup Team

Table 75-B
Summary of Detected Compounds in Surface Soils
Compared to Non-BCT Screening Levels for Site 75
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	Risk-Based Concentrations Soil Ingestion[4]		Units
						Residential	Industrial	
CH2M HILL	BARIUM	SB75A	122	=	234	550	14000	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SS75A	0.1	J	NA	46	410	MG/KG
CH2M HILL	CALCIUM	SB75A	3110	=	5840	NA	NA	MG/KG
CH2M HILL	COBALT	SB75A	12.4	=	18.3	470	12000	MG/KG
CH2M HILL	COPPER	SB75A	16.4	J	33	310	8200	MG/KG
CH2M HILL	DIELDRIN	SB75A	0.006	J	.086	.04	.36	MG/KG
CH2M HILL	MAGNESIUM	SB75A	2360	=	4600	NA	NA	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SS75B	0.006	J	NA	85	760	MG/KG
CH2M HILL	NICKEL	SB75A	19.8	J	30	160	4100	MG/KG
CH2M HILL	p,p'-DDE	SB75A	0.015	=	.16	1.9	17	MG/KG
CH2M HILL	p,p'-DDT	SB75A	0.036	=	.074	1.9	17	MG/KG
CH2M HILL	POTASSIUM	SB75A	743	=	1820	NA	NA	MG/KG
CH2M HILL	VANADIUM	SB75A	24.7	=	48.4	55	1400	MG/KG

Notes:
1. Detected values are obtained from the *Draft Parcel 22 Report-Screening Sites Sampling Program for Defense Depot Memphis, TN*, CH2M HILL, 1997.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. Risk-Based Concentrations are obtained from the *EPA Region III Risk-based Concentrations Table*, R.L. Smith, April, 1997.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
= - indicates unqualified detection.
J - indicates estimated value above the detection limit but below the reporting limit.

Table 75-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 75
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	ALUMINUM	SB75B	4 to 6	11700	=	21829	NA	MG/KG
CH2M HILL	ARSENIC	SB75B	4 to 6	4	=	17	29	MG/KG
CH2M HILL	BARIUM	SB75B	4 to 6	71.3	=	300	1600	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	SB75A	4 to 6	0.054	J	NA	2	MG/KG
CH2M HILL	BENZO(a)PYRENE	SB75A	4 to 6	0.057	J	NA	8	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	SB75A	4 to 6	0.05	J	NA	5	MG/KG
CH2M HILL	BENZO(k)FLUORANTHENE	SB75A	4 to 6	0.047	J	NA	49	MG/KG
CH2M HILL	BERYLLIUM	SB75B	4 to 6	0.39	J	1.2	63	MG/KG
CH2M HILL	CALCIUM	SB75B	4 to 6	1680	=	2400	NA	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB75B	4 to 6	16.6	=	26	38	MG/KG
CH2M HILL	CHRYSENE	SB75A	4 to 6	0.08	J	NA	160	MG/KG
CH2M HILL	COBALT	SB75B	4 to 6	4.5	J	20	NA	MG/KG
CH2M HILL	COPPER	SB75B	4 to 6	9.5	J	33	NA	MG/KG
CH2M HILL	FLUORANTHENE	SB75A	4 to 6	0.16	J	.045	4300	MG/KG
CH2M HILL	IRON	SB75B	4 to 6	14800	J	38000	NA	MG/KG
CH2M HILL	LEAD	SB75B	4 to 6	7.6	=	24	1.5	MG/KG
CH2M HILL	MAGNESIUM	SB75B	4 to 6	1870	=	4900	NA	MG/KG
CH2M HILL	MANGANESE	SB75B	4 to 6	155	=	1500	NA	MG/KG
CH2M HILL	NICKEL	SB75B	4 to 6	12.3	J	37	130	MG/KG
CH2M HILL	PHENANTHRENE	SB75A	4 to 6	0.12	J	NA	4300	MG/KG
CH2M HILL	POTASSIUM	SB75B	4 to 6	523	J	1800	NA	MG/KG
CH2M HILL	PYRENE	SB75A	4 to 6	0.12	J	.042	2800	MG/KG
CH2M HILL	VANADIUM	SB75B	4 to 6	27.9	=	51	6000	MG/KG
CH2M HILL	ZINC	SB75B	4 to 6	31.3	J	110	12000	MG/KG

Notes:
1. Detected values are obtained from the *Draft Parcel 22 Report-Screening Sites Sampling Program for Defense Depot Memphis, TN*, CH2M HILL, 1997.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. RBC-GWP values are obtained from the *EPA Region III Risk-based Concentrations Table*, R. L. Smith, April, 1997.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
= - indicates unqualified detection
J - indicates estimated value above the detection limit but below the reporting limit.
RBC-GWP - Risk-Based Concentrations - Groundwater Protection

Table 76-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 76
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
CH2M HILL	ARSENIC	SB76A	12	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SB76B	13.4	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SB76C	13.2	=	20	20	Bckg	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB76A	31.1	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB76B	33	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB76C	35	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	LEAD	SB76A	17.5	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SB76B	37.3	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SB76C	25.3	=	30	400	CERCLA	MG/KG
CH2M HILL	ZINC	SB76A	83.8	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SB76B	91	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SB76C	72.6	=	130	23000	Residential RBC	MG/KG

Notes:
1. Detected values are obtained from the *Draft Parcel 21 Report-Screening Sites Sampling Program for Defense Depot* Memphis, TN, CH2M HILL, 1997.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum* , CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. Based on values selected by the BRAC Cleanup Team in the August 1997 BCT meeting minutes, Memphis, Tennessee.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
J - indicates estimated value above the detection limit but below the reporting limit.
= - indicates unqualified detection
BCT - BRAC Cleanup Team

Table 76-B
Summary of Detected Compounds in Surface Soils
Compared to Non-BCT Screening Levels for Site 76
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	Risk-Based Concentrations Soil Ingestion[4]		Units
						Residential	Industrial	
CH2M HILL	ACETONE	SB76A	0.004	J	NA	780	20000	MG/KG
CH2M HILL	ACETONE	SB76B	0.005	J	NA	780	20000	MG/KG
CH2M HILL	ACETONE	SB76C	0.004	J	NA	780	20000	MG/KG
CH2M HILL	CADMIUM	SB76B	2.8	=	1.4	3.9	100	MG/KG
CH2M HILL	COPPER	SB76A	26.2	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SB76B	30	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SB76C	22.4	=	33	310	8200	MG/KG
CH2M HILL	DIELDRIN	SB76A	**0.29**	=	.086	**.04**	.36	MG/KG
CH2M HILL	DIELDRIN	SB76B	0.0041	=	.086	.04	.36	MG/KG
CH2M HILL	DIELDRIN	SB76C	0.0069	J	.086	.04	.36	MG/KG
CH2M HILL	NICKEL	SB76A	33.7	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SB76B	29	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SB76C	24.2	=	30	160	4100	MG/KG
CH2M HILL	p,p'-DDE	SB76B	0.0044	=	.16	1.9	17	MG/KG
CH2M HILL	p,p'-DDE	SB76C	0.015	=	.16	1.9	17	MG/KG
CH2M HILL	p,p'-DDT	SB76B	0.0099	=	.074	1.9	17	MG/KG
CH2M HILL	p,p'-DDT	SB76C	0.019	=	.074	1.9	17	MG/KG

Notes:
1. Detected values are obtained from the *Draft Parcel 21 Report-Screening Sites Sampling Program for Defense Depot Memphis, TN*, CH2M HILL, 1997.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. Risk-Based Concentrations are obtained from the *EPA Region III Risk-based Concentrations Table*, R.L. Smith, April, 1997.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
= - indicates unqualified detection.
J - indicates estimated value above the detection limit but below the reporting limit.

Table 76-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 76
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	ACETONE	SB76A	18 to 20	0.006	J	NA	16	MG/KG
CH2M HILL	ACETONE	SB76A	4 to 6	0.004	J	NA	16	MG/KG
CH2M HILL	ACETONE	SB76B	18 to 20	0.006	J	NA	16	MG/KG
CH2M HILL	ACETONE	SB76B	4 to 6	0.006	J	NA	16	MG/KG
CH2M HILL	ACETONE	SB76C	4 to 6	0.005	J	NA	16	MG/KG
CH2M HILL	ALUMINUM	SB76C	18 to 20	4840	=	21829	NA	MG/KG
CH2M HILL	ARSENIC	SB76A	18 to 20	7	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB76A	4 to 6	10.3	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB76B	18 to 20	7.7	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB76B	4 to 6	14.6	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB76C	18 to 20	2.8	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB76C	4 to 6	13	=	17	29	MG/KG
CH2M HILL	BARIUM	SB76C	18 to 20	8.5	J	300	1600	MG/KG
CH2M HILL	BERYLLIUM	SB76C	4 to 6	1.2	=	1.2	63	MG/KG
CH2M HILL	CALCIUM	SB76C	18 to 20	520	J	2400	NA	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB76A	18 to 20	41.6	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB76A	4 to 6	27.7	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB76B	18 to 20	41.1	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB76B	4 to 6	39.7	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB76C	18 to 20	9.6	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB76C	4 to 6	36.5	=	26	38	MG/KG
CH2M HILL	COBALT	SB76C	18 to 20	1.1	J	20	NA	MG/KG
CH2M HILL	COPPER	SB76A	18 to 20	15.1	=	33	NA	MG/KG
CH2M HILL	COPPER	SB76A	4 to 6	24.7	=	33	NA	MG/KG
CH2M HILL	COPPER	SB76B	18 to 20	9.3	=	33	NA	MG/KG
CH2M HILL	COPPER	SB76B	4 to 6	24.8	=	33	NA	MG/KG
CH2M HILL	COPPER	SB76C	18 to 20	3.3	J	33	NA	MG/KG
CH2M HILL	COPPER	SB76C	4 to 6	21.4	=	33	NA	MG/KG
CH2M HILL	IRON	SB76C	18 to 20	11600	J	38000	NA	MG/KG
CH2M HILL	LEAD	SB76A	18 to 20	11.5	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB76A	4 to 6	14.7	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB76B	18 to 20	12.4	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB76B	4 to 6	53.8	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB76C	18 to 20	4.8	=	24	1.5	MG/KG

Table 76-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 76
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	LEAD	SB76C	4 to 6	18.6	=	24	1.5	MG/KG
CH2M HILL	MAGNESIUM	SB76C	18 to 20	279	J	4900	NA	MG/KG
CH2M HILL	MANGANESE	SB76C	18 to 20	17.3	=	1500	NA	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SB76A	18 to 20	0.001	J	NA	.02	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SB76B	4 to 6	0.002	J	NA	.02	MG/KG
CH2M HILL	NICKEL	SB76A	18 to 20	16.8	=	37	130	MG/KG
CH2M HILL	NICKEL	SB76A	4 to 6	31.5	=	37	130	MG/KG
CH2M HILL	NICKEL	SB76B	18 to 20	4.7	=	37	130	MG/KG
CH2M HILL	NICKEL	SB76B	4 to 6	30.8	=	37	130	MG/KG
CH2M HILL	NICKEL	SB76C	18 to 20	1.7	J	37	130	MG/KG
CH2M HILL	NICKEL	SB76C	4 to 6	22.7	=	37	130	MG/KG
CH2M HILL	VANADIUM	SB76C	18 to 20	23.6	=	51	6000	MG/KG
CH2M HILL	ZINC	SB76A	18 to 20	19.2	=	110	12000	MG/KG
CH2M HILL	ZINC	SB76A	4 to 6	76.8	=	110	12000	MG/KG
CH2M HILL	ZINC	SB76B	18 to 20	15.9	=	110	12000	MG/KG
CH2M HILL	ZINC	SB76B	4 to 6	61	=	110	12000	MG/KG
CH2M HILL	ZINC	SB76C	18 to 20	4.5	J	110	12000	MG/KG
CH2M HILL	ZINC	SB76C	4 to 6	51.6	=	110	12000	MG/KG

Notes:
1. Detected values are obtained from the *Draft Parcel 21 Report-Screening Sites Sampling Program for Defense Depot Memphis, TN*, CH2M HILL, 1997.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. RBC-GWP values are obtained from the *EPA Region III Risk-based Concentrations Table*, R. L. Smith, April, 1997.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
= - indicates unqualified detection
J - indicates estimated value above the detection limit but below the reporting limit.
RBC-GWP - Risk-Based Concentrations - Groundwater Protection

Table 78-A
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 78
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	ACETONE	SB78A	1 to 3	0.015	=	NA	16	MG/KG
CH2M HILL	ACETONE	SB78A	18 to 21	0.006	J	NA	16	MG/KG
CH2M HILL	ACETONE	SB78A	4 to 6	0.079	=	NA	16	MG/KG
CH2M HILL	ACETONE	SB78B	1 to 3	0.012	J	NA	16	MG/KG
CH2M HILL	ACETONE	SB78C	1 to 3	0.009	J	NA	16	MG/KG
CH2M HILL	ACETONE	SB78C	4 to 6	0.004	J	NA	16	MG/KG
CH2M HILL	ACETONE	SB78D	1 to 3	0.006	J	NA	16	MG/KG
CH2M HILL	ACETONE	SB78D	18 to 21	0.006	J	NA	16	MG/KG
CH2M HILL	ACETONE	SB78D	4 to 6	0.005	J	NA	16	MG/KG
CH2M HILL	ALUMINUM	SB78B	18 to 20	9360	=	21829	NA	MG/KG
CH2M HILL	ANTHRACENE	SB78A	4 to 6	0.13	J	NA	12000	MG/KG
CH2M HILL	ANTHRACENE	SB78D	1 to 3	0.083	J	NA	12000	MG/KG
CH2M HILL	ARSENIC	SB78A	1 to 3	15	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB78A	18 to 21	14.2	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB78A	4 to 6	18.2	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB78B	1 to 3	20.4	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB78B	18 to 20	5.1	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB78B	4 to 6	11	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB78C	1 to 3	22.2	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB78C	18 to 21	10.9	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB78C	4 to 6	17.2	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB78D	1 to 3	22.6	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB78D	18 to 21	17.8	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB78D	4 to 6	16.5	=	17	29	MG/KG
CH2M HILL	BARIUM	SB78B	18 to 20	77.6	=	300	1600	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	SB78A	1 to 3	0.12	J	NA	2	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	SB78A	4 to 6	0.43	=	NA	2	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	SB78D	1 to 3	0.14	J	NA	2	MG/KG
CH2M HILL	BENZO(a)PYRENE	SB78A	1 to 3	0.086	J	NA	8	MG/KG
CH2M HILL	BENZO(a)PYRENE	SB78A	4 to 6	0.31	J	NA	8	MG/KG
CH2M HILL	BENZO(a)PYRENE	SB78D	1 to 3	0.15	J	NA	8	MG/KG

Table 78-A
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 78
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	BENZO(b)FLUORANTHENE	SB78A	1 to 3	0.11	J	NA	5	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	SB78A	4 to 6	0.41	=	NA	5	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	SB78D	1 to 3	0.16	J	NA	5	MG/KG
CH2M HILL	BENZO(g,h,i)PERYLENE	SB78A	1 to 3	0.086	J	NA	1400	MG/KG
CH2M HILL	BENZO(g,h,i)PERYLENE	SB78A	4 to 6	0.26	J	NA	1400	MG/KG
CH2M HILL	BENZO(k)FLUORANTHENE	SB78A	1 to 3	0.12	J	NA	49	MG/KG
CH2M HILL	BENZO(k)FLUORANTHENE	SB78A	4 to 6	0.38	J	NA	49	MG/KG
CH2M HILL	BENZO(k)FLUORANTHENE	SB78D	1 to 3	0.14	J	NA	49	MG/KG
CH2M HILL	BERYLLIUM	SB78B	18 to 20	0.33	J	1.2	63	MG/KG
CH2M HILL	BERYLLIUM	SB78B	4 to 6	0.5	J	1.2	63	MG/KG
CH2M HILL	BERYLLIUM	SB78D	18 to 21	1.4	=	1.2	63	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB78B	1 to 3	0.051	J	NA	3600	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB78C	4 to 6	0.058	J	NA	3600	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB78D	1 to 3	0.062	J	NA	3600	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB78D	18 to 21	0.062	J	NA	3600	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB78D	4 to 6	0.046	J	NA	3600	MG/KG
CH2M HILL	CADMIUM	SB78C	1 to 3	77.4	=	1.4	8	MG/KG
CH2M HILL	CALCIUM	SB78B	18 to 20	2310	=	2400	NA	MG/KG
CH2M HILL	CHLOROBENZENE	SB78D	18 to 21	0.002	J	NA	1	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB78A	1 to 3	19.4	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB78A	18 to 21	36.5	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB78A	4 to 6	29.8	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB78B	1 to 3	28.7	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB78B	18 to 20	12	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB78B	4 to 6	14.8	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB78C	1 to 3	31.4	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB78C	18 to 21	29.6	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB78C	4 to 6	28.7	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB78D	1 to 3	26.3	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB78D	18 to 21	41.8	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB78D	4 to 6	24.3	=	26	38	MG/KG

Table 78-A
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 78
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	CHRYSENE	SB78A	1 to 3	0.18	J	NA	160	MG/KG
CH2M HILL	CHRYSENE	SB78A	4 to 6	0.67	=	NA	160	MG/KG
CH2M HILL	CHRYSENE	SB78D	1 to 3	0.2	J	NA	160	MG/KG
CH2M HILL	COBALT	SB78B	18 to 20	7.4	=	20	NA	MG/KG
CH2M HILL	COPPER	SB78A	1 to 3	28.8	=	33	NA	MG/KG
CH2M HILL	COPPER	SB78A	18 to 21	32.4	=	33	NA	MG/KG
CH2M HILL	COPPER	SB78A	4 to 6	36.8	=	33	NA	MG/KG
CH2M HILL	COPPER	SB78B	1 to 3	30.1	=	33	NA	MG/KG
CH2M HILL	COPPER	SB78B	18 to 20	14	J	33	NA	MG/KG
CH2M HILL	COPPER	SB78B	4 to 6	19.1	J	33	NA	MG/KG
CH2M HILL	COPPER	SB78C	1 to 3	38.3	=	33	NA	MG/KG
CH2M HILL	COPPER	SB78C	18 to 21	24.7	=	33	NA	MG/KG
CH2M HILL	COPPER	SB78C	4 to 6	26.9	=	33	NA	MG/KG
CH2M HILL	COPPER	SB78D	1 to 3	38.1	=	33	NA	MG/KG
CH2M HILL	COPPER	SB78D	18 to 21	25.5	=	33	NA	MG/KG
CH2M HILL	COPPER	SB78D	4 to 6	31.6	=	33	NA	MG/KG
CH2M HILL	DI-n-BUTYL PHTHALATE	SB78A	18 to 21	0.084	J	NA	2300	MG/KG
CH2M HILL	DI-n-BUTYL PHTHALATE	SB78A	4 to 6	0.072	J	NA	2300	MG/KG
CH2M HILL	DI-n-BUTYL PHTHALATE	SB78B	1 to 3	0.1	J	NA	2300	MG/KG
CH2M HILL	DI-n-BUTYL PHTHALATE	SB78C	1 to 3	0.08	J	NA	2300	MG/KG
CH2M HILL	DI-n-BUTYL PHTHALATE	SB78C	18 to 21	0.19	J	NA	2300	MG/KG
CH2M HILL	DI-n-BUTYL PHTHALATE	SB78C	4 to 6	0.07	J	NA	2300	MG/KG
CH2M HILL	DI-n-BUTYL PHTHALATE	SB78D	1 to 3	0.14	J	NA	2300	MG/KG
CH2M HILL	DI-n-BUTYL PHTHALATE	SB78D	18 to 21	0.21	J	NA	2300	MG/KG
CH2M HILL	DI-n-BUTYL PHTHALATE	SB78D	4 to 6	0.1	J	NA	2300	MG/KG
CH2M HILL	FLUORANTHENE	SB78A	1 to 3	0.38	J	.045	4300	MG/KG
CH2M HILL	FLUORANTHENE	SB78A	4 to 6	0.85	=	.045	4300	MG/KG
CH2M HILL	FLUORANTHENE	SB78D	1 to 3	0.37	J	.045	4300	MG/KG
CH2M HILL	FLUORIDE	SB78A	18 to 21	1.55	=	NA	NA	MG/KG
CH2M HILL	FLUORIDE	SB78C	18 to 21	1.69	=	NA	NA	MG/KG
CH2M HILL	INDENO(1,2,3-c,d)PYRENE	SB78A	1 to 3	0.082	J	NA	14	MG/KG

Table 78-A
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 78
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	INDENO(1,2,3-c,d)PYRENE	SB78A	4 to 6	0.24	J	NA	14	MG/KG
CH2M HILL	INDENO(1,2,3-c,d)PYRENE	SB78D	1 to 3	0.13	J	NA	14	MG/KG
CH2M HILL	IRON	SB78B	18 to 20	15800	J	38000	NA	MG/KG
CH2M HILL	LEAD	SB78A	1 to 3	21	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB78A	18 to 21	15.5	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB78A	4 to 6	28.1	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB78B	1 to 3	27.3	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB78B	18 to 20	7.5	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB78B	4 to 6	13	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB78C	1 to 3	25.5	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB78C	18 to 21	15.9	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB78C	4 to 6	24.4	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB78D	1 to 3	25.7	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB78D	18 to 21	21.4	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB78D	4 to 6	19.3	=	24	1.5	MG/KG
CH2M HILL	MAGNESIUM	SB78B	18 to 20	2510	=	4900	NA	MG/KG
CH2M HILL	MANGANESE	SB78B	18 to 20	557	=	1500	NA	MG/KG
CH2M HILL	METHYL ETHYL KETONE (2-BUTANONE)	SB78A	1 to 3	0.002	J	NA	NA	MG/KG
CH2M HILL	METHYL ETHYL KETONE (2-BUTANONE)	SB78A	4 to 6	0.01	J	NA	NA	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SB78A	1 to 3	0.002	J	NA	.02	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SB78B	1 to 3	0.004	J	NA	.02	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SB78C	1 to 3	0.002	J	NA	.02	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SB78D	1 to 3	0.003	J	NA	.02	MG/KG
CH2M HILL	NICKEL	SB78A	1 to 3	26	=	37	130	MG/KG
CH2M HILL	NICKEL	SB78A	18 to 21	40.5	=	37	130	MG/KG
CH2M HILL	NICKEL	SB78A	4 to 6	37	=	37	130	MG/KG
CH2M HILL	NICKEL	SB78B	1 to 3	34.4	=	37	130	MG/KG
CH2M HILL	NICKEL	SB78B	18 to 20	18	J	37	130	MG/KG
CH2M HILL	NICKEL	SB78B	4 to 6	21.2	J	37	130	MG/KG
CH2M HILL	NICKEL	SB78C	1 to 3	40.3	=	37	130	MG/KG
CH2M HILL	NICKEL	SB78C	18 to 21	31.1	=	37	130	MG/KG

Table 78-A
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 78
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	NICKEL	SB78C	4 to 6	30.7	=	37	130	MG/KG
CH2M HILL	NICKEL	SB78D	1 to 3	45.2	=	37	130	MG/KG
CH2M HILL	NICKEL	SB78D	18 to 21	24.8	=	37	130	MG/KG
CH2M HILL	NICKEL	SB78D	4 to 6	38.4	=	37	130	MG/KG
CH2M HILL	pH	SB78A	1 to 3	7.6	=	NA	NA	PH
CH2M HILL	pH	SB78A	18 to 21	6.5	=	NA	NA	PH
CH2M HILL	pH	SB78A	4 to 6	7.3	=	NA	NA	PH
CH2M HILL	pH	SB78B	1 to 3	7.9	=	NA	NA	PH
CH2M HILL	pH	SB78B	18 to 20	7.1	=	NA	NA	PH
CH2M HILL	pH	SB78B	4 to 6	7.4	=	NA	NA	PH
CH2M HILL	pH	SB78C	1 to 3	6.1	=	NA	NA	PH
CH2M HILL	pH	SB78C	18 to 21	6.9	=	NA	NA	PH
CH2M HILL	pH	SB78C	4 to 6	7.3	=	NA	NA	PH
CH2M HILL	pH	SB78D	1 to 3	7.1	=	NA	NA	PH
CH2M HILL	pH	SB78D	18 to 21	6.7	=	NA	NA	PH
CH2M HILL	pH	SB78D	4 to 6	7	=	NA	NA	PH
CH2M HILL	PHENANTHRENE	SB78A	1 to 3	0.12	J	NA	4300	MG/KG
CH2M HILL	PHENANTHRENE	SB78A	4 to 6	0.13	J	NA	4300	MG/KG
CH2M HILL	PHENANTHRENE	SB78D	1 to 3	0.3	J	NA	4300	MG/KG
CH2M HILL	POTASSIUM	SB78B	18 to 20	803	=	1800	NA	MG/KG
CH2M HILL	PYRENE	SB78A	1 to 3	0.28	J	.042	2800	MG/KG
CH2M HILL	PYRENE	SB78A	4 to 6	0.74	=	.042	2800	MG/KG
CH2M HILL	PYRENE	SB78D	1 to 3	0.34	J	.042	2800	MG/KG
CH2M HILL	SELENIUM	SB78B	1 to 3	1.3	=	.64	5	MG/KG
CH2M HILL	SELENIUM	SB78C	4 to 6	1.5	=	.64	5	MG/KG
CH2M HILL	SODIUM	SB78B	18 to 20	157	J	NA	NA	MG/KG
CH2M HILL	TETRACHLOROETHYLENE(PCE)	SB78C	1 to 3	0.001	J	NA	.06	MG/KG
CH2M HILL	TETRACHLOROETHYLENE(PCE)	SB78C	18 to 21	0.003	J	NA	.06	MG/KG
CH2M HILL	TETRACHLOROETHYLENE(PCE)	SB78C	4 to 6	0.002	J	NA	.06	MG/KG
CH2M HILL	TOTAL 1,2-DICHLOROETHENE	SB78C	1 to 3	0.002	J	NA	.4	MG/KG
CH2M HILL	TRICHLOROETHYLENE (TCE)	SB78B	1 to 3	0.4	=	NA	.06	MG/KG

Table 78-A
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 78
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	TRICHLOROETHYLENE (TCE)	SB78B	18 to 20	**11**	=	NA	.06	MG/KG
CH2M HILL	TRICHLOROETHYLENE (TCE)	SB78B	4 to 6	**0.085**	=	NA	.06	MG/KG
CH2M HILL	VANADIUM	SB78B	18 to 20	24.3	=	51	6000	MG/KG
CH2M HILL	ZINC	SB78A	1 to 3	104	=	110	12000	MG/KG
CH2M HILL	ZINC	SB78A	18 to 21	101	=	110	12000	MG/KG
CH2M HILL	ZINC	SB78A	4 to 6	126	=	110	12000	MG/KG
CH2M HILL	ZINC	SB78B	1 to 3	120	=	110	12000	MG/KG
CH2M HILL	ZINC	SB78B	18 to 20	37.8	J	110	12000	MG/KG
CH2M HILL	ZINC	SB78B	4 to 6	67.6	J	110	12000	MG/KG
CH2M HILL	ZINC	SB78C	1 to 3	130	=	110	12000	MG/KG
CH2M HILL	ZINC	SB78C	18 to 21	83.4	=	110	12000	MG/KG
CH2M HILL	ZINC	SB78C	4 to 6	99.3	=	110	12000	MG/KG
CH2M HILL	ZINC	SB78D	1 to 3	132	=	110	12000	MG/KG
CH2M HILL	ZINC	SB78D	18 to 21	69.9	=	110	12000	MG/KG
CH2M HILL	ZINC	SB78D	4 to 6	120	=	110	12000	MG/KG

Notes:
1. Detected values are obtained from the *Draft Parcel 21 Report-Screening Sites Sampling Program for Defense Depot Memphis, TN*, CH2M HILL, 1997.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. RBC-GWP values are obtained from the *EPA Region III Risk-based Concentrations Table*, R. L. Smith, April, 1997.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
= - indicates unqualified detection
J - indicates estimated value above the detection limit but below the reporting limit.
RBC-GWP - Risk-Based Concentrations - Groundwater Protection

TAB

Parcel 22

Parcel 22

Screening Sites Sampling Program

for

Defense Distribution Depot Memphis, Tennessee

March 1998

Prepared for

U.S. Army Engineering and Support Center, Huntsville

Prepared by

CH2M HILL

2567 Fairlane Drive

Montgomery, Alabama 36116

137449.RR.ZZ

Parcel 22
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Parcel 22 is a 376-square-foot (ft^2) parcel in the south-central part of the Main Installation in Operable Unit (OU)-3 (shown in Figure 1). Parcel 22 is made up of an area between Buildings 689 and 690.

The screening sites in this document have been identified by the Defense Distribution Depot Memphis, Tennessee (DDMT) through a review of existing documents, interviews with facility personnel, and knowledge of the facility's operations. Screening sites are locations at DDMT where there is a potential for materials to have been released to the environment from past operations. There is one screening site in Parcel 22:

- Screening Site 77 – Unknown Waste near Building 689 and 690

Sites where there is a confirmed presence of contaminants from past operations are addressed in the Remedial Investigation Sampling Program. Other facilities have been addressed in the Base Realignment and Closure (BRAC) Sampling Program. The results of these programs are addressed in separate reports.

The purpose of the Screening Sites Sampling Program is to identify whether past activities at each of the sites have resulted in releases from the site that would require further investigation. The intent is not to fully delineate the nature and extent of soil or groundwater contamination attributable to past operations, but to conduct technically based screening analyses sufficient to identify the likelihood of contamination.

The purpose of this letter report is to evaluate the results of the Screening Sites Sampling Program and sampling from previous investigations and to recommend No Further Action or further investigation at screening sites in this parcel. The following sections present the results of past investigations; Screening Sites Sampling Program strategy, procedures, and results; and recommendations for each site.

Surface soils, subsurface soils, surface water, and sediments were investigated as part of the Screening Sites Sampling Program. Surface soil samples (any sample whose lower depth is 2 feet or less) were taken both as independent samples and as the upper interval of a soil boring profile. Thus, surface soil samples taken as part of a soil boring may have an "SB" designation and are initially discussed under Subsurface Soil Sampling Procedure (Section 2.2.2.2). However, the results from that upper interval are presented in the surface soils tables and discussions in Section 3.0

Screening Site 77–Unknown Waste near Buildings 689 and 690

1.0 Introduction

The chart below presents the location and status information for this screening site.

Parcel	Building Number	RI/FS[1] OU	Site Number	CERCLA[2] Status
22	689 and 690	3	77	Screening

[1]RI/FS = Remedial Investigation/Feasibility Study
[2]CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act

This site is located between Buildings 689 and 690 off L Street, as shown in Drawing 1. This warehouse may have stored or shipped hazardous materials in the past. Also, a battery recoupment area exists immediately within the area between the two buildings.

2.0 Study Area Investigation

2.1 Previous Investigations

There have been no previous investigations at this site.

2.2 Screening Site Sampling

2.2.1 Sampling Strategy

The sampling strategy was developed to evaluate whether releases have occurred to surface soils and subsurface soils. Two biased soil borings were used to evaluate whether potential contaminants exists at the site. Samples were collected at the surface (zero to 12 inches) and at approximately 5-foot, 10-foot, and 20-foot depths. Four additional surface soil samples were collected. A boring depth of 20 feet was selected because surface and shallow soil contamination is probable.

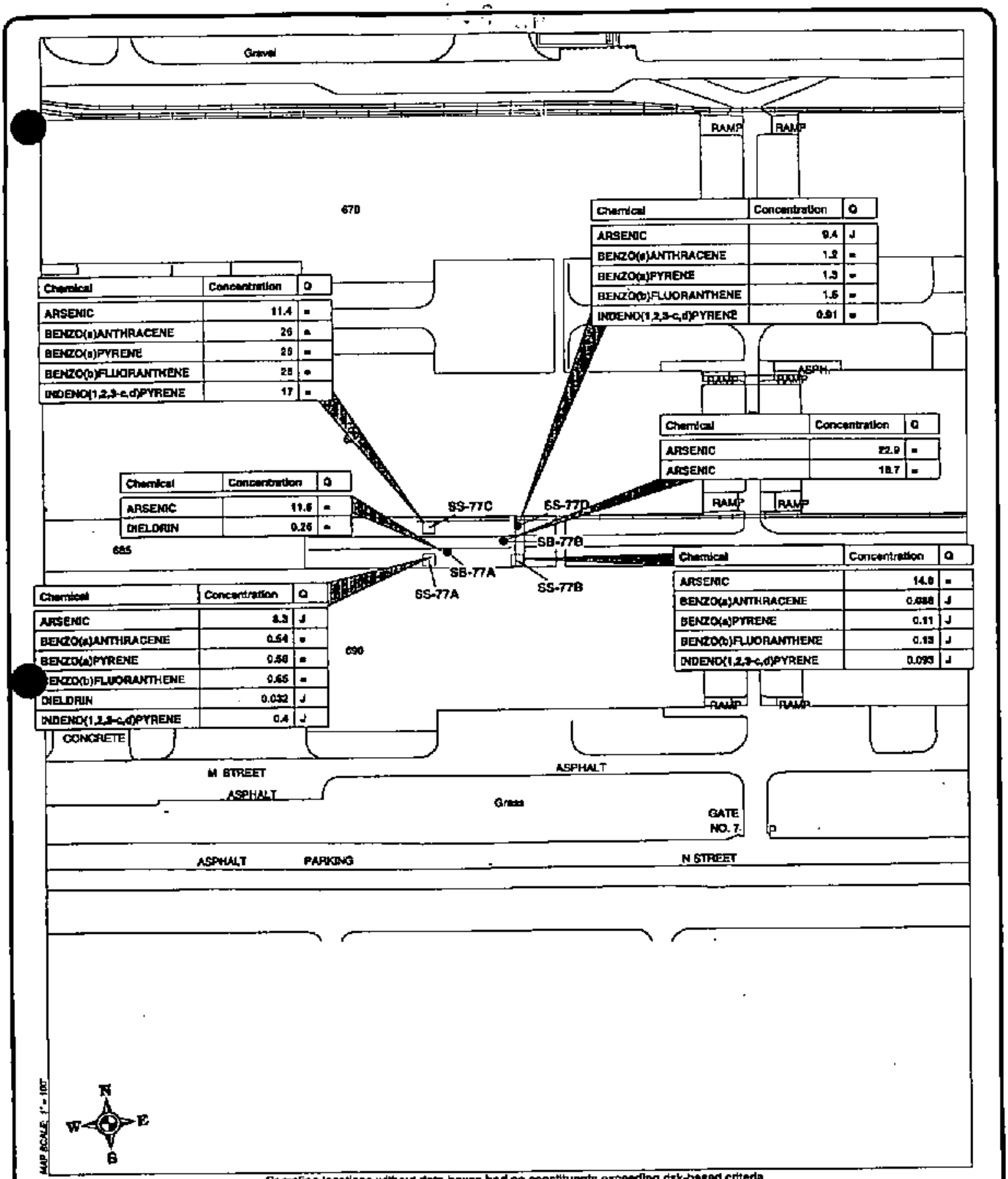
2.2.2 Sampling Procedures

Sections 2.2.2.1 and 2.2.2.2 describe the sampling procedures and laboratory analyses performed for surface and subsurface soil.

2.2.2.1 Surface Soil Sampling Procedures

With the approval of the Tennessee Department of Environment and Conservation (TDEC) and the U.S. Environmental Protection Agency (EPA), surface samples were collected from six locations (SS77A, SS77B, SS77C, SS77D, SB77A, and SB77B) at this site (shown in Figure 1). The following details the sample locations:

- Sample SS77A was taken 8 feet east of the southeastern side of Building 685 just 11 feet north of the loading dock and 1 foot south of the nearby storm drain.



Chemical	Concentration	Q
ARSENIC	11.4	=
BENZO(a)ANTHRACENE	26	=
BENZO(a)PYRENE	29	=
BENZO(b)FLUORANTHENE	28	=
INDENO(1,2,3-c,d)PYRENE	17	=

Chemical	Concentration	Q
ARSENIC	9.4	J
BENZO(a)ANTHRACENE	1.2	=
BENZO(a)PYRENE	1.3	=
BENZO(b)FLUORANTHENE	1.5	=
INDENO(1,2,3-c,d)PYRENE	0.91	=

Chemical	Concentration	Q
ARSENIC	22.9	=
ARSENIC	18.7	=

Chemical	Concentration	Q
ARSENIC	11.6	=
DIELDRIN	0.26	=

Chemical	Concentration	Q
ARSENIC	14.9	=
BENZO(a)ANTHRACENE	0.088	J
BENZO(a)PYRENE	0.11	J
BENZO(b)FLUORANTHENE	0.13	J
INDENO(1,2,3-c,d)PYRENE	0.093	J

Chemical	Concentration	Q
ARSENIC	8.3	J
BENZO(a)ANTHRACENE	0.54	=
BENZO(a)PYRENE	0.58	=
BENZO(b)FLUORANTHENE	0.65	=
DIELDRIN	0.032	J
INDENO(1,2,3-c,d)PYRENE	0.4	J

Sampling locations without data boxes had no constituents exceeding risk-based criteria

LEGEND

- Surface Soil Sampling Location (mg/kg)
- Soil Boring Sampling Location (mg/kg)

(Q) Qualifier Definitions
= - indicates unqualified detection
J - indicates estimated value above detection limit, but below reporting limit

Figure 1
Site 77, Unknown Waste near Bldgs 689 & 690
Constituents Exceeding Risk-Based Criteria
Defense Distribution Depot Memphis, TN

CH2MHILL

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- Sample SS77B was taken 13 feet north of the northeastern corner of Building 690 and 2 feet west of the nearby storm drain.
- Sample SS77C was taken 9 feet east of the northeastern side of Building 685 and 2 feet south of the nearby storm drain.
- Sample SS77D was taken north of Sample SS77B, 9 feet north of Asphalt Street just west of the walkway and 7 feet south of the nearby storm drain.

The locations of the surface soil samples associated with borings are discussed in Section 2.2.2.2.

The soil was removed from the ground using a standard stainless-steel hand auger. Volatile organic compound (VOC) samples were immediately collected from the top six inches of soil before being mixed. Part of the VOC sample was placed into a sealable plastic bag and allowed to equilibrate. The head space in the plastic bag was measured for VOCs using a hand-held photoionization detector (PID), and the results were used to determine which sample location was selected for Level 3 contaminant of potential concern (COPC) or target compound list/target analyte list (TCL/TAL) analyses. The soil was transferred into a stainless-steel bowl using stainless-steel trowels, mixed, and then placed into the appropriate sample jars.

All sampling tools were decontaminated before being used at each sample location, according to the procedures specified in the *Generic Quality Assurance Project Plan* (CH2M HILL, 1995) for the RI/FS currently being conducted at DDMT.

2.2.2.2 Subsurface Soil Sampling Procedures

Based on the recommendations from TDEC and EPA, subsurface soil samples were collected from two locations (SB77A and SB77B) at this site. At each location, samples were collected at three depths: zero to 1 foot, 4 to 5 feet, and 9 to 10 feet. The samples were collected using a 2-inch-diameter, stainless-steel push sampler. The following describes the sample locations:

- Sample SB77A was located north of Building 690 just 3 feet north of the railroad track parallel to Building 690 and 30 feet east of the eastern side of Building 685.
- Sample SB77B was located south of Building 689 just 9 feet east of Bay Door 7 and 15 feet south of the parallel railroad track to Building 689.

VOC soil samples were collected directly from the continuous sampler using stainless-steel spoons. Part of the VOC sample was placed into a sealable plastic bag and allowed to equilibrate. The head space in the plastic bag was measured for VOCs using a hand-held PID, and the results were used to determine which interval within each boring was selected for Level 3 COPC or TCL/TAL analyses. The remaining soil was placed into a stainless-steel bowl, mixed, and then transferred into the appropriate sample jars.

All sampling tools were decontaminated before being used at each sample location according to the procedures specified in the *Generic Quality Assurance Project Plan* (CH2M HILL, 1995).

2.2.3 Analytical Procedures

Four surface soil samples and six samples from the soil borings were sent to CH2M HILL's Analytical Services in Montgomery, Alabama for VOC, semivolatile organic compound (SVOC), pesticide, pH, metal, and TCL/TAL analyses. Samples received at the laboratory were

analyzed in accordance with the procedures outlined in the *Generic Quality Assurance Project Plan* (CH2M HILL, 1995).

A data quality evaluation (DQE) was performed to assess the effect of the overall analytical process on the usability of the data CH2M HILL collected in 1997. The DQE established that the detection of acetone and bis(2-ethylhexyl)phthalate can be attributed to field sampling and laboratory contamination rather than to environmental conditions at the site. Also, low concentrations of dioxins and furans can be attributed to background or instrument noise and are not indicative of environmental conditions. With the exception of the qualifications listed above, the DQE concluded that data can be used in the project decision-making process.

3.0 Interpretation of Sampling Results

Sections 3.1.1 through 3.1.4 present results of the Screening Sites Sampling Program for Screening Site 77. Data are presented by media for surface soil and subsurface soil and compared with appropriate screening criteria in three summary tables: Tables 77-A, 77-B, and 77-C. Data from the 1997 CH2M HILL investigation are presented along with historical data from the *Remedial Investigations at DDMT, Final Report* (Law Environmental, 1990). If a value from a sampling location exceeds one of the comparison criteria, that value and the comparison criterion are shown in **bold** on the summary table.

COPCs are parameters that exceed both background values and the screening criteria. Where concentrations exceed the selected background value, the concentration is compared with the observed range of background values as reviewed and established by the BRAC Cleanup Team (BCT).

3.1 Presentation of Results

3.1.1 Surface Soil

Results of the surface soil analyses with values above detection limits are shown in Tables 77-A and 77-B.

3.1.1.1 BCT Screening Criteria

Table 77-A summarizes constituents for which the BRAC Cleanup Team (BCT) has selected a screening criteria. Antimony, arsenic, and PAH compounds were found at concentrations that exceed the BCT screening criteria.

Antimony was found in Sample SS77B at 7.4 milligrams per kilogram (mg/kg), which is nearly identical to the background value of 7.0 mg/kg.

Arsenic was found in Sample SB77B at 22.9 mg/kg, which slightly exceeds the selected background value of 20 mg/kg. A duplicate analysis for Sample SB77B found 18.8 mg/kg, which is below the background value. The other five surface soil samples collected at this site were below the background level.

Polycyclic aromatic hydrocarbon (PAH) compounds, including benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluroanthene, and indo(1,2,3,c,d)pyrene, were found at concentrations exceeding the screening criteria. PAH compounds are found sitewide

at DDMT, possibly because of railroad operations, and will be addressed in an upcoming risk evaluation.

3.1.1.2 Other Screening Criteria

Table 77-B compares the remaining constituents with the soil ingestion screening criteria for both residential and industrial exposure scenarios. The only remaining constituents in surface soil that exceeded screening criteria were bis(2-ethylhexyl)phthlate and dieldrin.

Bis(2-ethylhexyl)phthlate was found in Sample SB77A at 250 mg/kg, which exceeds the residential risk-based concentration (RBC) of 46 mg/kg but not the industrial RBC of 410 mg/kg. This compound is a common laboratory contaminant as indicated by the DQE evaluations.

Dieldrin was found in Sample SB77A at 0.26 mg/kg, which exceeds the residential but not the industrial RBC. Dieldrin is found sitewide at DDMT, as well as in the background samples, and will be addressed as a sitewide issue in an upcoming evaluation.

Soil pH values were neutral to slightly alkaline. Significant spills of battery acid from the recoup area (if untreated) would have resulted in acidic soil pH values and this was not the case. Also, no significant metal levels were detected; thus, soil pH alteration does not appear to be a significant issue.

3.1.2 Subsurface Soils

Table 77-C summarizes subsurface soil sampling data. Lead was found in several samples at concentrations below the background value of 24 mg/kg. There are no COPCs for subsurface soils at this site.

3.2 Vertical and Lateral Extent

A total of five soil locations were sampled from biased locations to detect any possible contamination. Based on the limited data collected so far, it appears that there are no site-specific COPCs attributed to Screening Site 77 near Buildings 689 and 690. The relatively high PAHs detected appear to be related to the railroad tracks.

Results for Sample SS77C showed PAH concentrations of benzo(a)pyrene at 26 mg/kg, benzo(b)fluoranthene at 26 mg/kg, benzo(K)fluoranthene at 20 mg/kg, indeno(1,2,3-c,d)pyrene at 17 mg/kg, and pyrene at 56 mg/kg. These values are about two orders of magnitude above the levels observed in the other samples from this site away from the tracks. Sample SS77C was collected approximately two feet from a storm drain near the battery recoupment area. The PAHs could be from one of the several unrelated operations in the area, including railroad operations (tracks are less than ten feet away), from roof drainage that flows across the ground to the storm drain, or from a utility pole (creosote seepage).

3.3 Potential Migration Pathways

There are no site waste operations-related COPCs at this site. However, PAHs were detected in most of the soil samples, with high levels in one sample. These could potentially migrate through surface runoff. Migration to groundwater for these relative low solubility chemicals is

unimportant, also because of the depth to groundwater at greater than 40 feet. The following paragraphs provide a general discussion of potential migration pathways for the PAHs found at Screening Site 77.

This group (benzo(a)anthracene, benzo(a)pyrene, benzo(k)fluoranthene, benzo(b)fluoranthene, and indeno(1,2,3-c,d)pyrene) of related long-chain PAHs has similar chemical and physical characteristics and tends to migrate and behave similarly in the environment. Generally, these compounds have low vapor pressures, are only marginally soluble in water, and have a high affinity for soils. These compounds have been detected at concentrations above screening values for surface soils at DDMT. They would be expected to migrate as adsorbed components of the soils and potentially would be available to aquatic organisms in turbid surface water or to bottom feeders in areas with contaminated sediments. That none of these compounds was detected in sediments in drainage ditches leading off site indicates that this is not a major source of contaminant migration for these compounds at this site. These compounds do not bioaccumulate significantly because of their rapid metabolism and excretion by most aquatic organisms.

3.4 Additional Data Needs

Further risk evaluation is recommended to evaluate PAHs in surface soil. Also, the need for additional data to address PAHs will be evaluated as part of the sitewide PAH analysis.

4.0 Interpretation of Screening Criteria Comparisons

4.1 Methodology

The Preliminary Risk Evaluation (PRE) was performed in accordance with the *Guidance on Preliminary Risk Evaluations for the Purpose of Reaching a Finding of Suitability to Lease (FOSL)* (EPA Region IV, 1994). A discussion of the PRE methodology is provided as Appendix A to this document.

4.2 Screening Site 77 Risk

Carcinogenic risks and noncarcinogenic ratios for Screening Site 77 are presented in Table 4-41 of the draft PRE (USAESC, 1998). Detailed chemical-specific estimates are presented in Appendix A of the PRE.

The PRE carcinogenic risk rations were excessive for both industrial and residential scenarios due to the presence of PAHs in three of the four surface soil samples collected from the site.

The noncarcinogenic PRE ratio was less than a values of 1.0 for an industrial worker, but was above a value of 1.0 for a resident, primarily from naturally occurring antimony.

The PAHs at the site may require further characterization for human health impacts.5.0 Summary and Recommendations

5.1 Summary

PAH compounds, including benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluroanthene, and indo(1,2,3,c,d)pyrene, were found at concentrations exceeding the screening criteria. PAH compounds are found sitewide at DDMT, possibly because of railroad operations, and will be addressed in an upcoming risk evaluation.

Dieldrin was found in Sample SB77A at 0.26 mg/kg, which exceeds the residential but not the industrial RBC. Dieldrin is found sitewide at DDMT and will be addressed in an upcoming risk evaluation.

5.2 Recommendations

Because of the risks associated with PAHs in surface soils, a further risk evaluation is recommended. Dieldrin in surface soil also will be addressed as part of an upcoming sitewide risk evaluation.

Table 77-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 77
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
CH2M HILL	ACENAPHTHENE	SS77A	0.086	J	NA	470	Residential RBC	MG/KG
CH2M HILL	ACENAPHTHENE	SS77C	4.1	J	NA	470	Residential RBC	MG/KG
CH2M HILL	ACENAPHTHENE	SS77D	0.16	J	NA	470	Residential RBC	MG/KG
CH2M HILL	ALUMINUM	SS77D	10100	=	24000	24000	Bkgd	MG/KG
CH2M HILL	ANTHRACENE	SS77A	0.14	J	.096	2300	Residential RBC	MG/KG
CH2M HILL	ANTHRACENE	SS77C	6.7	J	.096	2300	Residential RBC	MG/KG
CH2M HILL	ANTHRACENE	SS77D	0.24	J	.096	2300	Residential RBC	MG/KG
CH2M HILL	ANTIMONY	SS77B	7.4	=	7	7	Bckg	MG/KG
CH2M HILL	ARSENIC	SB77A	11.5	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SB77B	18.7	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SB77B	22.9	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SS77A	8.3	J	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SS77B	14.8	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SS77C	11.4	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SS77D	9.4	J	20	20	Bckg	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	SS77A	0.54	=	.71	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	SS77B	0.086	J	.71	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	SS77C	26	=	.71	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	SS77D	1.2	=	.71	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(a)PYRENE	SS77A	0.56	=	.96	0.088	Residential RBC	MG/KG
CH2M HILL	BENZO(a)PYRENE	SS77B	0.11	J	.96	0.088	Residential RBC	MG/KG
CH2M HILL	BENZO(a)PYRENE	SS77C	26	=	.96	0.088	Residential RBC	MG/KG
CH2M HILL	BENZO(a)PYRENE	SS77D	1.3	=	.96	0.088	Residential RBC	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	SS77A	0.65	=	.78	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	SS77B	0.13	J	.78	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	SS77C	26	=	.78	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	SS77D	1.5	=	.78	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(g,h,i)PERYLENE	SS77A	0.45	=	.82	230	Residential RBC	MG/KG
CH2M HILL	BENZO(g,h,i)PERYLENE	SS77B	0.1	J	.82	230	Residential RBC	MG/KG
CH2M HILL	BENZO(g,h,i)PERYLENE	SS77C	18	=	.82	230	Residential RBC	MG/KG
CH2M HILL	BENZO(g,h,i)PERYLENE	SS77D	0.98	=	.82	230	Residential RBC	MG/KG
CH2M HILL	BENZO(k)FLUORANTHENE	SS77A	0.39	J	.78	8.8	Residential RBC	MG/KG

Table 77-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 77
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
CH2M HILL	BENZO(k)FLUORANTHENE	SS77B	0.11	J	.78	8.8	Residential RBC	MG/KG
CH2M HILL	BENZO(k)FLUORANTHENE	SS77C	20	=	.78	8.8	Residential RBC	MG/KG
CH2M HILL	BENZO(k)FLUORANTHENE	SS77D	0.96	=	.78	8.8	Residential RBC	MG/KG
CH2M HILL	BERYLLIUM	SS77A	0.32	J	1.1	1.1	Bckg	MG/KG
CH2M HILL	BERYLLIUM	SS77D	0.36	J	1.1	1.1	Bckg	MG/KG
CH2M HILL	CARBAZOLE	SS77A	0.12	J	.067	32	Residential RBC	MG/KG
CH2M HILL	CARBAZOLE	SS77C	4	J	.067	32	Residential RBC	MG/KG
CH2M HILL	CARBAZOLE	SS77D	0.2	J	.067	32	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB77A	19	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB77B	27.1	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB77B	37	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS77A	12.4	J	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS77B	24.6	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS77C	25.3	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS77D	12.5	J	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHRYSENE	SS77A	0.67	=	.94	88	Residential RBC	MG/KG
CH2M HILL	CHRYSENE	SS77B	0.12	J	.94	88	Residential RBC	MG/KG
CH2M HILL	CHRYSENE	SS77C	30	=	.94	88	Residential RBC	MG/KG
CH2M HILL	CHRYSENE	SS77D	1.5	=	.94	88	Residential RBC	MG/KG
CH2M HILL	FLUORANTHENE	SS77A	1.2	=	1.6	310	Residential RBC	MG/KG
CH2M HILL	FLUORANTHENE	SS77B	0.21	J	1.6	310	Residential RBC	MG/KG
CH2M HILL	FLUORANTHENE	SS77C	67	=	1.6	310	Residential RBC	MG/KG
CH2M HILL	FLUORANTHENE	SS77D	3	=	1.6	310	Residential RBC	MG/KG
CH2M HILL	FLUORENE	SS77A	0.061	J	NA	310	Residential RBC	MG/KG
CH2M HILL	FLUORENE	SS77C	2.6	J	NA	310	Residential RBC	MG/KG
CH2M HILL	FLUORENE	SS77D	0.082	J	NA	310	Residential RBC	MG/KG
CH2M HILL	INDENO(1,2,3-c,d)PYRENE	SS77A	0.4	J	.7	0.88	Residential RBC	MG/KG
CH2M HILL	INDENO(1,2,3-c,d)PYRENE	SS77B	0.093	J	.7	0.88	Residential RBC	MG/KG
CH2M HILL	INDENO(1,2,3-c,d)PYRENE	SS77C	17	=	.7	0.88	Residential RBC	MG/KG
CH2M HILL	INDENO(1,2,3-c,d)PYRENE	SS77D	0.91	=	.7	0.88	Residential RBC	MG/KG
CH2M HILL	IRON	SS77D	18300	=	37000	37000	Bckg	MG/KG
CH2M HILL	LEAD	SB77A	38.1	=	30	400	CERCLA	MG/KG

Table 77-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 77
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
CH2M HILL	LEAD	SB77B	20.9	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SB77B	26.9	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SS77A	14.2	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SS77B	32.8	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SS77C	71.3	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SS77D	12.4	=	30	400	CERCLA	MG/KG
CH2M HILL	MANGANESE	SS77D	552	=	1300	1300	Bckg	MG/KG
CH2M HILL	PHENANTHRENE	SS77A	0.72	=	.61	2300	Residential RBC	MG/KG
CH2M HILL	PHENANTHRENE	SS77B	0.1	J	.61	2300	Residential RBC	MG/KG
CH2M HILL	PHENANTHRENE	SS77C	36	=	.61	2300	Residential RBC	MG/KG
CH2M HILL	PHENANTHRENE	SS77D	1.3	=	.61	2300	Residential RBC	MG/KG
CH2M HILL	PYRENE	SS77A	1.3	=	1.5	230	Residential RBC	MG/KG
CH2M HILL	PYRENE	SS77B	0.2	J	1.5	230	Residential RBC	MG/KG
CH2M HILL	PYRENE	SS77C	56	=	1.5	230	Residential RBC	MG/KG
CH2M HILL	PYRENE	SS77D	3	=	1.5	230	Residential RBC	MG/KG
CH2M HILL	ZINC	SB77A	73.5	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SB77B	108	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SB77B	136	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SS77A	53.5	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SS77B	83.1	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SS77C	104	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SS77D	51.4	=	130	23000	Residential RBC	MG/KG

Notes:
1. Detected values are obtained from the *Draft Parcel 22 Report-Screening Sites Sampling Program for Defense Depot* Memphis, TN, CH2M HILL, 1997.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. Based on values selected by the BRAC Cleanup Team in the August 1997 BCT meeting minutes, Memphis, Tennessee.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
J - indicates estimated value above the detection limit but below the reporting limit.

Table 77-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 77
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
= - indicates unqualified detection								
BCT - BRAC Cleanup Team								

Table 77-B
Summary of Detected Compounds in Surface Soils
Compared to Non-BCT Screening Levels for Site 77
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	Risk-Based Concentrations Soil Ingestion[4]		Units
						Residential	Industrial	
CH2M HILL	ACETONE	SB77A	0.004	J	NA	780	20000	MG/KG
CH2M HILL	ALPHA-CHLORDANE	SS77A	0.024	J	.029	.49	4.4	MG/KG
CH2M HILL	ALPHA-CHLORDANE	SS77B	0.0027	J	.029	.49	4.4	MG/KG
CH2M HILL	BARIUM	SS77D	114	=	234	550	14000	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB77A	250	=	NA	46	410	MG/KG
CH2M HILL	CADMIUM	SS77A	0.45	J	1.4	3.9	100	MG/KG
CH2M HILL	CALCIUM	SS77D	2020	=	5840	NA	NA	MG/KG
CH2M HILL	COBALT	SS77D	8.8	=	18.3	470	12000	MG/KG
CH2M HILL	COPPER	SB77A	29	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SB77B	36.3	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SB77B	43.3	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SS77A	15.3	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SS77B	26.1	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SS77C	51.6	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SS77D	15.6	=	33	310	8200	MG/KG
CH2M HILL	DIELDRIN	SB77A	0.26	=	.086	.04	.36	MG/KG
CH2M HILL	DIELDRIN	SS77A	0.032	J	.086	.04	.36	MG/KG
CH2M HILL	GAMMA-CHLORDANE	SS77A	0.04	=	.026	.49	4.4	MG/KG
CH2M HILL	GAMMA-CHLORDANE	SS77B	0.0036	J	.026	.49	4.4	MG/KG
CH2M HILL	MAGNESIUM	SS77D	2290	=	4600	NA	NA	MG/KG
CH2M HILL	MERCURY	SS77C	0.14	=	.43	2.3	61	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SB77B	0.003	J	NA	85	760	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SB77B	0.002	J	NA	85	760	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SS77B	0.003	J	NA	85	760	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SS77C	0.003	J	NA	85	760	MG/KG
CH2M HILL	NICKEL	SB77A	14.4	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SB77B	39.3	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SB77B	51.1	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SS77A	17	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SS77B	26.8	=	30	160	4100	MG/KG

Table 77-B
Summary of Detected Compounds in Surface Soils
Compared to Non-BCT Screening Levels for Site 77
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	Risk-Based Concentrations Soil Ingestion[4]		Units
						Residential	Industrial	
CH2M HILL	NICKEL	SS77C	15.1	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SS77D	18.1	=	30	160	4100	MG/KG
CH2M HILL	p,p'-DDE	SB77A	0.077	=	.16	1.9	17	MG/KG
CH2M HILL	p,p'-DDE	SS77A	0.061	=	.16	1.9	17	MG/KG
CH2M HILL	p,p'-DDE	SS77D	0.013	J	.16	1.9	17	MG/KG
CH2M HILL	p,p'-DDT	SB77A	0.21	=	.074	1.9	17	MG/KG
CH2M HILL	p,p'-DDT	SB77B	0.0022	J	.074	1.9	17	MG/KG
CH2M HILL	p,p'-DDT	SS77A	0.26	=	.074	1.9	17	MG/KG
CH2M HILL	p,p'-DDT	SS77B	0.013	=	.074	1.9	17	MG/KG
CH2M HILL	p,p'-DDT	SS77D	0.029	=	.074	1.9	17	MG/KG
CH2M HILL	PENTACHLOROPHENOL	SS77D	0.32	=	NA	5.3	48	MG/KG
CH2M HILL	pH	SB77A	8.1	=	NA	NA	NA	PH
CH2M HILL	pH	SB77B	7.2	=	NA	NA	NA	PH
CH2M HILL	pH	SB77B	7.5	=	NA	NA	NA	PH
CH2M HILL	pH	SS77A	8.9	=	NA	NA	NA	PH
CH2M HILL	pH	SS77B	8.4	=	NA	NA	NA	PH
CH2M HILL	pH	SS77C	8.3	=	NA	NA	NA	PH
CH2M HILL	POTASSIUM	SS77D	939	=	1820	NA	NA	MG/KG
CH2M HILL	SODIUM	SS77D	192	J	NA	NA	NA	MG/KG
CH2M HILL	VANADIUM	SS77D	24.5	J	48.4	55	1400	MG/KG

Notes:
1. Detected values are obtained from the *Draft Parcel 22 Report-Screening Sites Sampling Program for Defense Depot Memphis, TN*, CH2M HILL, 1997.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. Risk-Based Concentrations are obtained from the *EPA Region III Risk-based Concentrations Table*, R.L. Smith, April, 1997.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
= - indicates unqualified detection.
J - indicates estimated value above the detection limit but below the reporting limit.

Table 77-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 77
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	ACETONE	SB77A	4 to 5	0.006	J	NA	16	MG/KG
CH2M HILL	ACETONE	SB77A	9.5 to 10	0.005	J	NA	16	MG/KG
CH2M HILL	ARSENIC	SB77A	4 to 5	17.9	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB77A	9.5 to 10	12.3	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB77B	4 to 5	12.6	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB77B	9 to 10	9	=	17	29	MG/KG
CH2M HILL	BENZYL BUTYL PHTHALATE	SB77B	9 to 10	0.077	J	NA	930	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB77B	4 to 5	0.082	J	NA	3600	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB77A	4 to 5	29.1	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB77A	9.5 to 10	27.9	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB77B	4 to 5	29.5	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB77B	9 to 10	33.7	=	26	38	MG/KG
CH2M HILL	COPPER	SB77A	4 to 5	33.1	=	33	NA	MG/KG
CH2M HILL	COPPER	SB77A	9.5 to 10	33.4	=	33	NA	MG/KG
CH2M HILL	COPPER	SB77B	4 to 5	29.1	=	33	NA	MG/KG
CH2M HILL	COPPER	SB77B	9 to 10	19.2	=	33	NA	MG/KG
CH2M HILL	LEAD	SB77A	4 to 5	21.3	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB77A	9.5 to 10	15.3	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB77B	4 to 5	15.7	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB77B	9 to 10	16.1	=	24	1.5	MG/KG
CH2M HILL	METHYL ETHYL KETONE (2-BUTANONE)	SB77A	4 to 5	0.004	J	NA	NA	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SB77B	4 to 5	0.002	J	NA	.02	MG/KG
CH2M HILL	NICKEL	SB77A	4 to 5	46.3	=	37	130	MG/KG
CH2M HILL	NICKEL	SB77A	9.5 to 10	37.9	=	37	130	MG/KG
CH2M HILL	NICKEL	SB77B	4 to 5	39.2	=	37	130	MG/KG
CH2M HILL	NICKEL	SB77B	9 to 10	29.2	=	37	130	MG/KG
CH2M HILL	pH	SB77A	4 to 5	6.3	=	NA	NA	PH
CH2M HILL	pH	SB77A	9.5 to 10	6.5	=	NA	NA	PH
CH2M HILL	pH	SB77B	4 to 5	6.2	=	NA	NA	PH
CH2M HILL	pH	SB77B	9 to 10	6.7	=	NA	NA	PH
CH2M HILL	ZINC	SB77A	4 to 5	121	=	110	12000	MG/KG

Table 77-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 77
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	ZINC	SB77A	9.5 to 10	91.2	=	110	12000	MG/KG
CH2M HILL	ZINC	SB77B	4 to 5	77.7	=	110	12000	MG/KG
CH2M HILL	ZINC	SB77B	9 to 10	63.5	=	110	12000	MG/KG

Notes:
1. Detected values are obtained from the *Draft Parcel 22 Report-Screening Sites Sampling Program for Defense Depot Memphis, TN*, CH2M HILL, 1997.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. RBC-GWP values are obtained from the *EPA Region III Risk-based Concentrations Table*, R. L. Smith, April, 1997.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
= - indicates unqualified detection
J - indicates estimated value above the detection limit but below the reporting limit.
RBC-GWP - Risk-Based Concentrations - Groundwater Protection

TAB

Parcel 23

Parcel 23

Screening Sites Sampling Program

for

Defense Distribution Depot Memphis, Tennessee

March 1998

Prepared for

U.S. Army Engineering and Support Center, Huntsville

Prepared by

CH2M HILL

2567 Fairlane Drive

Montgomery, Alabama 36116

137449.RR.ZZ

Parcel 23
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Parcel 23 is a 8,815-square-foot (ft^2) parcel in the southwestern portion of the Main Installation in Operable Unit (OU)-2 (shown in Figure 1). Parcel 23 is made up of Buildings 783, 787, 793, and 995; open storage area X01; and the adjacent railroad tracks.

The screening sites in this document have been identified by the Defense Distribution Depot Memphis, Tennessee (DDMT) through a review of existing documents, interviews with facility personnel, and knowledge of the facility's operations. Screening sites are locations at DDMT where there is a potential for materials to have been released to the environment from past operations. The screening sites in Parcel 23 include the following:

- Screening Site 82 – Flammables (Buildings 783 and 793)

Sites where there is a confirmed presence of contaminants from past operations are addressed in the Remedial Investigation Sampling Program. Other facilities have been addressed in the Base Realignment and Closure (BRAC) Sampling Program. Results of these programs are addressed in separate reports.

The purpose of the Screening Sites Sampling Program is to identify whether past activities at each site have resulted in releases from the site that would require further investigation. The intent is not to fully delineate the nature and extent of soil or groundwater contamination attributable to past operations, but to conduct technically based screening analyses sufficient to identify the likelihood of contamination.

The purpose of this letter report is to evaluate the results of the Screening Sites Sampling Program and sampling from previous investigations and to recommend No Further Action or further investigation at screening sites in this parcel. The remainder of this report presents the results of past investigations; Screening Sites Sampling Program strategy, procedures, and results; and recommendations for each site.

Surface soils, subsurface soils, surface water, and sediments were investigated as part of the Screening Sites Sampling Program. Surface soil samples (any sample whose lowest depth is two feet or less) were taken both as independent samples and as the upper interval of a soil boring profile. Thus, surface soil samples taken as part of a soil boring may have an "SB" designation and are initially discussed under Subsurface Soil Sampling Procedure (Section 2.2.2.2). However, the results from that upper interval are presented in the surface soils tables and discussions in Section 3.0.

Screening Site 82—Flammables (Buildings 783 and 793)

1.0 Introduction

The chart below presents the location and status information for this screening site.

Parcel	Building Number	RI/FS[1] OU	Site Number	CERCLA[2] Status
23	783 and 793	2	82	N/A

[1]RI/FS: Remedial Investigation/Feasibility Study
[2]CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act

Screening Site 82, consisting of Buildings 783 and 793, is situated at the southwestern intersection of K Street and 9th Street (shown in Figure 1). Buildings 783 and 793 (igloos), previously designated as storage areas for flammable items and ordnance material, are the location of the former DDMT recoupment facility. The interior floors of Buildings 783 and 793 (approximately 400 feet south of Building 783) are constructed of concrete and slope to the north and south walls. Along these walls are drains that lead to the exterior of the buildings (on the eastern side).

2.0 Study Area Investigation

2.1 Previous Investigations

No previous sampling data exist for this site. As a result, a biased sampling approach was selected to assess the presence of contamination. Because a wide range of materials was managed at the site, there is a significant potential for contamination. According to facility records, flammables, explosives, and dioxin-laden soils were stored in the igloos.

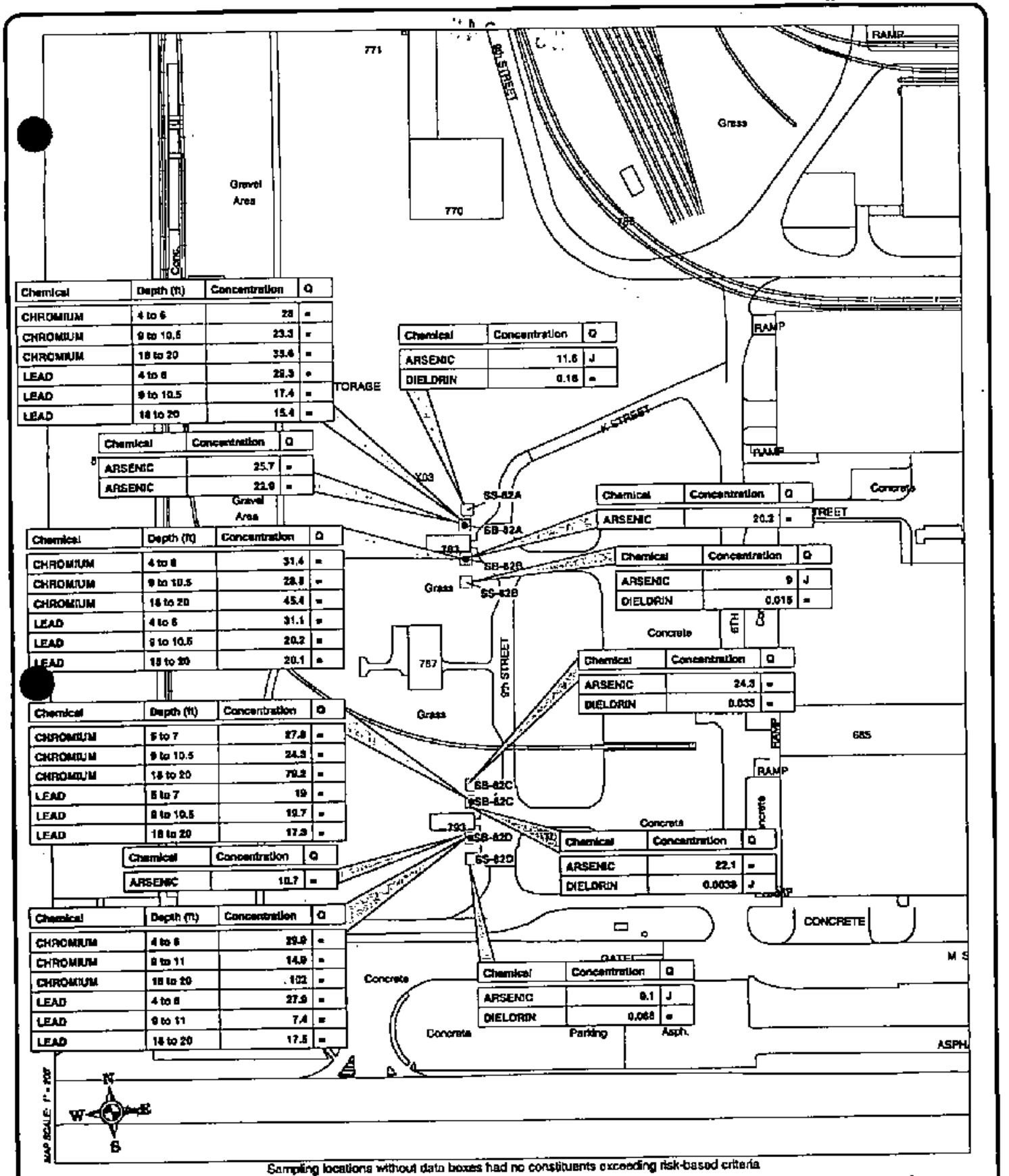
2.2 Screening Site Sampling Program

2.2.1 Sampling Strategy

The sampling strategy was developed to evaluate whether releases have occurred to surface and subsurface soils. Samples were analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), pesticides, metals, and dioxins. Four surface and 16 subsurface soil samples were sent to CH2M HILL's Analytical Services in Montgomery, Alabama for VOC, SVOC, pesticide, metals, dioxins, and target compound list/target analyte list (TCL/TAL) analyses in accordance with the Screening Sites Field Sampling Plan (CH2M HILL, 1995).

2.2.2 Sampling Procedures

Sections 2.2.2.1 through 2.2.3 describe the sampling procedures and laboratory analyses performed for Screening Site 82 surface and subsurface soils.



Sampling locations without data boxes had no constituents exceeding risk-based criteria

LEGEND

- Surface Soil Sampling Location (mg/kg)
- Soil Boring Sampling Location (mg/kg)

(Q) Qualifier Definitions

= - indicates unqualified detection

J - indicates estimated value above detection limit, but below reporting limit.

Figure 1

Site 82, Flammables Buildings 783 and 793

Constituents Exceeding Risk-Based Criteria

Defense Distribution Depot Memphis, TN

CH2MHILL

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2.2.2.1 Surface Soil Sampling Procedures

With the approval of the Tennessee Department of Environment and Conservation (TDEC) and the U.S. Environmental Protection Agency (EPA), surface soil samples were collected from eight locations (SS82A, SS82B, SS82C, SS82D, SB82A, SB82B, SB82C, and SB82D) at this site (shown in Figure 1). The sampling locations were located near the entrance to each building or "igloo." The following describes the location of each surface sample:

- Sample SS82A was located 22 feet north of the northeast corner of Building 783 and 16 feet west of 9th Street.
- Sample SS82B was located 16 feet east of the southeast corner of the concrete wall in front of Building 783 and 2 feet west of 9th Street.
- Sample SS82C was located 9 feet north of the northeast corner of Building 793 and 4 feet west of 9th Street.
- Sample SS82D was located south of Building 793 on the western edge of 9th Street at the intersection of M Street.

The location of the surface soil samples associated with borings are described in Section 2.2.2.2.

The soil was removed from the ground using a standard stainless-steel hand auger. VOC samples were immediately collected from the top six inches of soil before being mixed. Part of the VOC sample was placed into a sealable plastic bag and allowed to equilibrate. The head space in the sealable plastic bag was measured for VOCs using a hand-held photoionization detector (PID), and the results were used to determine which sample location was selected for Level 3 analyses. The samples were transferred to stainless-steel mixing bowls using stainless-steel trowels, mixed, and then placed into the appropriate sample jars.

2.2.2.2 Subsurface Soil Sampling Procedure2

With the approval of the TDEC and EPA, subsurface soil samples were collected from four locations (SB82A, SB82B, SB82C, and SB82D) at this site. At each location, samples were taken at four depths: zero to 1 foot, 4 to 6 feet (or 5 to 7 feet), 9 to 10.5 feet, and 18 to 20 feet. The following describes the location of each subsurface soil sample:

- Sample SB82A was located 3 feet south of Building 783, near the drain just 6 feet east of the concrete doorway located on the south of Building 783.
- Sample SB82B was also located 3 feet south of Building 783 but near another drain just 7 feet west of the concrete door.
- Sample SB82C was located 3 feet south of Building 793, near the drain just 7 feet east of the door pad located on the south of Building 793.
- Sample SB82D was located 2.5 feet south of Building 793, near another drain just 7 feet west of the door pad.

Each boring was sampled using a 2-inch-diameter stainless-steel push sampler. Samples were collected at an interval of 18 to 20 feet using a 1-inch-diameter stainless-steel push sampler.

VOC soil samples were collected directly from the continuous sampler using stainless-steel spoons. A portion of the VOC sample was placed into a sealable plastic bag and allowed to equilibrate. The head space in the plastic bag was measured for VOCs using a hand-held PID, and the results were used to determine which interval within each boring was selected for Level 3 analyses. The remaining soil was placed into a stainless-steel bowl, mixed, and then transferred into the appropriate sample jars.

All sampling tools were decontaminated before being used at each sample location. Decontamination procedures are followed according to the *Generic Quality Assurance Project Plan* (CH2M HILL, 1995) for the RI/FS currently being conducted at DDMT.

2.2.3 Analytical Procedures

Four surface and 16 subsurface soil samples were sent to CH2M HILL's Analytical Services in Montgomery, Alabama for VOC, SVOC, pesticide, metals, dioxins, and TCL/TAL analyses. Samples received at the laboratory were analyzed in accordance with the procedures outlined in the *Generic Quality Assurance Project Plan* (CH2M HILL, 1995).

A United States Corps of Engineers (COE) split sample was collected from the zero- to one-foot interval of Sample SB82A. This one subsurface soil sample was sent to COE's Atlanta, Georgia laboratory for analysis of VOCs, SVOCs, pesticides, metals, and dioxins.

A data quality evaluation (DQE) was performed to assess the effect of the overall analytical process on the usability of the data. The DQE established that the detection of acetone and bis(2-ethylhexyl)phthalate can be attributed to field sampling and laboratory contamination rather than environmental conditions at the site. Also, low concentrations of dioxins and furans can be attributed to background or instrument noise and are not indicative of environmental conditions. With exception to the qualifications listed above, the DQE concluded that data can be used in the project decision-making process.

3.0 Interpretation of Sampling Results

3.1 Presentation of Results

Sections 3.1.1 through 3.1.2 present the results of the Screening Sites Sampling Program for Screening Site 82. Data are presented separately for surface soil and subsurface soil. Data are compared with appropriate screening criteria in three summary tables: Tables 82-A, 82-B, and 82-C. Data from the 1997 CH2M HILL investigation are presented along with historical data from the *Remedial Investigations at DDMT, Final Report* (Law Environmental, 1990). If a value from a sampling location exceeds one of the comparison criteria, that value and the comparison criterion are shown in bold on the summary table.

Chemicals of potential concern (COPCs) are parameters that exceed both background values and the screening criteria. Where concentrations exceed the selected background value, the concentration is compared with the observed range of background values as reviewed and established by the BRAC Cleanup Team (BCT).

Four COPCs have been identified for Screening Site 82: arsenic, chromium, dieldrin, and lead. Dieldrin, which has been identified by the BCT as a sitewide COPC, will be evaluated on a sitewide basis.

3.1.1 Surface Soil

Results of the surface soil analyses with values above detection limits are shown in Tables 82-A and 82-B.

3.1.1.1 BCT Screening Criteria

Table 82-A summarizes constituents for which the BCT has selected a screening criteria. Arsenic was detected slightly above background in the following surface soil samples: SS82C (24.3 mg/kg), SB82A (22.9 mg/kg and 25.7 mg/kg; duplicate analysis), SB82B (20.2 mg/kg), and SB82C (22.1 mg/kg). The detected arsenic concentrations in surface soil at Screening Site 82 are considered to be typical of background values.

Dioxin was also detected in sample SS82A at a total dioxin equivalency factor (TCDD equivalent) of 0.00001 mg/kg. This concentration is essentially equal to the surface soil background concentration.

3.1.1.2 Other Screening Criteria

Chemicals without BCT criteria were compared against health-based, risk-based concentrations (RBC) values and background values where appropriate. Table 82-B summarizes these comparisons with screening criteria for both residential and industrial exposure scenarios. Dieldrin was the only compound detected at concentrations exceeding the screening level values. Low level dioxins and furan compounds were detected in surface soils, however the risks were evaluated via the total dioxin equivalency factor discussed in Section 3.1.1.1.

Dieldrin, a sitewide COPC, was detected in Sample SS82A at 0.18 mg/kg, which exceeds the residential soil ingestion screening level value of 0.04 mg/kg and the background value of 0.086 mg/kg.

3.1.2 Subsurface Soils

Table 82-C summarizes subsurface soil sampling data. Chromium and lead were found at concentrations exceeding the comparison criteria (background and groundwater protection criteria).

Chromium was detected in twelve samples at concentrations ranging from 23.3 mg/kg to 102 mg/kg. The three highest values were detected in the 18- to 20-foot depth of Samples SB82B (45.4 mg/kg), SB82C (79.2 mg/kg), and SB82D (102 mg/kg); these detections exceeded the background value of 26 mg/kg and the groundwater protection criteria value of 38 mg/kg. The surface soils from these soil borings do not indicate presence of chromium above background levels (see Table 82-A). Such elevated concentrations at about similar depths were detected elsewhere on DDMT. Thus elevated chromium in subsurface soilis likely due to natural variability with changing soil type.

Lead was detected in twelve samples at concentrations that are generally within the background range; lead was found at concentrations ranging from 7.4 mg/kg to 31.1 mg/kg.

The three highest values were detected at the 4- to 6-foot depth of Samples SB82B (31.1 mg/kg), SB82A (29.3 mg/kg), and SB82D (27.9 mg/kg). Although, these detections slightly exceeded the background value of 24 mg/kg, are thought to be similar to the background values.

3.2 Vertical and Lateral Extent

A total of eight locations were sampled from biased locations at Screening Site 82 to be able detect potential contamination at the site. Based on the data collected so far, there are no COPCs that persist uniformly across the media at Screening Site 82. The COPCs that were found (arsenic, chromium, dieldrin and lead) are at concentrations similar to background levels, with the exception of dieldrin concentrations.

High concentrations of chromium were detected at the 18- to 20-foot depth, exceeding background and groundwater protection criteria values. The increase in chromium concentration with depth could be due to changes in soil types that occur with depth.

Dieldrin, found in surface soil throughout the DDMT Main Installation, will be addressed on a facilitywide basis as part of an upcoming risk evaluation. Dieldrin was not detected in subsurface soils at Screening Site 82.

3.3 Potential Migration Pathways

This subsection provides a general discussion of potential migration pathways for COPCs found at Screening Site 82 soils.

Arsenic exists at Screening Site 82 in surface soils and subsurface soils at concentrations within screening level values. Arsenic's mobility and toxicity are tied to its complex geochemistry and its ability to readily form soluble complexes. Arsenic may also readily be adsorbed onto clays, oxides, or humic organic material and may migrate as suspended soil in surface water or as a sediment. Arsenic can exist in four common oxidation states, and these control its solubility. It readily transports through aquatic environments as a dissolved salt or as a complex with an organic compound. The mobility of arsenic is not important as the observed arsenic levelsare nearly identical to the background levels.

Chromium has been detected in surface soils, subsurface soils, surface water, and sediment at the DDMT in concentrations greater than the screening levels. Chromium occurs in two oxidation states: +3 and +6. The trivalent form readily combines with aqueous hydroxide to form insoluble chromium hydroxide and is of little risk. The hexavalent form is soluble and tends to stay in solution, unless some activated carbon material is present for it to sorb onto. The total chromium measured from subsurface soils 18-20 feet deep could potentially leach to groundwater at the site. Dissolved chromium is readily adsorbed onto sediments but may be bioaccumulated through aquatic organisms.

Dieldren exists at the DDMT in surface and subsurface soils. Since this compound is only minutely soluble in water, its most likely potential migration pathway at this site is via erosion as suspended soil particles in the surface water, where it potentially would be available to aquatic organisms. Dieldren in the subsurface soils should be relatively immobile and not impact groundwater quality.

Lead exists at concentrations greater than screening criteria in subsurface soils at Screening Site 82. Lead is moderately soluble and potentially can be leached from any of these forms of occurrence, reaching concentrations in aqueous solution in both groundwater and surface water that would be of concern to both human and ecological receptors. Additionally, lead in surface soils and sediment potentially may move as suspended particulate matter in surface waters and impact aquatic organisms.

3.4 Additional Data Needs

Groundwater data from the source area or downgradient should be evaluated for presence of chromium. No further characterization/investigations are suggested for Screening Site 82.

4.0 Preliminary Risk Evaluation

4.1 Methodology

The Preliminary Risk Evaluation (PRE) was performed in accordance with the *Guidance on Preliminary Risk Evaluations for the Purpose of Reaching a Finding of Suitability to Lease (FOSL)* (EPA Region IV, 1994). A discussion of the PRE methodology is provided as Appendix A to this document.

4.2 Screening Site 82 Risk

Direct exposure related risk to the surface media is evaluated through PRE. Carcinogenic risks and noncarcinogenic ratios for Screening Site 82 are presented in Table 4-43 of the draft PRE (USAESC, 1998). Detailed chemical-specific PRE estimates are presented in Appendix A of the PRE.

The PRE carcinogenic risk ratio for both industrial worker and residential receptor scenarios is above a one-in-a-million risk level due to the presence of arsenic ranging between 20.2 and 24.3 mg/kg, compared to the background level of 20 mg/kg.

The noncarcinogenic PRE ratio for a worker is well below a value of 1.0, but is above 1.0 for a resident due to the presence of low levels of naturally occurring metals.

Thus, there are no human health concerns at this site from site-related contamination. No further action is recommended at Screening Site 82.

5.0 Summary and Recommendations

5.1 Summary

There are slight risks associated with Screening Site 82 because of arsenic existing just above background levels. According to Table 5-2, the PRE results indicate that the carcinogenic PRE risk ratio is above 10^{-4} due to arsenic being just above background levels. The PRE results also indicate that residential noncarcinogenic risks are above one due to natural parameters.

5.2 Recommendations

It is recommended that No Further Action is required at Screening Site 82. Groundwater at the site may be sampled to determine absence of impacts to the groundwater at the site from elevated chromium in the subsurface soils.

Table 82-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 82
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
CH2M HILL	ALUMINUM	SS82B	9930	=	24000	24000	Bkgd	MG/KG
CH2M HILL	ALUMINUM	SS82D	9630	=	24000	24000	Bkgd	MG/KG
CH2M HILL	ARSENIC	SB82A	22.9	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SB82A	25.7	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SB82B	20.2	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SB82C	22.1	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SB82D	10.7	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SS82A	11.5	J	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SS82B	9	J	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SS82C	24.3	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SS82D	9.1	J	20	20	Bckg	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	SS82B	0.044	J	.71	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(a)PYRENE	SS82B	0.07	J	.96	0.088	Residential RBC	MG/KG
CH2M HILL	BENZO(a)PYRENE	SS82C	0.044	J	.96	0.088	Residential RBC	MG/KG
CH2M HILL	BENZO(a)PYRENE	SS82D	0.042	J	.96	0.088	Residential RBC	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	SS82B	0.059	J	.78	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(g,h,i)PERYLENE	SS82B	0.054	J	.82	230	Residential RBC	MG/KG
CH2M HILL	BENZO(k)FLUORANTHENE	SS82B	0.06	J	.78	8.8	Residential RBC	MG/KG
CH2M HILL	BENZO(k)FLUORANTHENE	SS82C	0.051	J	.78	8.8	Residential RBC	MG/KG
CH2M HILL	BERYLLIUM	SB82D	0.52	J	1.1	1.1	Bckg	MG/KG
CH2M HILL	BERYLLIUM	SS82A	0.41	J	1.1	1.1	Bckg	MG/KG
CH2M HILL	BERYLLIUM	SS82B	0.34	J	1.1	1.1	Bckg	MG/KG
CH2M HILL	BERYLLIUM	SS82D	0.24	J	1.1	1.1	Bckg	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB82A	25.8	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB82A	31	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB82B	26.3	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB82C	26.8	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB82D	14.2	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS82A	13.7	J	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS82B	11.3	J	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS82C	25.9	=	24.8	39	Residential RBC	MG/KG

Table 82-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 82
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
CH2M HILL	CHROMIUM, TOTAL	SS82D	19.4	J	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHRYSENE	SS82B	0.062	J	.94	88	Residential RBC	MG/KG
CH2M HILL	CHRYSENE	SS82C	0.048	J	.94	88	Residential RBC	MG/KG
CH2M HILL	CHRYSENE	SS82D	0.046	J	.94	88	Residential RBC	MG/KG
CH2M HILL	FLUORANTHENE	SS82B	0.066	J	1.6	310	Residential RBC	MG/KG
CH2M HILL	FLUORANTHENE	SS82C	0.052	J	1.6	310	Residential RBC	MG/KG
CH2M HILL	FLUORANTHENE	SS82D	0.04	J	1.6	310	Residential RBC	MG/KG
CH2M HILL	INDENO(1,2,3-c,d)PYRENE	SS82B	0.05	J	.7	0.88	Residential RBC	MG/KG
CH2M HILL	IRON	SS82B	17100	=	37000	37000	Bckg	MG/KG
CH2M HILL	IRON	SS82D	15500	=	37000	37000	Bckg	MG/KG
CH2M HILL	LEAD	SB82A	26.2	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SB82A	35.9	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SB82B	22.9	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SB82C	33.5	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SB82D	13.9	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SS82A	19.2	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SS82B	24.3	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SS82C	50.8	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SS82D	11.8	=	30	400	CERCLA	MG/KG
CH2M HILL	MANGANESE	SS82B	575	=	1300	1300	Bckg	MG/KG
CH2M HILL	MANGANESE	SS82D	481	=	1300	1300	Bckg	MG/KG
CH2M HILL	PYRENE	SS82B	0.068	J	1.5	230	Residential RBC	MG/KG
CH2M HILL	PYRENE	SS82C	0.044	J	1.5	230	Residential RBC	MG/KG
CH2M HILL	PYRENE	SS82D	0.043	J	1.5	230	Residential RBC	MG/KG
CH2M HILL	TCDD Equivalent	SB82A	2.779E-06	=	.000011	0.00001	Bckg	MG/KG
CH2M HILL	TCDD Equivalent	SB82B	3.247E-06	=	.000011	0.00001	Bckg	MG/KG
CH2M HILL	TCDD Equivalent	SB82C	3.848E-06	=	.000011	0.00001	Bckg	MG/KG
CH2M HILL	TCDD Equivalent	SB82D	6.647E-06	=	.000011	0.00001	Bckg	MG/KG
CH2M HILL	TCDD Equivalent	SB82D	7.972E-06	=	.000011	0.00001	Bckg	MG/KG
CH2M HILL	TCDD Equivalent	SS82A	0.00001026	=	.000011	0.00001	Bckg	MG/KG
CH2M HILL	ZINC	SB82A	234	=	130	23000	Residential RBC	MG/KG

Table 82-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 82
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
CH2M HILL	ZINC	SB82A	154	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SB82B	128	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SB82C	119	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SB82D	79.1	J	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SS82A	61.8	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SS82B	60.7	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SS82C	152	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SS82D	25.7	=	130	23000	Residential RBC	MG/KG

Notes:
1. Detected values are obtained from the *Draft Parcel 23 Report-Screening Sites Sampling Program for Defense Depot* Memphis, TN, CH2M HILL, 1997.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. Based on values selected by the BRAC Cleanup Team in the August 1997 BCT meeting minutes, Memphis, Tennessee.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
J - indicates estimated value above the detection limit but below the reporting limit.
= - indicates unqualified detection
BCT - BRAC Cleanup Team

Table 82-B
Summary of Detected Compounds in Surface Soils
Compared to Non-BCT Screening Levels for Site 82
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	Risk-Based Concentrations Soil Ingestion[4]		Units
						Residential	Industrial	
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZOFURAN	SB82A	0.000005	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZOFURAN	SB82B	0.000004	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZOFURAN	SB82C	0.000039	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZOFURAN	SB82D	0.000199	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZOFURAN	SB82D	0.00029	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZOFURAN	SS82A	0.000005	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,7,8,9-HEPTACHLORODIBENZOFURAN	SB82D	0.000002	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,7,8,9-HEPTACHLORODIBENZOFURAN	SB82D	0.000003	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,7,8-HEXACHLORODIBENZOFURAN	SB82D	0.000004	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,7,8-HEXACHLORODIBENZOFURAN	SB82D	0.000004	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,6,7,8-HEXACHLORODIBENZO-P-DIOXIN	SB82D	0.000008	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,6,7,8-HEXACHLORODIBENZOFURAN	SB82D	0.000001	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,6,7,8-HEXACHLORODIBENZOFURAN	SB82D	0.000002	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,7,8,9-HEXACHLORODIBENZO-P-DIOXIN	SB82D	0.000005	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,7,8,9-HEXACHLORODIBENZO-P-DIOXIN	SB82D	0.000005	J	NA	NA	NA	MG/KG
CH2M HILL	2,3,4,6,7,8-HEXACHLORODIBENZOFURAN	SB82D	0.000003	J	NA	NA	NA	MG/KG
CH2M HILL	BARIUM	SS82B	119	=	234	550	14000	MG/KG
CH2M HILL	BARIUM	SS82D	101	=	234	550	14000	MG/KG
CH2M HILL	BENZYL BUTYL PHTHALATE	SS82C	0.083	J	.645	1600	41000	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB82A	0.1	J	NA	46	410	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB82C	0.17	J	NA	46	410	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SS82A	0.92	=	NA	46	410	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SS82C	0.055	J	NA	46	410	MG/KG
CH2M HILL	BROMOMETHANE	SB82B	0.002	J	NA	11	290	MG/KG
CH2M HILL	CALCIUM	SS82B	1850	=	5840	NA	NA	MG/KG
CH2M HILL	CALCIUM	SS82D	1180	=	5840	NA	NA	MG/KG
CH2M HILL	COBALT	SS82B	7.6	=	18.3	470	12000	MG/KG
CH2M HILL	COBALT	SS82D	4.4	J	18.3	470	12000	MG/KG
CH2M HILL	COPPER	SB82A	35.8	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SB82A	36.8	=	33	310	8200	MG/KG

Table 82-B
Summary of Detected Compounds in Surface Soils
Compared to Non-BCT Screening Levels for Site 82
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	Risk-Based Concentrations Soil Ingestion[4]		Units
						Residential	Industrial	
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZOFURAN	SB82A	0.000005	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZOFURAN	SB82B	0.000004	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZOFURAN	SB82C	0.000039	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZOFURAN	SB82D	0.000199	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZOFURAN	SB82D	0.00029	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZOFURAN	SS82A	0.000005	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,7,8,9-HEPTACHLORODIBENZOFURAN	SB82D	0.000002	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,7,8,9-HEPTACHLORODIBENZOFURAN	SB82D	0.000003	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,7,8-HEXACHLORODIBENZOFURAN	SB82D	0.000004	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,7,8-HEXACHLORODIBENZOFURAN	SB82D	0.000004	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,6,7,8-HEXACHLORODIBENZO-P-DIOXIN	SB82D	0.000008	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,6,7,8-HEXACHLORODIBENZOFURAN	SB82D	0.000001	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,6,7,8-HEXACHLORODIBENZOFURAN	SB82D	0.000002	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,7,8,9-HEXACHLORODIBENZO-P-DIOXIN	SB82D	0.000005	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,7,8,9-HEXACHLORODIBENZO-P-DIOXIN	SB82D	0.000005	J	NA	NA	NA	MG/KG
CH2M HILL	2,3,4,6,7,8-HEXACHLORODIBENZOFURAN	SB82D	0.000003	J	NA	NA	NA	MG/KG
CH2M HILL	BARIUM	SS82B	119	=	234	550	14000	MG/KG
CH2M HILL	BARIUM	SS82D	101	=	234	550	14000	MG/KG
CH2M HILL	BENZYL BUTYL PHTHALATE	SS82C	0.083	J	.645	1600	41000	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB82A	0.1	J	NA	46	410	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB82C	0.17	J	NA	46	410	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SS82A	0.92	=	NA	46	410	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SS82C	0.055	J	NA	46	410	MG/KG
CH2M HILL	BROMOMETHANE	SB82B	0.002	J	NA	11	290	MG/KG
CH2M HILL	CALCIUM	SS82B	1850	=	5840	NA	NA	MG/KG
CH2M HILL	CALCIUM	SS82D	1180	=	5840	NA	NA	MG/KG
CH2M HILL	COBALT	SS82B	7.6	=	18.3	470	12000	MG/KG
CH2M HILL	COBALT	SS82D	4.4	J	18.3	470	12000	MG/KG
CH2M HILL	COPPER	SB82A	35.8	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SB82A	36.8	=	33	310	8200	MG/KG

Table 82-B
Summary of Detected Compounds in Surface Soils
Compared to Non-BCT Screening Levels for Site 82
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	Risk-Based Concentrations Soil Ingestion[4]		Units
						Residential	Industrial	
CH2M HILL	COPPER	SB82B	34.5	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SB82C	35.3	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SB82D	20.9	J	33	310	8200	MG/KG
CH2M HILL	COPPER	SS82A	17.3	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SS82B	14.7	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SS82C	33.2	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SS82D	9.9	=	33	310	8200	MG/KG
CH2M HILL	DI-n-BUTYL PHTHALATE	SB82A	0.18	J	NA	780	20000	MG/KG
CH2M HILL	DIELDRIN	SB82C	0.0038	J	.086	.04	.36	MG/KG
CH2M HILL	DIELDRIN	SS82A	0.18	=	.086	.04	.36	MG/KG
CH2M HILL	DIELDRIN	SS82B	0.015	=	.086	.04	.36	MG/KG
CH2M HILL	DIELDRIN	SS82C	0.033	=	.086	.04	.36	MG/KG
CH2M HILL	DIELDRIN	SS82D	0.066	=	.086	.04	.36	MG/KG
CH2M HILL	MAGNESIUM	SS82B	2070	=	4600	NA	NA	MG/KG
CH2M HILL	MAGNESIUM	SS82D	779	=	4600	NA	NA	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SS82C	0.003	J	NA	85	760	MG/KG
CH2M HILL	NICKEL	SB82A	39	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SB82A	39.2	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SB82B	40.8	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SB82C	35.2	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SB82D	23.2	J	30	160	4100	MG/KG
CH2M HILL	NICKEL	SS82A	17.9	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SS82B	16.5	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SS82C	35.5	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SS82D	9.5	=	30	160	4100	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SB82A	0.002772	J	.01	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SB82B	0.003241	J	.01	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SB82C	0.003767	J	.01	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SB82D	0.006168	=	.01	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SB82D	0.007275	=	.01	NA	NA	MG/KG

Table 82-B
Summary of Detected Componnds in Surface Soils
Compared to Non-BCT Screening Levels for Site 82
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	Risk-Based Concentrations Soil Ingestion[4]		Units
						Residential	Industrial	
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SS82A	0.01025	=	.01	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	SB82A	0.000007	J	.00039	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	SB82B	0.000006	J	.00039	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	SB82C	0.000081	J	.00039	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	SB82D	0.000479	J	.00039	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	SB82D	0.000697	J	.00039	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	SS82A	0.00001	J	.00039	NA	NA	MG/KG
CH2M HILL	POTASSIUM	SS82B	899	=	1820	NA	NA	MG/KG
CH2M HILL	POTASSIUM	SS82D	526	J	1820	NA	NA	MG/KG
CH2M HILL	SELENIUM	SB82A	1.3	=	.81	39	1000	MG/KG
CH2M HILL	SODIUM	SS82B	94.5	J	NA	NA	NA	MG/KG
CH2M HILL	SODIUM	SS82D	129	J	NA	NA	NA	MG/KG
CH2M HILL	VANADIUM	SS82B	22.3	J	48.4	55	1400	MG/KG
CH2M HILL	VANADIUM	SS82D	25.9	J	48.4	55	1400	MG/KG

Notes:
1. Detected values are obtained from the *Draft Parcel 23 Report-Screening Sites Sampling Program for Defense Depot Memphis, TN*, CH2M HILL, 1997.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. Risk-Based Concentrations are obtained from the *EPA Region III Risk-based Concentrations Table*, R.L. Smith, April, 1997.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
= - indicates unqualified detection.
J - indicates estimated value above the detection limit but below the reporting limit.

Table 82-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 82
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZOFURAN	SB82A	9 to 10.5	0.000003	J	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZOFURAN	SB82C	9 to 10.5	0.000003	J	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZOFURAN	SB82D	9 to 11	0.000002	J	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZOFURAN	SB82D	9 to 11	0.000002	J	NA	NA	MG/KG
CH2M HILL	1,2,3,6,7,8-HEXACHLORODIBENZOFURAN	SB82C	9 to 10.5	0.000001	J	NA	NA	MG/KG
CH2M HILL	1,2,3,7,8,9-HEXACHLORODIBENZO-P-DIOXIN	SB82C	9 to 10.5	0.000003	J	NA	NA	MG/KG
CH2M HILL	1,2,3,7,8,9-HEXACHLORODIBENZOFURAN	SB82C	9 to 10.5	0.000002	J	NA	NA	MG/KG
CH2M HILL	2,3,4,6,7,8-HEXACHLORODIBENZOFURAN	SB82C	9 to 10.5	0.000002	J	NA	NA	MG/KG
CH2M HILL	ACETONE	SB82A	18 to 20	0.004	J	NA	16	MG/KG
CH2M HILL	ACETONE	SB82A	9 to 10.5	0.004	J	NA	16	MG/KG
CH2M HILL	ARSENIC	SB82A	18 to 20	8.5	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB82A	4 to 6	23.5	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB82A	9 to 10.5	16.1	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB82B	18 to 20	12.5	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB82B	4 to 6	26.2	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB82B	9 to 10.5	19.3	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB82C	18 to 20	11.9	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB82C	5 to 7	19.5	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB82C	9 to 10.5	17.5	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB82D	18 to 20	15.1	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB82D	4 to 6	26.5	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB82D	9 to 11	7.9	=	17	29	MG/KG
CH2M HILL	BERYLLIUM	SB82D	18 to 20	1.3	=	1.2	63	MG/KG
CH2M HILL	BERYLLIUM	SB82D	9 to 11	0.39	J	1.2	63	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB82A	18 to 20	0.096	J	NA	3600	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB82A	4 to 6	0.066	J	NA	3600	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB82B	18 to 20	7.8	=	NA	3600	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB82B	4 to 6	0.054	J	NA	3600	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB82B	9 to 10.5	0.059	J	NA	3600	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB82C	18 to 20	2.1	=	NA	3600	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB82C	5 to 7	0.1	J	NA	3600	MG/KG

Table 82-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 82
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB82C	9 to 10.5	0.07	J	NA	3600	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB82D	18 to 20	0.092	J	NA	3600	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB82D	4 to 6	0.051	J	NA	3600	MG/KG
CH2M HILL	BROMOMETHANE	SB82C	5 to 7	0.003	J	NA	.2	MG/KG
CH2M HILL	BROMOMETHANE	SB82C	9 to 10.5	0.002	J	NA	.2	MG/KG
CH2M HILL	CADMIUM	SB82D	9 to 11	0.46	J	1.4	8	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB82A	18 to 20	35.6	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB82A	4 to 6	28	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB82A	9 to 10.5	23.3	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB82B	18 to 20	45.4	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB82B	4 to 6	31.4	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB82B	9 to 10.5	28.8	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB82C	18 to 20	79.2	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB82C	5 to 7	27.8	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB82C	9 to 10.5	24.3	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB82D	18 to 20	102	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB82D	4 to 6	29.9	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB82D	9 to 11	14.9	=	26	38	MG/KG
CH2M HILL	COPPER	SB82A	18 to 20	17.6	=	33	NA	MG/KG
CH2M HILL	COPPER	SB82A	4 to 6	35.1	=	33	NA	MG/KG
CH2M HILL	COPPER	SB82A	9 to 10.5	29.3	=	33	NA	MG/KG
CH2M HILL	COPPER	SB82B	18 to 20	19.6	=	33	NA	MG/KG
CH2M HILL	COPPER	SB82B	4 to 6	42.1	=	33	NA	MG/KG
CH2M HILL	COPPER	SB82B	9 to 10.5	30.7	=	33	NA	MG/KG
CH2M HILL	COPPER	SB82C	18 to 20	25.2	=	33	NA	MG/KG
CH2M HILL	COPPER	SB82C	5 to 7	36.8	=	33	NA	MG/KG
CH2M HILL	COPPER	SB82C	9 to 10.5	33.4	=	33	NA	MG/KG
CH2M HILL	COPPER	SB82D	18 to 20	21.9	=	33	NA	MG/KG
CH2M HILL	COPPER	SB82D	4 to 6	40.1	=	33	NA	MG/KG
CH2M HILL	COPPER	SB82D	9 to 11	16.6	J	33	NA	MG/KG
CH2M HILL	DI-n-BUTYL PHTHALATE	SB82A	18 to 20	0.078	J	NA	2300	MG/KG

Table 82-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 82
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	DI-n-BUTYL PHTHALATE	SB82D	18 to 20	0.15	J	NA	2300	MG/KG
CH2M HILL	LEAD	SB82A	18 to 20	15.4	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB82A	4 to 6	29.3	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB82A	9 to 10.5	17.4	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB82B	18 to 20	20.1	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB82B	4 to 6	31.1	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB82B	9 to 10.5	20.2	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB82C	18 to 20	17.3	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB82C	5 to 7	19	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB82C	9 to 10.5	19.7	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB82D	18 to 20	17.5	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB82D	4 to 6	27.9	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB82D	9 to 11	7.4	=	24	1.5	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SB82A	4 to 6	0.003	J	NA	.02	MG/KG
CH2M HILL	NICKEL	SB82A	18 to 20	23.9	=	37	130	MG/KG
CH2M HILL	NICKEL	SB82A	4 to 6	34.4	=	37	130	MG/KG
CH2M HILL	NICKEL	SB82A	9 to 10.5	34.4	=	37	130	MG/KG
CH2M HILL	NICKEL	SB82B	18 to 20	26.4	=	37	130	MG/KG
CH2M HILL	NICKEL	SB82B	4 to 6	40.4	=	37	130	MG/KG
CH2M HILL	NICKEL	SB82B	9 to 10.5	35.6	=	37	130	MG/KG
CH2M HILL	NICKEL	SB82C	18 to 20	30.6	=	37	130	MG/KG
CH2M HILL	NICKEL	SB82C	5 to 7	40.4	=	37	130	MG/KG
CH2M HILL	NICKEL	SB82C	9 to 10.5	41.8	=	37	130	MG/KG
CH2M HILL	NICKEL	SB82D	18 to 20	29.4	=	37	130	MG/KG
CH2M HILL	NICKEL	SB82D	4 to 6	40	=	37	130	MG/KG
CH2M HILL	NICKEL	SB82D	9 to 11	17	J	37	130	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SB82A	18 to 20	0.00005	J	.009	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SB82A	4 to 6	0.007869	=	.009	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SB82A	9 to 10.5	0.000129	J	.009	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SB82B	18 to 20	0.000184	J	.009	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SB82B	4 to 6	0.004909	J	.009	NA	MG/KG

Table 82-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 82
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SB82B	9 to 10.5	0.000348	J	.009	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SB82C	18 to 20	0.000127	J	.009	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SB82C	5 to 7	0.003195	J	.009	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SB82C	9 to 10.5	0.000026	J	.009	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SB82D	18 to 20	0.000136	J	.009	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SB82D	4 to 6	0.002834	J	.009	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SB82D	9 to 11	0.003038	J	.009	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SB82D	9 to 11	0.001266	J	.009	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	SB82A	4 to 6	0.000005	J	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	SB82A	9 to 10.5	0.000008	J	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	SB82B	9 to 10.5	0.000007	J	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	SB82C	5 to 7	0.000003	J	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	SB82C	9 to 10.5	0.000006	J	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	SB82D	4 to 6	0.000002	J	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	SB82D	9 to 11	0.000003	J	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	SB82D	9 to 11	0.000004	J	NA	NA	MG/KG
CH2M HILL	p,p'-DDT	SB82A	9 to 10.5	0.0079	=	.0072	32	MG/KG
CH2M HILL	SELENIUM	SB82D	4 to 6	1.6	=	.64	5	MG/KG
CH2M HILL	TCDD Equivalent	SB82A	18 to 20	0.00000005	=	.000006	NA	MG/KG
CH2M HILL	TCDD Equivalent	SB82A	4 to 6	7.874E-06	=	.000006	NA	MG/KG
CH2M HILL	TCDD Equivalent	SB82A	9 to 10.5	1.37E-07	=	.000006	NA	MG/KG
CH2M HILL	TCDD Equivalent	SB82B	18 to 20	1.84E-07	=	.000006	NA	MG/KG
CH2M HILL	TCDD Equivalent	SB82B	4 to 6	4.909E-06	=	.000006	NA	MG/KG
CH2M HILL	TCDD Equivalent	SB82B	9 to 10.5	3.55E-07	=	.000006	NA	MG/KG
CH2M HILL	TCDD Equivalent	SB82C	18 to 20	1.27E-07	=	.000006	NA	MG/KG
CH2M HILL	TCDD Equivalent	SB82C	5 to 7	3.198E-06	=	.000006	NA	MG/KG
CH2M HILL	TCDD Equivalent	SB82C	9 to 10.5	3.2E-08	=	.000006	NA	MG/KG
CH2M HILL	TCDD Equivalent	SB82D	18 to 20	1.36E-07	=	.000006	NA	MG/KG
CH2M HILL	TCDD Equivalent	SB82D	4 to 6	2.836E-06	=	.000006	NA	MG/KG
CH2M HILL	TCDD Equivalent	SB82D	9 to 11	3.041E-06	=	.000006	NA	MG/KG
CH2M HILL	TCDD Equivalent	SB82D	9 to 11	0.00000127	=	.000006	NA	MG/KG

Table 82-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 82
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	ZINC	SB82A	18 to 20	60.7	=	110	12000	MG/KG
CH2M HILL	ZINC	SB82A	4 to 6	112	=	110	12000	MG/KG
CH2M HILL	ZINC	SB82A	9 to 10.5	112	=	110	12000	MG/KG
CH2M HILL	ZINC	SB82B	18 to 20	59.2	=	110	12000	MG/KG
CH2M HILL	ZINC	SB82B	4 to 6	132	=	110	12000	MG/KG
CH2M HILL	ZINC	SB82B	9 to 10.5	101	=	110	12000	MG/KG
CH2M HILL	ZINC	SB82C	18 to 20	64.4	=	110	12000	MG/KG
CH2M HILL	ZINC	SB82C	5 to 7	128	=	110	12000	MG/KG
CH2M HILL	ZINC	SB82C	9 to 10.5	102	=	110	12000	MG/KG
CH2M HILL	ZINC	SB82D	18 to 20	61	=	110	12000	MG/KG
CH2M HILL	ZINC	SB82D	4 to 6	143	=	110	12000	MG/KG
CH2M HILL	ZINC	SB82D	9 to 11	47.5	J	110	12000	MG/KG

Notes:
1. Detected values are obtained from the *Draft Parcel 23 Report-Screening Sites Sampling Program for Defense Depot Memphis, TN*, CH2M HILL, 1997.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum* , CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. RBC-GWP values are obtained from the *EPA Region III Risk-based Concentrations Table* , R. L. Smith, April, 1997.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
= - indicates unqualified detection
J - indicates estimated value above the detection limit but below the reporting limit.
RBC-GWP - Risk-Based Concentrations - Groundwater Protection

TAB

Parcel 27

Parcel 27

Screening Sites Sampling Program

for

Defense Distribution Depot Memphis, Tennessee

March 1998

Prepared for

U.S. Army Engineering and Support Center, Huntsville

Prepared by

CH2M HILL

2567 Fairlane Drive

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Parcel 27
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Parcel 27 is a 3,126 square foot (ft^2) parcel in the southwestern portion of the Main Installation in Operable Unit (OU)-2 (shown in Figure 1). Parcel 27 is made up of Building 972.

The screening sites in this document have been identified by the Defense Distribution Depot Memphis, Tennessee (DDMT) through a review of existing documents, interviews with facility personnel, and knowledge of the facility's operations. Screening sites are locations at DDMT where there is a potential for materials to have been released to the environment from past operations. Screening sites in Parcel 27 include the following:

- Screening Site 84 – Building 972

Sites where there is a confirmed presence of contaminants from past operations are addressed in the Remedial Investigation Sampling Program. Other facilities have been addressed in the Base Realignment and Closure (BRAC) Sampling Program. Results of these programs are addressed in separate reports.

The purpose of the Screening Sites Sampling Program is to identify whether past activities at each site have resulted in releases from the site that would require further investigation. This preliminary sampling was intended to adequately detect potential soil or groundwater contamination attributable to past operations. If this screening analysis identifies a need for further contamination delineation, a nature and extent investigation will be recommended as part of this analysis.

The purpose of this letter report is to evaluate the results of the Screening Sites Sampling Program and sampling from previous investigations and to recommend No Further Action or further investigation at screening sites in this parcel. The remainder of this report presents the results of past investigations; Screening Sites Sampling Program strategy, procedures, and results; and recommendations for each site.

Surface soils, subsurface soils, surface water, and sediments were investigated as part of the Screening Sites Sampling Program. Surface soil samples (any sample whose lowest depth is two feet or less) were taken both as independent samples and as the upper interval of a soil boring profile. Thus, surface soil samples taken as part of a soil boring may have an "SB" designation and are initially discussed under Subsurface Soil Sampling Procedure (Section 2.2.2.2). However, the results from that upper interval are presented in the surface soils tables and discussions in Section 3.0.

Screening Site 84—Building 972

1.0 Introduction

The chart below presents the location and status information for this screening site.

Parcel	Building Number	RI/FS[1] OU	Site Number	CERCLA[2] Status
27	972	2	84	Screening

[1]RI/FS: Remedial Investigation/Feasibility Study
[2]CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act

Screening Site 84 (Building 972) is situated in the southwestern part of the Main Installation (shown on Figure 1). Building 972 is located between 25th and 21st Streets. In the past, the northernmost end of Building 972 has stored flammable substances, solvents, waste oil, and other raw materials.

No samples associated with this site have previously been collected. Six surface soil and three subsurface locations were selected at this site. The biased sample locations (Figure 1) were selected at probable pad runoff locations and near stormwater inlets because surface water flow may transport contaminants and cause them to accumulate in areas where surface water may pond. Surface and subsurface sampling locations are located just outside the large metal bay doors at the northernmost extreme end of the building.

2.0 Study Area Investigation

2.1 Previous Investigations

No previous investigations have been performed at Screening Site 84.

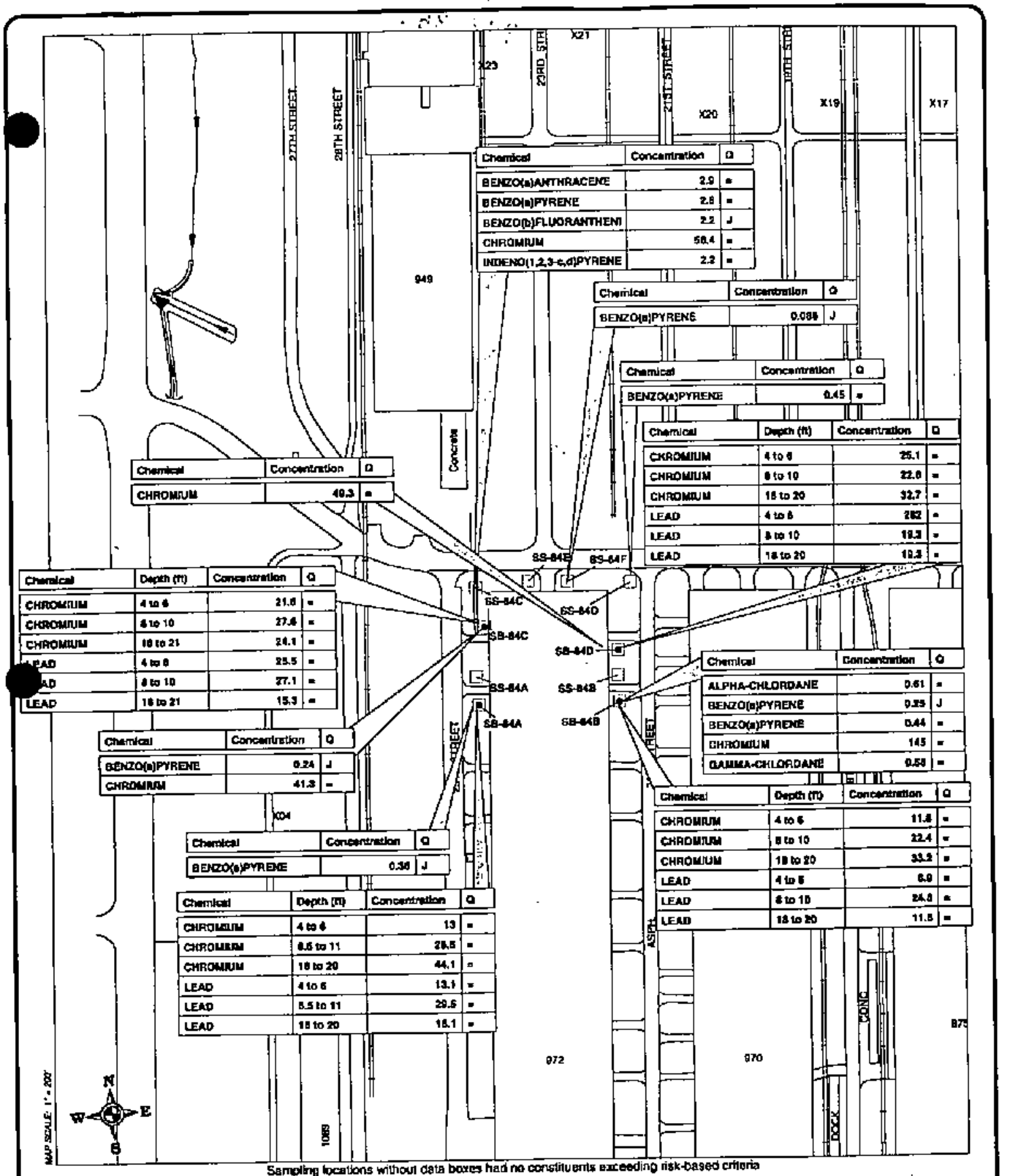
2.2 Screening Site Sampling Program

2.2.1 Sampling Strategy

The sampling strategy was developed to evaluate whether releases have occurred to surface soils and subsurface soils. Samples were analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), pesticides, and metals. At least one sample from each media for each site was analyzed for target compound list/target analyte list (TCL/TAL) constituents in accordance with the Screening Sites Field Sampling Plan (CH2M HILL, 1995).

2.2.2 Sampling Procedures

Sections 2.2.2.1 and 2.2.2.2 describe the sampling procedures and laboratory analyses performed for surface and subsurface soils at Screening Site 84.



Chemical	Concentration	Q
BENZO(a)ANTHRACENE	2.9	=
BENZO(a)PYRENE	2.8	=
BENZO(b)FLUORANTHENE	2.2	J
CHROMIUM	58.4	=
INDENO(1,2,3-c,d)PYRENE	2.2	=

Chemical	Concentration	Q
BENZO(a)PYRENE	0.089	J

Chemical	Concentration	Q
BENZO(a)PYRENE	0.45	=

Chemical	Concentration	Q
CHROMIUM	49.3	=

Chemical	Depth (ft)	Concentration	Q
CHROMIUM	4 to 8	25.1	=
CHROMIUM	8 to 10	22.6	=
CHROMIUM	18 to 20	32.7	=
LEAD	4 to 8	282	=
LEAD	8 to 10	19.3	=
LEAD	18 to 20	19.3	=

Chemical	Depth (ft)	Concentration	Q
CHROMIUM	4 to 8	21.6	=
CHROMIUM	8 to 10	27.6	=
CHROMIUM	18 to 21	24.1	=
LEAD	4 to 8	25.5	=
LEAD	8 to 10	27.1	=
LEAD	18 to 21	15.3	=

Chemical	Concentration	Q
ALPHA-CHLORDANE	0.61	=
BENZO(a)PYRENE	0.35	J
BENZO(a)PYRENE	0.44	=
CHROMIUM	145	=
GAMMA-CHLORDANE	0.58	=

Chemical	Concentration	Q
BENZO(a)PYRENE	0.24	J
CHROMIUM	41.3	=

Chemical	Concentration	Q
BENZO(a)PYRENE	0.36	J

Chemical	Depth (ft)	Concentration	Q
CHROMIUM	4 to 8	11.8	=
CHROMIUM	8 to 10	22.4	=
CHROMIUM	18 to 20	33.2	=
LEAD	4 to 8	8.0	=
LEAD	8 to 10	24.8	=
LEAD	18 to 20	11.5	=

Chemical	Depth (ft)	Concentration	Q
CHROMIUM	4 to 8	13	=
CHROMIUM	8.5 to 11	28.5	=
CHROMIUM	18 to 20	44.1	=
LEAD	4 to 8	13.1	=
LEAD	8.5 to 11	29.5	=
LEAD	18 to 20	18.1	=

Sampling locations without data boxes had no constituents exceeding risk-based criteria

LEGEND

Surface Soil Sampling Location (mg/kg)

Soil Boring Sampling Location (mg/kg)

(Q) Qualifier Definitions

= - indicates unqualified detection

J - indicates estimated value above detection limit, but below reporting limit.

Figure 1
Site 84, Building 972
Constituents Exceeding Risk-Based Criteria
Defense Distribution Depot Memphis, TN

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2.2.2.1 Surface Soil Sampling Procedures

With the approval of the Tennessee Department of Environment and Conservation (TDEC) and the U.S. Environmental Protection Agency (EPA), surface soil samples were collected from ten locations (SS84A, SS84B, SS84C, SS84D, SS84E, SS84F, SB84A, SB84B, SB84C, and SB84D) at this site (shown in Figure 1). The following describes the location of each surface soil sample:

- Sample SS84A was taken 9 feet west of Building 972 and 2 feet north of the concrete extending from the west side of Building 972.
- Sample SS84B was taken 8 feet east of Building 972 and 6 inches north of the north side of Bay Door 27.
- Sample SS84C was taken 9 feet west of the northwest corner of Building 972 just east of the railroad tracks.
- Sample SS84D was taken 18 feet east of the northeast corner of Building 972 and just south of a 2-foot by 4-foot drain.
- Samples SS84E and SS84F were taken 12 feet north of Building 972. Sample SS84E was taken 12 feet north of Building 972 on the west side of the driveway.
- Sample SS84F, also taken 12 feet north of Building 972, was taken on the east side of the driveway both just south of G Street.

The location of the surface soil samples associated with borings are described in Section 2.2.2.2.

The soil was removed from the ground using a standard, stainless-steel hand auger. VOC samples were immediately collected from the top six inches of soil before being mixed. Part of the VOC sample was placed into a sealable plastic bag and allowed to equilibrate. The head space in the plastic bag was measured for VOCs using a hand-held photoionization detector (PID), and the results were used to determine which sample location was selected for Level 3 analyses. The sample was transferred to a stainless-steel bowl using stainless-steel trowels, mixed, and then placed into the appropriate sample jars.

2.2.2.2 Subsurface Soil Sampling Procedures

With the approval of the TDEC and EPA, subsurface soil samples were collected from four locations (SB84A, SB84B, SB84C, and SB84D) at this site and used to evaluate possible contamination. At each location, samples were taken at four depths: zero to 1 foot, 4 to 6 feet, 8 to 10 feet and 18 to 20 feet. The following describes the sample locations:

- Sample SB84A was taken on the northwest side of Building 972, just 9 feet west of the building and 1 foot north of the concrete drive extending west of Building 972.
- Sample SB84B was taken on the northeast side of Building 972, just 4 feet east of the building and 1 foot south of the concrete drive extending east of Building 972.
- Sample SB84C was taken on the northwest side of Building 972, just 6 feet west of the building and 1 foot north of the concrete drive extending west of Building 972.
- Sample SB84D was taken on the northeast side of Building 972, just 4 feet east of the building and 1 foot north of the concrete drive extending east of Building 972.

Samples were collected using a 2-inch-diameter, stainless-steel push sampler. Samples were collected at an interval of 18 to 20 feet using a 1-inch-diameter, stainless-steel push sampler. VOC soil samples were collected directly from the continuous sampler using stainless-steel spoons. Part of the VOC sample was placed into a sealable plastic bag and allowed to equilibrate. The head space in the plastic bag was measured for VOCs using a hand-held PID, and the results were used to determine which interval within each boring was selected for Level 3 constituents of potential concern (COPCs) or TCL/TAL analyses. The remaining soil was placed into a stainless-steel bowl, mixed, and then transferred into the appropriate sample jars.

All sampling tools were decontaminated before being used at each sample location according to the procedures specified in the *Generic Quality Assurance Project Plan* (CH2M HILL, 1995) for the RI/FS currently being conducted at the DDMT.

2.2.3 Analytical Procedures

Six surface and 16 subsurface soil samples were sent to CH2M HILL's Analytical Services in Montgomery, Alabama for VOC, SVOC, pesticide, metal, and TCL/TAL analyses. Samples received at the laboratory were analyzed in accordance with the procedures outlined in the *Generic Quality Assurance Project Plan* (CH2M HILL, 1995).

A data quality evaluation (DQE) was performed to assess the effect of the overall analytical process on the usability of the data. The DQE established that the detection of acetone and bis(2-ethylhexyl)phthalate can be attributed to field sampling and laboratory contamination rather than environmental conditions at the site. Also, low concentrations of dioxins and furans can be attributed to background or instrument noise and are not indicative of environmental conditions. With exception to the qualifications listed above, the DQE concluded that data can be used in the project decision-making process.

3.0 Interpretation of Sampling Results

3.1 Presentation of Results

Sections 3.1.1 through 3.1.2 present the results of the Screening Sites Sampling Program for Screening Site 84. Data are presented by media for surface soil and by subsurface soil. Data are compared with appropriate screening criteria in three summary tables: Tables 84-A, 84-B, and 84-C. Data from the 1997 CH2M HILL investigation are presented along with historical data from the *Remedial Investigations at DDMT, Final Report* (Law Environmental, 1990). If a value from a sampling location exceeds one of the comparison criteria, that value and the comparison criterion are shown in bold on the summary table.

COPCs are parameters that exceed both background values and the screening criteria. Where concentrations exceed the selected background value, the concentration is compared with the observed range of background values as reviewed and established by the BRAC Cleanup Team (BCT).

Eight COPCs were identified for Screening Site 84: chromium, lead, alpha-chlordane, benzo(a)anthracene, benzo(a)pyrene, benzo(b)flouranthene, gamma-chlordane, and

indeno(1,2,3-c,d)pyrene. Benzo(a)pyrene, which has been identified by the BCT as a sitewide COPC, will be evaluated on a sitewide basis.

3.1.1 Surface Soil

Results of the surface soil analyses with values above detection limits are shown in Tables 84-A and 84-B.

3.1.1.1 BCT Screening Criteria

Table 84-A summarizes constituents for which the BCT has selected a screening criteria. Chromium, benzo(a)anthracene, benzo(a)pyrene, benzo(b)flouranthene, and indeno(1,2,3-c,d)pyrene were detected at concentrations exceeding the BCT criteria and background values.

Chromium concentrations were detected in 12 surface soil samples for Screening Site 84 ranging from 13.2 milligrams per kilogram (mg/kg) to 145 mg/kg. Four of the detected concentrations exceeded the BCT criteria value of 39 mg/kg and the background value of 24.8 mg/kg. These exceedances were detected in Samples SB84B, SB84C, SB84D, and SS84C at 145 mg/kg, 41.3 mg/kg, 49.3 mg/kg, and 56.4 mg/kg, respectively.

Benzo(a)anthracene was detected in nine surface soil samples with concentrations ranging from 0.046 mg/kg to 2.9 mg/kg. The highest concentration detected (2.9 mg/kg in Sample SS84C) was the only value that exceeded the BCT criteria value of 0.88 mg/kg and the background value of 0.71 mg/kg.

Benzo(a)pyrene was detected in eight surface soil samples with concentrations ranging from 0.2 mg/kg to 2.6 mg/kg. All eight concentrations detected exceeded the BCT criteria value of 0.088 mg/kg. However, only the highest value (detected in Sample SS84C at 2.6 mg/kg) exceeded the background value of 0.96 mg/kg.

Benzo(b)flouranthene was detected in nine surface soil samples with concentrations ranging from 0.09 mg/kg to 2.2 mg/kg. The highest concentration detected (2.2 mg/kg in Sample SS84C) was the only value that exceeded the BCT criteria value of 0.88 mg/kg and the background value of 0.78 mg/kg.

Indeno(1,2,3-c,d)pyrene was detected in eight surface soil samples with concentrations ranging from 0.054 mg/kg to 2.2 mg/kg. The highest concentration detected at 2.2 mg/kg in Sample SS84C exceeded the BCT criteria value of 0.88 mg/kg and the background value of 0.7 mg/kg.

Note that all the detected organic constituents are from a polycyclic aromatic hydrocarbons (PAH) group of compounds, which are found sitewide at DDMT because of railroad operations or asphalt paved areas. These detected PAHs will be addressed in an upcoming risk evaluation.

3.1.1.2 Other Screening Criteria

Table 84-B summarizes the remaining constituents compared with risk-based concentrations (RBCs) for both residential and industrial exposure scenarios. The chlorinated pesticides, alpha-chlordane and gamma-chlordane, were detected at concentrations exceeding the screening level values.

Alpha-chlordane was detected in eight of the ten surface soil samples at concentrations ranging from 0.01 mg/kg to 0.61 mg/kg. The highest concentration detected, 0.61 mg/kg at Sample

SB84B, exceeded the residential soil ingestion screening level value of 0.49 mg/kg and the background value of 0.029 mg/kg. An industrial worker-based RBC was not exceeded.

Gamma-chlordane was detected in eight surface soil samples at concentrations ranging from 0.0017 mg/kg to 0.58 mg/kg. The highest concentration detected, 0.58 mg/kg in Sample SB84B, exceeded the residential soil ingestion screening level value of 0.49 mg/kg and the background value of 0.026 mg/kg.

Both of these pesticides exist as mixtures in the environmental media and are expected to be from the past routine base applications. Only one sample had both alpha- and gamma-chlordane slightly above residential RBC but not industrial RBC.

3.1.2 Subsurface Soils

Table 84-C summarizes subsurface soil sampling data. Chromium and lead were found at concentrations exceeding the background and groundwater protection criteria values.

Chromium was detected in 12 surface soil samples at concentrations ranging from 11.8 mg/kg to 44.1 mg/kg. The highest concentration detected (44.1 mg/kg in Sample SB84A at 18 to 20 feet) exceeded the groundwater protection criteria value of 38 mg/kg and the background value of 26 mg/kg.

Lead was also detected in 12 subsurface soil samples at concentrations ranging from 11.8 mg/kg to 282 mg/kg. There were five detected values that exceed the groundwater protection criteria value of 1.5 mg/kg and the background value of 24 mg/kg. These values were found at Sample SB84A (29.5 mg/kg at 8.5 to10 feet), Sample SB84B (24.8 mg/kg at 8 to 10 feet), Sample SB84C (25.5 mg/kg at 4 to 6 feet), Sample SB84C (27.1 mg/kg at 8 to 10 feet) and Sample SB84D (282 mg/kg at 4 to 6 feet). The concentrations detected are considered to be within the background range with the exception of the highest concentration detected at 282 mg/kg in Sample SB84D. This highest detected lead could be from a lead particulate in the sample because its distribution within the sample boring is limited to the 8- to 10-foot sample and was not observed in the sample from below it (SB24D at 8 to 10 feet). Thus, migration to the soils underneath is not occurring at this time. Leaching to groundwater at depths greater than 60 feet has not been observed.

3.2 Vertical and Lateral Extent

A total of ten soil sampling locations were sampled to determine potential impacts to the soils around Screening Site 84.

Only two of the naturally occurring metals, chromium and lead, were observed in surface and subsurface soil. The PAHs benzo(a)anthracene, benzo(a)pyrene, benzo(b)flouranthene, indeno(1,2,3-c,d)pyrene and chlorinated pesticides alpha-chlordane and gamma-chlordane were only detected in surface soils.

Chromium concentrations detected in surface soil samples exceeded screening level values with the highest exceedance detected at Sample SB84B, located just east of the northeast side of Building 972. Other exceedances in the surface soil were detected at Sample SB84D, located just north of Sample SB84B, and Sample SB84C, located on the northwest side of Building 972.

Chromium concentrations detected in the subsurface soils were considered to be within the background value range.

Lead concentrations in the surface soils were below the BCT criteria value. However, lead concentrations in the subsurface soils exceeded the groundwater protection value (1.5 mg/kg) and the background value (24 mg/kg). The highest exceedance of 282 mg/kg was detected in Sample SB84D, located northeast of Building 972, at a depth of 4 to 6 feet. Sample SB84B, just south of Sample SB84D, did not detect lead concentrations much greater than background values. Lead concentrations in Samples SB84A and SB84C, both located on the northwest side of Building 972, only slightly exceeded the background value.

Although lead and chromium were elevated occasionally within the soil samples, they appear to be related to the industrial activities around Building 972 and/or the railroad tracks. These metal occurrences appear to be localized and are not extensive, based on the available data. There is no evidence of downward transport of these metals within the upper 20 feet of soil.

3.3 Potential Migration Pathways

The following paragraphs provide a general discussion of potential migration pathways for COPCs found at Screening Site 84.

Lead exists at concentrations greater than background or above screening criteria in surface and subsurface soils. Lead is moderately soluble and potentially can be leached from any of these forms of occurrence, reaching concentrations in aqueous solution in both groundwater and surface water that could be of concern to both human and ecological receptors. Additionally, lead in surface soils potentially may move as suspended particulate matter in surface waters and impact aquatic organisms. There is no indication for lead leaching to the groundwater at this site as soil samples from underneath the elevated lead detection areas were below background levels.

Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and indeno(1,2,3-c,d)pyrene, are part of a PAH group of compounds; these compounds have similar chemical and physical characteristics and tend to migrate and behave in the environment in a similar manner. Generally, these compounds have low vapor pressures, are only marginally soluble in water, and have a high affinity for soils. All of these compounds have been detected at concentrations above screening values for surface soils at DDMT. They would be expected to migrate as adsorbed components of the soils and would potentially be available to aquatic organisms in turbid surface water or to bottom feeders in areas with contaminated sediments. That these compounds were detected in sediments indicates there is not a major source of contaminant migration for these compounds at DDMT. These compounds do not bioaccumulate significantly due to their rapid metabolism and excretion by most aquatic organisms.

Chlordane, detected in surface soils at DDMT, is persistent, has a high affinity for soils, and is only marginally soluble in water. Sorption to soil particles and transport via surface water or wind is its primary potential migration mode. Chlordane potentially would be available to aquatic organisms if it were present as suspended sediment in turbid surface water or as a sediment in an area with bottom feeders, and it would bioaccumulate in that environment. However, since chlordane was not detected in either of these media during sampling activities at the DDMT, this is not believed to be an ongoing contaminant release mechanism at the site.

Chromium has been reported from surface and subsurface soils at the DDMT in concentrations greater than the screening levels. Chromium occurs in two oxidation states: +3 and +6. The trivalent form readily combines with aqueous hydroxide to form insoluble chromium hydroxide and is of little risk. The hexavalent form is soluble tends to stay in solution, unless some activated carbon material is present for it to sorb onto. Dissolved chromium is readily adsorbed onto sediments but may be bioaccumulated through aquatic organisms.

3.4 Additional Data Needs

No further characterization/investigations are suggested for this site.

4.0 Interpretation of Screening Criteria Comparisons

4.1 Methodology

The Preliminary Risk Evaluation (PRE) was performed in accordance with the *Guidance on Preliminary Risk Evaluations for the Purpose of Reaching a Finding of Suitability to Lease (FOSL)* (EPA Region IV, 1994). A discussion of the PRE methodology is provided as Appendix A to this document.

4.2 Screening Site 84 Risk

Carcinogenic risks and noncarcinogenic ratios for Screening Site 84 are presented in Table 4-48 of the draft PRE (USAESC, 1998), and detailed chemical-specific PRE estimates are presented in Appendix A of the PRE.

The PRE risk ratios were above a one-in-a-million risk level for both industrial worker and residential scenarios due to the low PAHs present in the surface soil at the site.

The noncarcinogenic PRE ratios were not exceeded for an industrial worker scenario but were exceeded for a residential scenario.

The PAHs may require further investigation for evaluation of the human health impact.

5.0 Summary and Recommendations

5.1 Summary

There are slight risks associated with Screening Site 84 because of the elevated concentration of PAHs in the surface soils. According to Table 5-2 of the PRE, the carcinogenic PRE risk ratio is above 10^{-6} for both industrial and residential scenarios due to the presence of PAHs. Residential noncarcinogenic risks were above one due to PAHs.

5.2 Recommendations

It is recommended that a risk assessment to evaluate PAHs be performed to confirm that No Further Action is required at Screening Site 84.

Table 84-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 84
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
CH2M HILL	ACENAPHTHENE	SB84A	0.071	J	NA	470	Residential RBC	MG/KG
CH2M HILL	ACENAPHTHENE	SB84B	0.063	J	NA	470	Residential RBC	MG/KG
CH2M HILL	ACENAPHTHENE	SS84C	0.82	=	NA	470	Residential RBC	MG/KG
CH2M HILL	ACENAPHTHENE	SS84D	0.047	J	NA	470	Residential RBC	MG/KG
CH2M HILL	ALUMINUM	SS84B	13600	=	24000	24000	Bkgd	MG/KG
CH2M HILL	ANTHRACENE	SB84A	0.17	J	.096	2300	Residential RBC	MG/KG
CH2M HILL	ANTHRACENE	SB84B	0.1	J	.096	2300	Residential RBC	MG/KG
CH2M HILL	ANTHRACENE	SB84B	0.093	J	.096	2300	Residential RBC	MG/KG
CH2M HILL	ANTHRACENE	SS84C	1.5	=	.096	2300	Residential RBC	MG/KG
CH2M HILL	ANTHRACENE	SS84D	0.1	J	.096	2300	Residential RBC	MG/KG
CH2M HILL	ANTIMONY	SS84A	3.1	J	7	7	Bckg	MG/KG
CH2M HILL	ANTIMONY	SS84B	1.9	J	7	7	Bckg	MG/KG
CH2M HILL	ARSENIC	SB84A	17.8	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SB84A	7.6	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SB84B	15.5	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SB84B	5.6	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SB84C	9.7	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SB84D	8.9	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SS84A	9.9	J	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SS84B	10.1	J	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SS84C	15.8	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SS84D	14.6	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SS84E	9.6	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SS84F	10.5	=	20	20	Bckg	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	SB84A	0.44	=	.71	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	SB84B	0.47	=	.71	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	SB84B	0.32	J	.71	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	SB84C	0.28	J	.71	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	SB84D	0.046	J	.71	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	SS84C	2.9	=	.71	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	SS84D	0.49	=	.71	0.88	Residential RBC	MG/KG

Table 84-A
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Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
CH2M HILL	BENZO(a)ANTHRACENE	SS84E	0.22	J	.71	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	SS84F	0.094	J	.71	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(a)PYRENE	SB84A	0.36	J	.96	0.088	Residential RBC	MG/KG
CH2M HILL	BENZO(a)PYRENE	SB84B	0.44	=	.96	0.088	Residential RBC	MG/KG
CH2M HILL	BENZO(a)PYRENE	SB84B	0.25	J	.96	0.088	Residential RBC	MG/KG
CH2M HILL	BENZO(a)PYRENE	SB84C	0.24	J	.96	0.088	Residential RBC	MG/KG
CH2M HILL	BENZO(a)PYRENE	SS84C	2.6	=	.96	0.088	Residential RBC	MG/KG
CH2M HILL	BENZO(a)PYRENE	SS84D	0.45	=	.96	0.088	Residential RBC	MG/KG
CH2M HILL	BENZO(a)PYRENE	SS84E	0.2	J	.96	0.088	Residential RBC	MG/KG
CH2M HILL	BENZO(a)PYRENE	SS84F	0.086	J	.96	0.088	Residential RBC	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	SB84A	0.42	=	.78	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	SB84B	0.43	=	.78	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	SB84B	0.32	J	.78	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	SB84C	0.25	J	.78	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	SB84D	0.043	J	.78	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	SS84C	2.2	J	.78	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	SS84D	0.5	=	.78	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	SS84E	0.26	J	.78	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	SS84F	0.09	J	.78	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(g,h,i)PERYLENE	SB84A	0.047	J	.82	230	Residential RBC	MG/KG
CH2M HILL	BENZO(g,h,i)PERYLENE	SB84B	0.31	J	.82	230	Residential RBC	MG/KG
CH2M HILL	BENZO(g,h,i)PERYLENE	SB84B	0.16	J	.82	230	Residential RBC	MG/KG
CH2M HILL	BENZO(g,h,i)PERYLENE	SB84C	0.18	J	.82	230	Residential RBC	MG/KG
CH2M HILL	BENZO(g,h,i)PERYLENE	SS84C	2	=	.82	230	Residential RBC	MG/KG
CH2M HILL	BENZO(g,h,i)PERYLENE	SS84D	0.3	J	.82	230	Residential RBC	MG/KG
CH2M HILL	BENZO(g,h,i)PERYLENE	SS84E	0.15	J	.82	230	Residential RBC	MG/KG
CH2M HILL	BENZO(g,h,i)PERYLENE	SS84F	0.052	J	.82	230	Residential RBC	MG/KG
CH2M HILL	BENZO(k)FLUORANTHENE	SB84A	0.38	J	.78	8.8	Residential RBC	MG/KG
CH2M HILL	BENZO(k)FLUORANTHENE	SB84B	0.39	J	.78	8.8	Residential RBC	MG/KG
CH2M HILL	BENZO(k)FLUORANTHENE	SB84B	0.27	J	.78	8.8	Residential RBC	MG/KG
CH2M HILL	BENZO(k)FLUORANTHENE	SB84C	0.26	J	.78	8.8	Residential RBC	MG/KG

Table 84-A
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Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
CH2M HILL	BENZO(k)FLUORANTHENE	SS84C	2.7	=	.78	8.8	Residential RBC	MG/KG
CH2M HILL	BENZO(k)FLUORANTHENE	SS84D	0.44	=	.78	8.8	Residential RBC	MG/KG
CH2M HILL	BENZO(k)FLUORANTHENE	SS84E	0.21	J	.78	8.8	Residential RBC	MG/KG
CH2M HILL	BENZO(k)FLUORANTHENE	SS84F	0.098	J	.78	8.8	Residential RBC	MG/KG
CH2M HILL	BERYLLIUM	SS84A	0.45	J	1.1	1.1	Bckg	MG/KG
CH2M HILL	BERYLLIUM	SS84B	0.4	J	1.1	1.1	Bckg	MG/KG
CH2M HILL	CARBAZOLE	SB84A	0.16	J	.067	32	Residential RBC	MG/KG
CH2M HILL	CARBAZOLE	SB84B	0.08	J	.067	32	Residential RBC	MG/KG
CH2M HILL	CARBAZOLE	SB84B	0.096	J	.067	32	Residential RBC	MG/KG
CH2M HILL	CARBAZOLE	SS84C	1.1	=	.067	32	Residential RBC	MG/KG
CH2M HILL	CARBAZOLE	SS84D	0.11	J	.067	32	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB84A	25.5	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB84A	12.9	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB84B	145	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB84B	17.4	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB84C	41.3	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB84D	49.3	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS84A	14.5	J	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS84B	13.2	J	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS84C	56.4	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS84D	24.5	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS84E	28.9	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS84F	37.4	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHRYSENE	SB84A	0.62	=	.94	88	Residential RBC	MG/KG
CH2M HILL	CHRYSENE	SB84B	0.57	=	.94	88	Residential RBC	MG/KG
CH2M HILL	CHRYSENE	SB84B	0.39	J	.94	88	Residential RBC	MG/KG
CH2M HILL	CHRYSENE	SB84C	0.4	J	.94	88	Residential RBC	MG/KG
CH2M HILL	CHRYSENE	SB84D	0.052	J	.94	88	Residential RBC	MG/KG
CH2M HILL	CHRYSENE	SS84C	3.4	=	.94	88	Residential RBC	MG/KG
CH2M HILL	CHRYSENE	SS84D	0.62	=	.94	88	Residential RBC	MG/KG
CH2M HILL	CHRYSENE	SS84E	0.29	J	.94	88	Residential RBC	MG/KG

Table 84-A
Summary of Detected Compounds in Surface Soils
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Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
CH2M HILL	CHRYSENE	SS84F	0.12	J	.94	88	Residential RBC	MG/KG
CH2M HILL	FLUORANTHENE	SB84A	1.1	=	1.6	310	Residential RBC	MG/KG
CH2M HILL	FLUORANTHENE	SB84B	1	=	1.6	310	Residential RBC	MG/KG
CH2M HILL	FLUORANTHENE	SB84B	0.68	=	1.6	310	Residential RBC	MG/KG
CH2M HILL	FLUORANTHENE	SB84C	0.71	=	1.6	310	Residential RBC	MG/KG
CH2M HILL	FLUORANTHENE	SB84D	0.099	J	1.6	310	Residential RBC	MG/KG
CH2M HILL	FLUORANTHENE	SS84A	0.056	J	1.6	310	Residential RBC	MG/KG
CH2M HILL	FLUORANTHENE	SS84C	8.2	=	1.6	310	Residential RBC	MG/KG
CH2M HILL	FLUORANTHENE	SS84D	1	=	1.6	310	Residential RBC	MG/KG
CH2M HILL	FLUORANTHENE	SS84E	0.4	=	1.6	310	Residential RBC	MG/KG
CH2M HILL	FLUORANTHENE	SS84F	0.19	J	1.6	310	Residential RBC	MG/KG
CH2M HILL	FLUORENE	SB84A	0.079	J	NA	310	Residential RBC	MG/KG
CH2M HILL	FLUORENE	SB84B	0.056	J	NA	310	Residential RBC	MG/KG
CH2M HILL	FLUORENE	SS84C	0.56	=	NA	310	Residential RBC	MG/KG
CH2M HILL	FLUORENE	SS84D	0.041	J	NA	310	Residential RBC	MG/KG
CH2M HILL	INDENO(1,2,3-c,d)PYRENE	SB84A	0.31	J	.7	0.88	Residential RBC	MG/KG
CH2M HILL	INDENO(1,2,3-c,d)PYRENE	SB84B	0.27	J	.7	0.88	Residential RBC	MG/KG
CH2M HILL	INDENO(1,2,3-c,d)PYRENE	SB84B	0.16	J	.7	0.88	Residential RBC	MG/KG
CH2M HILL	INDENO(1,2,3-c,d)PYRENE	SB84C	0.16	J	.7	0.88	Residential RBC	MG/KG
CH2M HILL	INDENO(1,2,3-c,d)PYRENE	SS84C	2.2	=	.7	0.88	Residential RBC	MG/KG
CH2M HILL	INDENO(1,2,3-c,d)PYRENE	SS84D	0.32	J	.7	0.88	Residential RBC	MG/KG
CH2M HILL	INDENO(1,2,3-c,d)PYRENE	SS84E	0.14	J	.7	0.88	Residential RBC	MG/KG
CH2M HILL	INDENO(1,2,3-c,d)PYRENE	SS84F	0.054	J	.7	0.88	Residential RBC	MG/KG
CH2M HILL	IRON	SS84B	20800	=	37000	37000	Bckg	MG/KG
CH2M HILL	LEAD	SB84A	21.5	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SB84A	15.1	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SB84B	72.8	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SB84B	25.6	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SB84C	104	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SB84D	81	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SS84A	12.5	=	30	400	CERCLA	MG/KG

Table 84-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 84
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
CH2M HILL	LEAD	SS84B	12	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SS84C	45.5	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SS84D	26.7	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SS84E	60.8	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SS84F	31	=	30	400	CERCLA	MG/KG
CH2M HILL	MANGANESE	SS84B	634	=	1300	1300	Bckg	MG/KG
CH2M HILL	PHENANTHRENE	SB84A	0.98	=	.61	2300	Residential RBC	MG/KG
CH2M HILL	PHENANTHRENE	SB84B	0.52	=	.61	2300	Residential RBC	MG/KG
CH2M HILL	PHENANTHRENE	SB84B	0.51	=	.61	2300	Residential RBC	MG/KG
CH2M HILL	PHENANTHRENE	SB84C	0.42	=	.61	2300	Residential RBC	MG/KG
CH2M HILL	PHENANTHRENE	SB84D	0.051	J	.61	2300	Residential RBC	MG/KG
CH2M HILL	PHENANTHRENE	SS84C	5.1	=	.61	2300	Residential RBC	MG/KG
CH2M HILL	PHENANTHRENE	SS84D	0.62	=	.61	2300	Residential RBC	MG/KG
CH2M HILL	PHENANTHRENE	SS84E	0.19	J	.61	2300	Residential RBC	MG/KG
CH2M HILL	PHENANTHRENE	SS84F	0.14	J	.61	2300	Residential RBC	MG/KG
CH2M HILL	PYRENE	SB84A	1	=	1.5	230	Residential RBC	MG/KG
CH2M HILL	PYRENE	SB84B	0.82	=	1.5	230	Residential RBC	MG/KG
CH2M HILL	PYRENE	SB84B	0.63	=	1.5	230	Residential RBC	MG/KG
CH2M HILL	PYRENE	SB84C	0.66	J	1.5	230	Residential RBC	MG/KG
CH2M HILL	PYRENE	SB84D	0.094	J	1.5	230	Residential RBC	MG/KG
CH2M HILL	PYRENE	SS84A	0.048	J	1.5	230	Residential RBC	MG/KG
CH2M HILL	PYRENE	SS84C	5.8	=	1.5	230	Residential RBC	MG/KG
CH2M HILL	PYRENE	SS84D	0.68	=	1.5	230	Residential RBC	MG/KG
CH2M HILL	PYRENE	SS84E	0.31	J	1.5	230	Residential RBC	MG/KG
CH2M HILL	PYRENE	SS84F	0.13	J	1.5	230	Residential RBC	MG/KG
CH2M HILL	ZINC	SB84A	108	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SB84A	67.4	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SB84B	95.7	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SB84B	130	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SB84C	115	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SB84D	56.9	=	130	23000	Residential RBC	MG/KG

Table 84-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 84
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
CH2M HILL	ZINC	SS84A	59.7	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SS84B	57.1	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SS84C	159	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SS84D	107	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SS84E	65.5	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SS84F	67.8	=	130	23000	Residential RBC	MG/KG

Notes:
1. Detected values are obtained from the *Draft Parcel 27 Report-Screening Sites Sampling Program for Defense Depot* Memphis, TN, CH2M HILL, 1997.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum* , CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. Based on values selected by the BRAC Cleanup Team in the August 1997 BCT meeting minutes, Memphis, Tennessee.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
J - indicates estimated value above the detection limit but below the reporting limit.
= - indicates unqualified detection
BCT - BRAC Cleanup Team

Table 84-B
Summary of Detected Compounds in Surface Soils
Compared to Non-BCT Screening Levels for Site 84
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	Risk-Based Concentrations Soil Ingestion[4]		Units
						Residential	Industrial	
CH2M HILL	ACETONE	SB84A	0.072	=	NA	780	20000	MG/KG
CH2M HILL	ACETONE	SB84A	0.024	=	NA	780	20000	MG/KG
CH2M HILL	ACETONE	SB84B	0.013	=	NA	780	20000	MG/KG
CH2M HILL	ACETONE	SB84B	0.14	=	NA	780	20000	MG/KG
CH2M HILL	ACETONE	SB84C	0.031	=	NA	780	20000	MG/KG
CH2M HILL	ACETONE	SB84D	0.007	J	NA	780	20000	MG/KG
CH2M HILL	ACETONE	SS84C	0.005	J	NA	780	20000	MG/KG
CH2M HILL	ACETONE	SS84D	0.006	J	NA	780	20000	MG/KG
CH2M HILL	ACETONE	SS84F	0.005	J	NA	780	20000	MG/KG
CH2M HILL	ALPHA-CHLORDANE	SB84B	0.61	=	.029	.49	4.4	MG/KG
CH2M HILL	ALPHA-CHLORDANE	SB84B	0.32	=	.029	.49	4.4	MG/KG
CH2M HILL	ALPHA-CHLORDANE	SB84D	0.072	=	.029	.49	4.4	MG/KG
CH2M HILL	ALPHA-CHLORDANE	SS84B	0.0014	J	.029	.49	4.4	MG/KG
CH2M HILL	ALPHA-CHLORDANE	SS84C	0.072	=	.029	.49	4.4	MG/KG
CH2M HILL	ALPHA-CHLORDANE	SS84D	0.017	=	.029	.49	4.4	MG/KG
CH2M HILL	ALPHA-CHLORDANE	SS84E	0.011	=	.029	.49	4.4	MG/KG
CH2M HILL	ALPHA-CHLORDANE	SS84F	0.01	=	.029	.49	4.4	MG/KG
CH2M HILL	BARIUM	SS84B	121	=	234	550	14000	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB84A	0.07	J	NA	46	410	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB84A	0.72	=	NA	46	410	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB84B	1.1	=	NA	46	410	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB84B	0.17	J	NA	46	410	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB84C	5.6	=	NA	46	410	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB84D	0.04	J	NA	46	410	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SS84D	0.89	=	NA	46	410	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SS84F	0.045	J	NA	46	410	MG/KG
CH2M HILL	BROMOMETHANE	SB84A	0.002	J	NA	11	290	MG/KG
CH2M HILL	CALCIUM	SS84B	10300	=	5840	NA	NA	MG/KG
CH2M HILL	COBALT	SS84B	8.7	=	18.3	470	12000	MG/KG
CH2M HILL	COPPER	SB84A	32.5	=	33	310	8200	MG/KG

Table 84-B
Summary of Detected Compounds in Surface Soils
Compared to Non-BCT Screening Levels for Site 84
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	Risk-Based Concentrations Soil Ingestion[4]		Units
						Residential	Industrial	
CH2M HILL	COPPER	SB84A	16.3	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SB84B	26.6	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SB84B	18.7	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SB84C	16.4	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SB84D	15.4	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SS84A	17.1	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SS84B	16.4	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SS84C	36.6	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SS84D	25.8	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SS84E	16.8	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SS84F	17.4	=	33	310	8200	MG/KG
CH2M HILL	GAMMA-CHLORDANE	SB84B	0.58	=	.026	.49	4.4	MG/KG
CH2M HILL	GAMMA-CHLORDANE	SB84B	0.34	=	.026	.49	4.4	MG/KG
CH2M HILL	GAMMA-CHLORDANE	SB84D	0.081	=	.026	.49	4.4	MG/KG
CH2M HILL	GAMMA-CHLORDANE	SS84B	0.0017	J	.026	.49	4.4	MG/KG
CH2M HILL	GAMMA-CHLORDANE	SS84C	0.084	=	.026	.49	4.4	MG/KG
CH2M HILL	GAMMA-CHLORDANE	SS84D	0.019	=	.026	.49	4.4	MG/KG
CH2M HILL	GAMMA-CHLORDANE	SS84E	0.013	=	.026	.49	4.4	MG/KG
CH2M HILL	GAMMA-CHLORDANE	SS84F	0.011	=	.026	.49	4.4	MG/KG
CH2M HILL	MAGNESIUM	SS84B	2910	=	4600	NA	NA	MG/KG
CH2M HILL	METHYL ETHYL KETONE (2-BUTANONE)	SB84A	0.018	=	.002	4700	100000	MG/KG
CH2M HILL	METHYL ETHYL KETONE (2-BUTANONE)	SB84B	0.002	J	.002	4700	100000	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SB84B	0.004	J	NA	85	760	MG/KG
CH2M HILL	NICKEL	SB84A	36.8	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SB84A	16.6	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SB84B	21.3	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SB84B	14.8	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SB84C	16.2	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SB84D	9.9	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SS84A	18.3	=	30	160	4100	MG/KG

Table 84-B
Summary of Detected Compounds in Surface Soils
Compared to Non-BCT Screening Levels for Site 84
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	Risk-Based Concentrations Soil Ingestion[4]		Units
						Residential	Industrial	
CH2M HILL	NICKEL	SS84B	16.8	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SS84C	37.2	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SS84D	29.7	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SS84E	13.7	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SS84F	20.2	=	30	160	4100	MG/KG
CH2M HILL	p,p'-DDE	SB84B	0.15	J	.16	1.9	17	MG/KG
CH2M HILL	p,p'-DDT	SB84B	0.4	=	.074	1.9	17	MG/KG
CH2M HILL	p,p'-DDT	SB84D	0.12	=	.074	1.9	17	MG/KG
CH2M HILL	p,p'-DDT	SS84B	0.002	J	.074	1.9	17	MG/KG
CH2M HILL	p,p'-DDT	SS84D	0.014	=	.074	1.9	17	MG/KG
CH2M HILL	p,p'-DDT	SS84E	0.016	=	.074	1.9	17	MG/KG
CH2M HILL	p,p'-DDT	SS84F	0.016	=	.074	1.9	17	MG/KG
CH2M HILL	POTASSIUM	SS84B	1050	=	1820	NA	NA	MG/KG
CH2M HILL	SELENIUM	SB84C	1.4	=	.81	39	1000	MG/KG
CH2M HILL	VANADIUM	SS84B	27.5	J	48.4	55	1400	MG/KG

Notes:
1. Detected values are obtained from the *Draft Parcel 27 Report-Screening Sites Sampling Program for Defense Depot Memphis, TN*, CH2M HILL, 1997.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. Risk-Based Concentrations are obtained from the *EPA Region III Risk-based Concentrations Table*, R.L. Smith, April, 1997.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
= - indicates unqualified detection.
J - indicates estimated value above the detection limit but below the reporting limit.

Table 84-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 84
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	ACETONE	SB84A	8.5 to 11	0.087	=	NA	16	MG/KG
CH2M HILL	ACETONE	SB84B	18 to 20	0.01	J	NA	16	MG/KG
CH2M HILL	ACETONE	SB84B	8 to 10	0.059	=	NA	16	MG/KG
CH2M HILL	ACETONE	SB84C	18 to 21	0.018	=	NA	16	MG/KG
CH2M HILL	ACETONE	SB84C	4 to 6	0.011	J	NA	16	MG/KG
CH2M HILL	ACETONE	SB84C	8 to 10	0.1	=	NA	16	MG/KG
CH2M HILL	ACETONE	SB84D	18 to 20	0.017	=	NA	16	MG/KG
CH2M HILL	ACETONE	SB84D	4 to 6	0.025	=	NA	16	MG/KG
CH2M HILL	ACETONE	SB84D	8 to 10	0.016	=	NA	16	MG/KG
CH2M HILL	ARSENIC	SB84A	18 to 20	9.8	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB84A	4 to 6	11.2	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB84A	8.5 to 11	17.4	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB84B	18 to 20	8.6	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB84B	4 to 6	6.6	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB84B	8 to 10	17.7	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB84C	18 to 21	11.3	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB84C	4 to 6	22.4	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB84C	8 to 10	22.1	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB84D	18 to 20	18.8	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB84D	8 to 10	18.6	=	17	29	MG/KG
CH2M HILL	BENZYL BUTYL PHTHALATE	SB84A	4 to 6	0.51	=	NA	930	MG/KG
CH2M HILL	BERYLLIUM	SB84A	4 to 6	0.53	J	1.2	63	MG/KG
CH2M HILL	BERYLLIUM	SB84B	4 to 6	0.28	J	1.2	63	MG/KG
CH2M HILL	BERYLLIUM	SB84C	8 to 10	1.2	=	1.2	63	MG/KG
CH2M HILL	BERYLLIUM	SB84D	4 to 6	1	=	1.2	63	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB84A	18 to 20	0.045	J	NA	3600	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB84A	8.5 to 11	0.055	J	NA	3600	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB84C	18 to 21	0.11	J	NA	3600	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB84C	4 to 6	0.06	J	NA	3600	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB84C	8 to 10	0.05	J	NA	3600	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB84D	18 to 20	0.13	J	NA	3600	MG/KG

Table 84-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 84
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB84D	8 to 10	0.54	=	NA	3600	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB84A	18 to 20	44.1	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB84A	4 to 6	13	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB84A	8.5 to 11	28.5	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB84B	18 to 20	33.2	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB84B	4 to 6	11.8	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB84B	8 to 10	22.4	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB84C	18 to 21	24.1	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB84C	4 to 6	21.6	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB84C	8 to 10	27.6	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB84D	18 to 20	32.7	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB84D	4 to 6	25.1	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB84D	8 to 10	22.6	=	26	38	MG/KG
CH2M HILL	COPPER	SB84A	18 to 20	26.9	=	33	NA	MG/KG
CH2M HILL	COPPER	SB84A	4 to 6	20	J	33	NA	MG/KG
CH2M HILL	COPPER	SB84A	8.5 to 11	41.8	=	33	NA	MG/KG
CH2M HILL	COPPER	SB84B	18 to 20	26.4	=	33	NA	MG/KG
CH2M HILL	COPPER	SB84B	4 to 6	13.4	J	33	NA	MG/KG
CH2M HILL	COPPER	SB84B	8 to 10	24.9	=	33	NA	MG/KG
CH2M HILL	COPPER	SB84C	18 to 21	32.4	=	33	NA	MG/KG
CH2M HILL	COPPER	SB84C	4 to 6	38.3	=	33	NA	MG/KG
CH2M HILL	COPPER	SB84C	8 to 10	47.1	=	33	NA	MG/KG
CH2M HILL	COPPER	SB84D	18 to 20	39.9	=	33	NA	MG/KG
CH2M HILL	COPPER	SB84D	4 to 6	37.6	=	33	NA	MG/KG
CH2M HILL	COPPER	SB84D	8 to 10	36.6	=	33	NA	MG/KG
CH2M HILL	DI-n-BUTYL PHTHALATE	SB84A	4 to 6	1.2	=	NA	2300	MG/KG
CH2M HILL	DI-n-BUTYL PHTHALATE	SB84D	18 to 20	0.075	J	NA	2300	MG/KG
CH2M HILL	LEAD	SB84A	18 to 20	16.1	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB84A	4 to 6	13.1	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB84A	8.5 to 11	29.5	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB84B	18 to 20	11.8	=	24	1.5	MG/KG

Table 84-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 84
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	LEAD	SB84B	4 to 6	8.9	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB84B	8 to 10	24.8	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB84C	18 to 21	15.3	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB84C	4 to 6	25.5	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB84C	8 to 10	27.1	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB84D	18 to 20	19.3	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB84D	4 to 6	282	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB84D	8 to 10	19.3	=	24	1.5	MG/KG
CH2M HILL	METHYL ETHYL KETONE (2-BUTANONE)	SB84A	8.5 to 11	0.019	=	NA	NA	MG/KG
CH2M HILL	METHYL ETHYL KETONE (2-BUTANONE)	SB84B	8 to 10	0.004	J	NA	NA	MG/KG
CH2M HILL	METHYL ETHYL KETONE (2-BUTANONE)	SB84C	8 to 10	0.013	=	NA	NA	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SB84B	8 to 10	0.004	J	NA	.02	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SB84C	4 to 6	0.002	J	NA	.02	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SB84D	18 to 20	0.001	J	NA	.02	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SB84D	4 to 6	0.001	J	NA	.02	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SB84D	8 to 10	0.001	J	NA	.02	MG/KG
CH2M HILL	NICKEL	SB84A	18 to 20	45.6	=	37	130	MG/KG
CH2M HILL	NICKEL	SB84A	4 to 6	22.9	J	37	130	MG/KG
CH2M HILL	NICKEL	SB84A	8.5 to 11	43.4	=	37	130	MG/KG
CH2M HILL	NICKEL	SB84B	18 to 20	23.1	=	37	130	MG/KG
CH2M HILL	NICKEL	SB84B	4 to 6	13.8	J	37	130	MG/KG
CH2M HILL	NICKEL	SB84B	8 to 10	22.2	=	37	130	MG/KG
CH2M HILL	NICKEL	SB84C	18 to 21	30.7	=	37	130	MG/KG
CH2M HILL	NICKEL	SB84C	4 to 6	36.3	=	37	130	MG/KG
CH2M HILL	NICKEL	SB84C	8 to 10	36	=	37	130	MG/KG
CH2M HILL	NICKEL	SB84D	18 to 20	44.2	=	37	130	MG/KG
CH2M HILL	NICKEL	SB84D	4 to 6	34.2	=	37	130	MG/KG
CH2M HILL	NICKEL	SB84D	8 to 10	33.4	=	37	130	MG/KG
CH2M HILL	SELENIUM	SB84C	4 to 6	1.6	=	.64	5	MG/KG
CH2M HILL	SELENIUM	SB84C	8 to 10	2.3	=	.64	5	MG/KG
CH2M HILL	SILVER	SB84A	4 to 6	0.38	J	.98	34	MG/KG

Table 84-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 84
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	TRICHLOROETHYLENE (TCE)	SB84C	18 to 21	0.01	J	NA	.06	MG/KG
CH2M HILL	TRICHLOROETHYLENE (TCE)	SB84C	4 to 6	0.003	J	NA	.06	MG/KG
CH2M HILL	ZINC	SB84A	18 to 20	97.8	=	110	12000	MG/KG
CH2M HILL	ZINC	SB84A	4 to 6	70.9	J	110	12000	MG/KG
CH2M HILL	ZINC	SB84A	8.5 to 11	140	=	110	12000	MG/KG
CH2M HILL	ZINC	SB84B	18 to 20	62.8	=	110	12000	MG/KG
CH2M HILL	ZINC	SB84B	4 to 6	41.2	J	110	12000	MG/KG
CH2M HILL	ZINC	SB84B	8 to 10	98.9	=	110	12000	MG/KG
CH2M HILL	ZINC	SB84C	18 to 21	80.8	=	110	12000	MG/KG
CH2M HILL	ZINC	SB84C	4 to 6	120	=	110	12000	MG/KG
CH2M HILL	ZINC	SB84C	8 to 10	121	=	110	12000	MG/KG
CH2M HILL	ZINC	SB84D	18 to 20	99.9	=	110	12000	MG/KG
CH2M HILL	ZINC	SB84D	4 to 6	110	=	110	12000	MG/KG
CH2M HILL	ZINC	SB84D	8 to 10	105	=	110	12000	MG/KG

Notes:
1. Detected values are obtained from the *Draft Parcel 27 Report-Screening Sites Sampling Program for Defense Depot Memphis, TN,* CH2M HILL, 1997.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. RBC-GWP values are obtained from the *EPA Region III Risk-based Concentrations Table*, R. L. Smith, April, 1997.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
= - indicates unqualified detection
J - indicates estimated value above the detection limit but below the reporting limit.
RBC-GWP - Risk-Based Concentrations - Groundwater Protection

TAB

Parcel 28

Parcel 28

Screening Sites Sampling Program

for

Defense Distribution Depot Memphis, Tennessee

March 1998

Prepared for

U.S. Army Engineering and Support Center, Huntsville

Prepared by

CH2M HILL

2567 Fairlane Drive

Montgomery, Alabama 36116

137449.RR.ZZ

Parcel 28
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Parcel 28 is a 3,725-square-foot (ft^2) parcel in the southwestern part of the Main Installation in Operable Unit (OU)-2 (shown in Figure 1). Parcel 28 is made up of Building 1089, open storage area X04, and the adjacent railroad tracks.

The screening sites in this document have been identified by the Defense Distribution Depot Memphis, Tennessee (DDMT) through a review of existing documents, interviews with facility personnel, and knowledge of the facility's operations. Screening sites are locations at DDMT where there is a potential for materials to have been released to the environment from past operations. The following screening site is in Parcel 28:

- Screening Site 89 – Building 1089

Sites where there is a confirmed presence of contaminants from past operations are addressed in the Remedial Investigation Sampling Program. Other facilities have been addressed in the Base Realignment and Closure (BRAC) Sampling Program. Results of these programs are addressed in separate reports.

The purpose of the Screening Sites Sampling Program is to identify whether past activities at each site have resulted in releases from the site that would require further investigation. The intent is not to fully delineate the nature and extent of soil or groundwater contamination attributable to past operations, but to conduct technically based screening analyses sufficient to identify the likelihood of contamination.

The purpose of this letter report is to evaluate the results of the Screening Sites Sampling Program and sampling from previous investigations and to recommend No Further Action or further investigation at screening sites in this parcel. The remainder of this report present the results of past investigations; Screening Sites Sampling Program strategy, procedures, and results; and recommendations for each site.

Surface soils, subsurface soils, surface water, and sediments were investigated as part of the Screening Sites Sampling Program. Surface soil samples (any sample whose lowest depth is two feet or less) were taken both as independent samples and as the upper interval of a soil boring profile. Thus, surface soil samples taken as part of a soil boring may have an "SB" designation and are initially discussed under Subsurface Soil Sampling Procedure (Section 2.2.2.2). However, the results from that upper interval are presented in the surface soils tables and discussions in Section 3.0.

Screening Site 89—Building 1089

1.0 Introduction

The chart below presents the location and status information for this screening site.

Parcel	Building Number	RI/FS[1] OU	Site Number	CERCLA[2] Status
28	1089	2	89	Screening

[1]RI/FS = Remedial Investigation/Feasibility Study
[2]CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act

Screening Site 89, which includes Building 1089 and the immediate surrounding area, is located on the western boundary of OU-2 (shown in Figure 1). Past uses of Building 1089 include storing various acids. According to the *Remedial Investigation at DDMT, Final Report* (Law Environmental, 1990), spills have reportedly occurred at this site; however, specific spill information (such as location, date, and quantity) has not been identified to date. In addition to acid storage, the *Installation Assessment of Defense Depot Memphis, Tennessee* (U.S. Army Toxic and Hazardous Materials Agency, 1982) indicated that sandblasting operations had been performed in the northern portion of this building.

2.0 Study Area Investigation

2.1 Previous Investigations

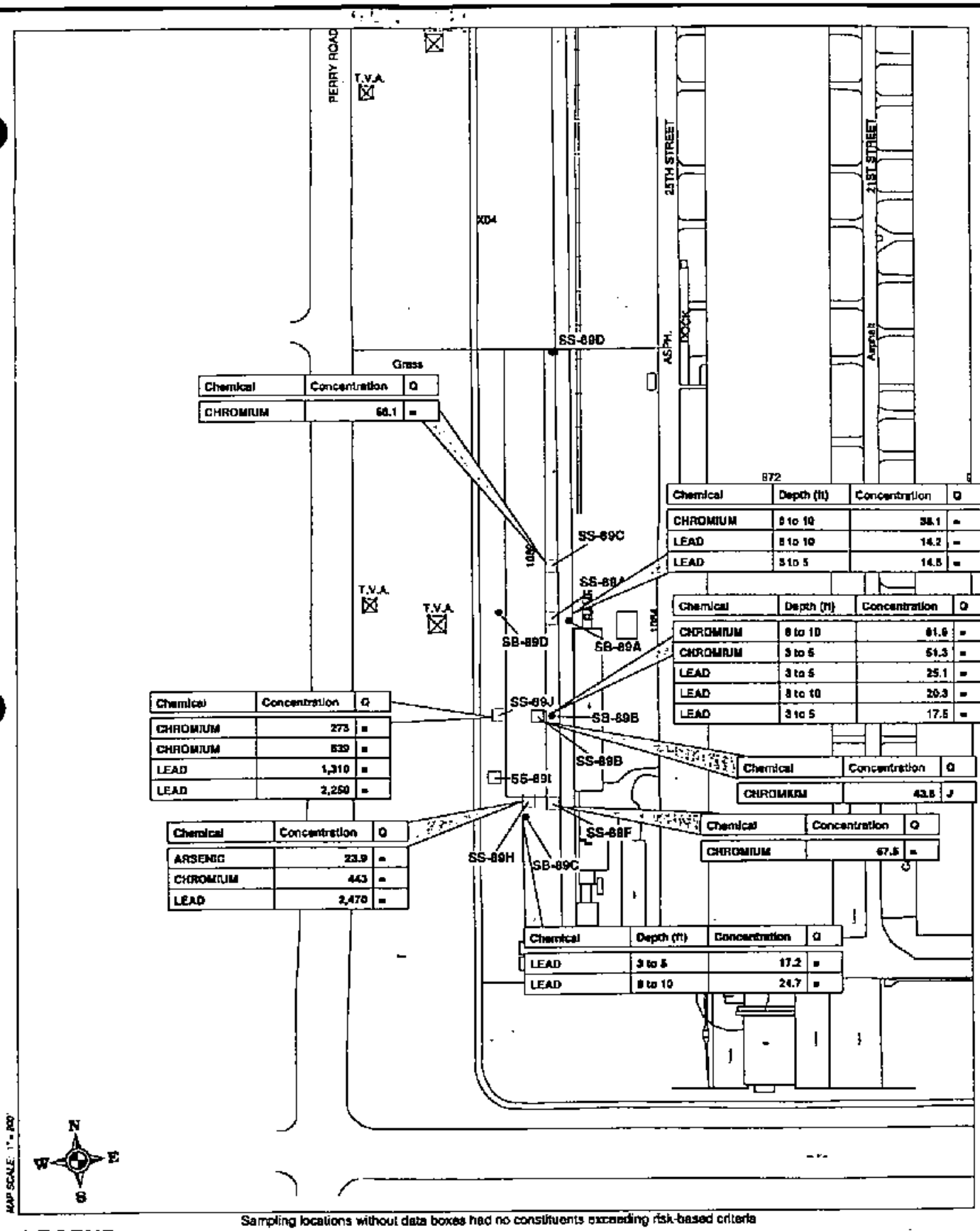
Previous investigations did not characterize potential soil contamination at this site. However, an analysis of surface soils at SS45 (in Appendix B, Table B-4 *Screening Sites Field Sampling Plan*, CH2M HILL, 1995) as part of the Screening Site 32 investigation did show elevated concentrations of metals just south of Building 1089.

Acid spills at the site may have leached metals into the subsurface; therefore, metals are a concern. Sandblasting operations also could release metals from equipment being cleaned. Volatile organic compounds (VOCs) would not typically be included, but results from MW21 indicated tetrachloroethene (PCE) above maximum contaminant levels (MCLs), and the source is unknown.

2.2 Screening Site Sampling Program

2.2.1 Sampling Strategy

The sampling strategy was developed to evaluate whether releases have occurred to surface and subsurface soils by locating samples in the suspected release areas. Samples were analyzed for VOCs, metals, and pH. At least one sample for each media was analyzed for target compound list/target analyte list (TCL/TAL) constituents in accordance with the *Screening Sites Field Sampling Plan* (CH2M HILL, 1995). The following sections present the sampling procedures and laboratory analyses performed for surface and subsurface soils.



Chemical	Concentration	Q
CHROMIUM	68.1	=

Chemical	Depth (ft)	Concentration	Q
CHROMIUM	8 to 10	38.1	=
LEAD	8 to 10	14.2	=
LEAD	3 to 5	14.8	=

Chemical	Depth (ft)	Concentration	Q
CHROMIUM	8 to 10	81.6	=
CHROMIUM	3 to 5	51.3	=
LEAD	3 to 5	25.1	=
LEAD	8 to 10	20.3	=
LEAD	3 to 5	17.5	=

Chemical	Concentration	Q
CHROMIUM	275	=
CHROMIUM	839	=
LEAD	1,310	=
LEAD	2,250	=

Chemical	Concentration	Q
CHROMIUM	43.8	J

Chemical	Concentration	Q
CHROMIUM	67.5	=

Chemical	Concentration	Q
ARSENIC	23.9	=
CHROMIUM	443	=
LEAD	2,470	=

Chemical	Depth (ft)	Concentration	Q
LEAD	3 to 5	17.2	=
LEAD	8 to 10	24.7	=

Sampling locations without data boxes had no constituents exceeding risk-based criteria

LEGEND

Surface Soil Sampling Location (mg/kg)

Soil Boring Sampling Location (mg/kg)

(Q) Qualifier Definitions
= - indicates unqualified detection
J - indicates estimated value above detection limit, but below reporting limit

Figure 1
Site 89, Building 1089
Constituents Exceeding Risk-Based Criteria
Defense Distribution Depot Memphis, TN

CH2MHILL

SITE89 MXD

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2.2.2 Sampling Procedures

2.2.2.1 Surface Soil Sampling Procedures

With the approval of the Tennessee Department of Environment and Conservation (TDEC) and the U.S. Environmental Protection Agency (EPA), surface soil samples were collected at eight locations (SS89A, SS89B, SS89C, SS89D, SS89F, SS89H, SS89I and SS89J) along the foundation of Building 1089 (shown in Figure 1). Samples were collected as close to the foundation as possible at a depth of zero to 12 inches. The following details the sample locations:

- Sample SS89A was taken 6 inches east of the 18th pole from the southeast corner of Building 1089.
- Sample SS89B was taken 6 inches east of the 10th pole from the southeast corner of Building 1089.
- Sample SS89C was taken just east of Building 1089 and 4 inches south of the concrete extending from the northeast side of Building 1089.
- Sample SS89D was taken 1 ft east of the northeast corner of the concrete extending from the northeast side of Building 1089.
- Sample SS89F was taken 3 ft south of the second girder at the southeast end of Building 1089.
- Sample SS89H was taken 2 ft south from the center of the south side of Building 1089.
- Sample SS89I was taken 5 ft west of Building 1089 just between the 2nd and 3rd pole from the southwest corner of the building.
- Sample SS89J was taken 1 ft west of Building 1089 just between the 5th and 6th pole from the southwest corner of the building.

The surface soil was removed from the ground using a standard stainless-steel hand auger. VOC samples were immediately collected from the top six inches of soil before being mixed. Part of the VOC sample was placed into a sealable plastic bag and allowed to equilibrate. The head space in the plastic bag was measured for VOCs using a hand-held photoionization detector (PID), and the results used to determine which sample location was selected for Level 3 analyses. The soil was transferred to a stainless-steel bowl using stainless-steel trowels, mixed, and then placed in the appropriate jars.

2.2.2.2 Subsurface Soil Sampling Procedures

With the approval of the TDEC and EPA, subsurface soil samples were collected at four locations (SB89A, SB89B, SB89C, and SB89D) at this site. At each location, samples were collected at two depths: 3 to 5 feet and 8 to 10 feet. The following details the sample locations:

- Sample SB89A was taken in the same location as SS89A, 6 inches east of the 18th pole from the southeast corner of Building 1089.
- Sample SB89B was taken in the same location as Sample SS89B, 6 inches east of the 10th pole from the southeast corner of Building 1089.
- Sample SB89C was taken in the same location as Sample SS89H, 2 feet south from the center

of the south side of Building 1089.

- Sample SB89D was taken 6 feet east of MW21, which is located mid-west of Building 1089.

The samples were collected using a 2-inch-diameter, stainless-steel push sampler. VOC soil samples were collected directly from the continuous sampler using stainless-steel spoons. Part of the VOC sample was placed into a sealable plastic bag and allowed to equilibrate. The head space in the plastic bag was measured for VOCs using a hand-held PID, and the results were used to determine which interval within each boring was selected for Level 3 constituents of potential concern (COPCs) or TCL/TAL analyses. The remaining soil was placed into a stainless-steel bowl, mixed, and then transferred into the appropriate sample jars.

All sampling tools were decontaminated before being used at each sample location according to the procedures specified in the *Generic Quality Assurance Project Plan* (CH2M HILL, 1995) for the RI/FS currently being conducted at the DDMT.

2.2.3 Analytical Procedures

Eight surface and eight subsurface soil samples were sent to CH2M HILL's Analytical Services in Montgomery, Alabama for VOC, pH, metal, and TCL/TAL analyses. Samples received at the laboratory were analyzed in accordance with the procedures outlined in the *Generic Quality Assurance Project Plan* (CH2M HILL, 1995).

A United States Corps of Engineers (COE) split sample was collected from the 3- to 5-foot interval of Sample SB89A. This one subsurface soil sample was sent to COE's Atlanta, Georgia laboratory for analysis of VOCs, pH, and metals.

A data quality evaluation (DQE) was performed to assess the effect of the overall analytical process on the usability of the data. The DQE established that the detection of acetone and bis(2-ethylhexyl)phthalate can be attributed to field sampling and laboratory contamination rather than environmental conditions at the site. Also, low concentrations of dioxins and furans can be attributed to background or instrument noise and are not indicative of environmental conditions. With exception to the qualifications listed above, the DQE concluded that data be used in the project decision-making process.

3.0 Interpretation of Sampling Results

3.1 Presentation of Results

Sections 3.1.1 through 3.1.4 present results of the Screening Sites Sampling Program for Screening Site 89. Data are presented separately for surface soil and subsurface soil. Data are compared with appropriate screening criteria in three summary tables: Tables 89-A through 89-C. Data from the 1997 CH2M HILL investigation are presented along with historical data from the *Remedial Investigations at DDMT, Final Report* (Law Environmental, 1990). If a value from a sampling location exceeds one of the comparison criteria, that value and the comparison criterion are shown in **bold** on the summary table.

COPCs are parameters that exceed both background values and the screening criteria. Where concentrations exceed the selected background value, the concentration is compared with the

observed range of background values as reviewed and established by the BRAC Cleanup Team (BCT).

Based on the comparison with criteria, there are three COPCs identified for Screening Site 89: arsenic, chromium, and lead.

3.1.1 Surface Soil

Results of the surface soil analyses with values above detection limits are shown in Tables 89-A and 89-B.

3.1.1.1 BCT Screening Criteria

Table 89-A summarizes constituents for which the BCT has selected a screening criteria. Arsenic, chromium, and lead were detected at concentrations exceeding the BCT criteria and background values.

Arsenic was detected in nine surface soil samples at concentrations ranging from 2.7 milligrams per kilogram (mg/kg) to 23.9 mg/kg. The highest concentration detected in Sample SS89H at 23.9 mg/kg exceeds the BCT criteria (background) value of 20 mg/kg. These concentrations are similar to naturally occurring levels. Chromium was detected in nine surface soil samples at concentrations ranging from 14.5 mg/kg to 539 mg/kg. Six of the nine sample concentrations detected exceed the BCT criteria value of 39 mg/kg and the background value of 24.8 mg/kg. The three highest exceedances were detected in Sample SS89 J (duplicate analysis) and Sample SS89H at 539 mg/kg, 273 mg/kg, and 443 mg/kg, respectively.

Lead was detected in nine surface soil samples at concentrations ranging from 14.9 mg/kg to 2470 mg/kg. Three of the concentrations detected significantly exceeded the BCT criteria value of 400 mg/kg and the background value of 30 mg/kg. The exceedances were detected in Sample SS89H and Sample SS89J (duplicate analysis at 2470 mg/kg, 2250 mg/kg, and 1310 mg/kg).

Chromium and lead are elevated in multiple samples above background, indicating they could be related to site operations.

3.1.1.2 Other Screening Criteria

Table 89-B summarizes the remaining constituents compared with risk-based concentrations (RBCs) for both residential and industrial exposure scenarios. No constituents were detected at concentrations exceeding the background and soil ingestion screening criteria values.

3.1.2 Subsurface Soil

Table 89-C summarizes subsurface soil sampling data. Chromium and lead were detected at concentrations exceeding the background and groundwater protection criteria values.

Chromium was detected in Sample SB89A (at the 8- to 10-foot depth), Sample SB89B (at the 3- to 5-foot depth), and Sample SB89B (at the 8- to 10-foot depth) at concentrations of 38.1 mg/kg, 51.3 mg/kg, and 81.6 mg/kg, respectively. All these concentrations exceed the groundwater protection criteria value of 38 mg/kg and the background value of 26 mg/kg. Chromium concentrations appear to be slightly elevated above background levels at Sample SB89B in the deeper soils but is within the groundwater protection criteria levels when compared to mean concentration within the area.

Lead was detected in Sample SB89B (at the 3- to 5-foot depth) and Sample SB89C (at the 8- to 10-foot depth) at concentrations of 25.1 mg/kg and 24.7 mg/kg, respectively, which exceed the groundwater protection criteria value of 1.5 mg/kg and the background value of 24 mg/kg. These concentrations, however, are similar to the background levels.

3.2 Vertical and Lateral Extent

A total of 13 sampling locations were sampled, four of which were soil borings sampled at multiple depths. Surface soil samples from southwest corner of the Building 1089 had elevated levels of chromium and lead. Also, arsenic is slightly elevated in one of the samples. Zinc at the site is elevated in the same locations as chromium and lead, indicating a common source for these metals. The highest concentrations and only exceedances of chromium in the surface soil were detected in Sample SS89J (located west of Building 1089 on the southern end) and Sample SS89H. Furthermore, the highest concentrations and only exceedances of lead were also detected in Sample SS89H and Sample SS89J.

The concentrations of lead, chromium, and arsenic in the subsurface soils were within the background levels range indicating that downward transport of metals has not occurred.

3.3 Potential Migration Pathways

The potential migration pathways for the arsenic and metals detected in the foundation around Building 1089 is due to surface soil transport caused by surface water runoff or wind. Transport to groundwater has not been observed to be significant because these metals are generally adsorbed onto soil and groundwater at the site is approximately 80 feet deep. The following paragraphs provide a general discussion of potential migration pathways for COPCs found at Screening Site 89.

The chromium, arsenic, and lead observed in the surface soils are suspected to be from historical operations involving paints at this site. These metals could be mixed with binding compounds such as latex and, thus, not be readily available for leaching and percolation.

Arsenic exists at several sites at the DDMT in surface soils at concentrations above screening levels. Arsenic's mobility and toxicity are tied to its complex geochemistry and its ability to readily form soluble complexes. Arsenic may also readily be adsorbed onto clays, oxides, or humic organic material and migrate as suspended soil in surface water or as a sediment. Arsenic can exist in four common oxidation states, and these control its solubility. It readily transports through aquatic environments as a dissolved salt or as a complex with an organic compound.

Chromium has been reported from surface and subsurface soils at the DDMT in concentrations greater than the screening levels. Chromium occurs in two oxidation states: +3 and +6. The trivalent form readily combines with aqueous hydroxide to form insoluble chromium hydroxide and is of little risk. The hexavalent form is soluble and tends to stay in solution, unless some activated carbon material is present for it to sorb onto. Dissolved chromium is readily adsorbed onto sediments but may be bioaccumulated through aquatic organisms.

Lead exists at concentrations greater than background, or above screening criteria, in surface soil, subsurface soils, and sediment at the DDMT. Lead is moderately soluble and potentially

can be leached from any of these forms of occurrence, reaching concentrations in aqueous solution in both groundwater and surface water that could be of concern to both human and ecological receptors. Additionally, lead in surface soils and sediment potentially may move as suspended particulate matter in surface waters and impact aquatic organisms.

3.4 Additional Data Needs

Screening Site 89 will need to go through the RI process and will likely require some remedial action because of the co-occurring elevated lead and chromium concentrations. Depth profile of the metals in the southwest corner of the building, where surface soil concentrations are highest, will be determined as part of the future actions at the site. Additional surface soil sample will be necessary to evaluate the extent of metals.

4.0 Interpretation of Screening Criteria Comparisons

4.1 Methodology

The Preliminary Risk Evaluation (PRE) was performed in accordance with the *Guidance on Preliminary Risk Evaluations for the Purpose of Reaching a Finding a Suitability to Lease (FOSL)* (EPA Region IV, 1994). A discussion of the PRE methodology is provided as Appendix A to this document.

4.2 Screening Site 89 Risk

Carcinogenic and noncarcinogenic risks for Screening Site 89 are presented in Table 4-50 of the draft PRE (USAESC, 1998), and detailed chemical-specific estimates are presented in Appendix A of the PRE.

The PRE risk ratio for carcinogenic chemicals indicated a risk of above one in a million due to the presence of arsenic in one sample at 23.9 mg/kg, compared to a background level of 20 mg/kg.

The noncarcinogenic PRE ratio was above a value of 1.0 for both industrial and residential exposure scenarios, primarily from excessive concentrations of the inorganic chemicals chromium, copper, lead, and zinc.

The inorganic constituent levels should be further evaluated prior to leasing the property.

5.0 Summary and Recommendations

5.1 Summary

According to Table 5-2, the PRE results indicate that the carcinogenic PRE risk ratio exceeds 10^{-6} due to arsenic slightly above background levels. Noncarcinogenic ratios exceed one for industrial and residential scenarios due to metals. Lead elevations are significant because they

exceed the CERCLA remediation criteria for lead at 400 mg/kg for residential exposures and 1000 mg/kg for industrial worker exposures.

5.2 Recommendations

It is recommended that localized elevated metals (lead, chromium, arsenic, and zinc) should be removed to be protective against potential future exposures at Screening Site 89.

Table 89-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 89
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
CH2M HILL	ACENAPHTHENE	SB28C	0.041	J	NA	470	Residential RBC	MG/KG
CH2M HILL	ALUMINUM	SS89A	3240	=	24000	24000	Bkgd	MG/KG
CH2M HILL	ARSENIC	SS89B	5.7	J	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SS89C	4.6	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SS89D	2.7	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SS89F	10.5	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SS89H	23.9	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SS89I	12.5	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SS89J	10.2	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SS89J	10.4	=	20	20	Bckg	MG/KG
CH2M HILL	BERYLLIUM	SS89A	0.13	J	1.1	1.1	Bckg	MG/KG
CH2M HILL	BERYLLIUM	SS89B	0.21	J	1.1	1.1	Bckg	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS89A	14.5	J	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS89B	43.8	J	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS89C	56.1	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS89D	15.5	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS89F	67.5	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS89H	443	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS89I	29	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS89J	539	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS89J	273	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	IRON	SS89A	8140	=	37000	37000	Bckg	MG/KG
CH2M HILL	LEAD	SS89A	24.6	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SS89B	139	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SS89C	227	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SS89D	14.9	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SS89F	237	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SS89H	2470	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SS89I	30.2	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SS89J	2250	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SS89J	1310	=	30	400	CERCLA	MG/KG

Table 89-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 89
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
CH2M HILL	MANGANESE	SS89A	154	=	1300	1300	Bckg	MG/KG
CH2M HILL	ZINC	SS89A	293	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SS89B	1500	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SS89C	226	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SS89D	527	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SS89F	388	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SS89H	666	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SS89I	147	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SS89J	1460	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SS89J	1600	=	130	23000	Residential RBC	MG/KG

Notes:
1. Detected values are obtained from the *Draft Parcel 28 Report-Screening Sites Sampling Program for Defense Depot* Memphis, TN. CH2M HILL, 1997.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum* , CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. Based on values selected by the BRAC Cleanup Team in the August 1997 BCT meeting minutes, Memphis, Tennessee.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
J - indicates estimated value above the detection limit but below the reporting limit.
= - indicates unqualified detection
BCT - BRAC Cleanup Team

Table 89-B
Summary of Detected Compounds in Surface Soils
Compared to Non-BCT Screening Levels for Site 89
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	Risk-Based Concentrations Soil Ingestion[4]		Units
						Residential	Industrial	
CH2M HILL	BARIUM	SS89A	30.5	=	234	550	14000	MG/KG
CH2M HILL	CADMIUM	SS89A	0.41	J	1.4	3.9	100	MG/KG
CH2M HILL	CADMIUM	SS89B	1.1	=	1.4	3.9	100	MG/KG
CH2M HILL	CADMIUM	SS89D	1.2	=	1.4	3.9	100	MG/KG
CH2M HILL	CADMIUM	SS89H	1.4	=	1.4	3.9	100	MG/KG
CH2M HILL	CADMIUM	SS89J	2.2	=	1.4	3.9	100	MG/KG
CH2M HILL	CADMIUM	SS89J	1.4	=	1.4	3.9	100	MG/KG
CH2M HILL	CALCIUM	SS89A	164000	=	5840	NA	NA	MG/KG
CH2M HILL	COBALT	SS89A	2.7	J	18.3	470	12000	MG/KG
CH2M HILL	COPPER	SS89B	23.1	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SS89C	16.2	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SS89D	8.1	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SS89F	34.2	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SS89H	73.2	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SS89I	29.9	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SS89J	88.6	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SS89J	58	=	33	310	8200	MG/KG
CH2M HILL	MAGNESIUM	SS89A	4760	=	4600	NA	NA	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SS89D	0.001	J	NA	85	760	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SS89F	0.002	J	NA	85	760	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SS89H	0.002	J	NA	85	760	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SS89I	0.003	J	NA	85	760	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SS89J	0.003	J	NA	85	760	MG/KG
CH2M HILL	NICKEL	SS89A	9.3	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SS89B	12.9	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SS89C	19.1	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SS89D	9.4	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SS89F	27.9	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SS89H	38.6	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SS89I	35.4	=	30	160	4100	MG/KG

Table 89-B
Summary of Detected Compounds in Surface Soils
Compared to Non-BCT Screening Levels for Site 89
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	Risk-Based Concentrations Soil Ingestion[4]		Units
						Residential	Industrial	
CH2M HILL	NICKEL	SS89J	45.6	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SS89J	32.2	=	30	160	4100	MG/KG
CH2M HILL	p,p'-DDE	SS89A	0.091	=	.16	1.9	17	MG/KG
CH2M HILL	p,p'-DDT	SS89A	0.078	=	.074	1.9	17	MG/KG
CH2M HILL	pH	SS89B	8.1	=	NA	NA	NA	PH
CH2M HILL	pH	SS89C	9.2	=	NA	NA	NA	PH
CH2M HILL	pH	SS89D	8.5	=	NA	NA	NA	PH
CH2M HILL	pH	SS89F	8.1	=	NA	NA	NA	PH
CH2M HILL	pH	SS89H	7	=	NA	NA	NA	PH
CH2M HILL	pH	SS89I	7	=	NA	NA	NA	PH
CH2M HILL	pH	SS89J	7.7	=	NA	NA	NA	PH
CH2M HILL	pH	SS89J	7.7	=	NA	NA	NA	PH
CH2M HILL	SELENIUM	SS89A	3.8	J	.81	39	1000	MG/KG
CH2M HILL	VANADIUM	SS89A	11.2	J	48.4	55	1400	MG/KG

Notes:
1. Detected values are obtained from the *Draft Parcel 28 Report-Screening Sites Sampling Program for Defense Depot Memphis, TN*, CH2M HILL, 1997.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. Risk-Based Concentrations are obtained from the *EPA Region III Risk-based Concentrations Table*, R.L. Smith, April, 1997.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
= - indicates unqualified detection.
J - indicates estimated value above the detection limit but below the reporting limit.

Table 89-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 89
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	ACETONE	SB89A	8 to 10	0.005	J	NA	16	MG/KG
CH2M HILL	ACETONE	SB89B	3 to 5	0.01	J	NA	16	MG/KG
CH2M HILL	ACETONE	SB89B	3 to 5	0.005	J	NA	16	MG/KG
CH2M HILL	ACETONE	SB89B	8 to 10	0.004	J	NA	16	MG/KG
CH2M HILL	ACETONE	SB89C	3 to 5	0.004	J	NA	16	MG/KG
CH2M HILL	ACETONE	SB89C	8 to 10	0.007	J	NA	16	MG/KG
CH2M HILL	ACETONE	SB89D	8 to 10	0.006	J	NA	16	MG/KG
CH2M HILL	ARSENIC	SB89A	3 to 5	8.8	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB89A	8 to 10	7.9	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB89B	3 to 5	9.2	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB89B	3 to 5	14.7	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB89B	8 to 10	20	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB89C	3 to 5	7.8	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB89C	8 to 10	15.8	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB89D	3 to 5	9.4	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB89D	8 to 10	8.4	=	17	29	MG/KG
CH2M HILL	BERYLLIUM	SB89B	3 to 5	1.6	=	1.2	63	MG/KG
CH2M HILL	BERYLLIUM	SB89B	8 to 10	1.4	=	1.2	63	MG/KG
CH2M HILL	BERYLLIUM	SB89C	8 to 10	1.2	=	1.2	63	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB89A	3 to 5	26.5	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB89A	8 to 10	38.1	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB89B	3 to 5	51.3	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB89B	3 to 5	33.4	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB89B	8 to 10	81.6	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB89C	3 to 5	31.3	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB89C	8 to 10	29.4	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB89D	3 to 5	30.5	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB89D	8 to 10	30.7	=	26	38	MG/KG
CH2M HILL	COPPER	SB89A	3 to 5	24.9	=	33	NA	MG/KG
CH2M HILL	COPPER	SB89A	8 to 10	17.5	=	33	NA	MG/KG
CH2M HILL	COPPER	SB89B	3 to 5	23.8	=	33	NA	MG/KG

Table 89-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 89
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	COPPER	SB89B	3 to 5	49.3	=	33	NA	MG/KG
CH2M HILL	COPPER	SB89B	8 to 10	29	=	33	NA	MG/KG
CH2M HILL	COPPER	SB89C	3 to 5	23.6	=	33	NA	MG/KG
CH2M HILL	COPPER	SB89C	8 to 10	36.2	=	33	NA	MG/KG
CH2M HILL	COPPER	SB89D	3 to 5	29.5	=	33	NA	MG/KG
CH2M HILL	COPPER	SB89D	8 to 10	18.2	=	33	NA	MG/KG
CH2M HILL	LEAD	SB89A	3 to 5	14.8	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB89A	8 to 10	14.2	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB89B	3 to 5	17.6	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB89B	3 to 5	25.1	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB89B	8 to 10	20.3	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB89C	3 to 5	17.2	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB89C	8 to 10	24.7	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB89D	3 to 5	15.6	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB89D	8 to 10	20.7	=	24	1.5	MG/KG
CH2M HILL	NICKEL	SB89A	3 to 5	31.6	=	37	130	MG/KG
CH2M HILL	NICKEL	SB89A	8 to 10	21.9	=	37	130	MG/KG
CH2M HILL	NICKEL	SB89B	3 to 5	47.8	=	37	130	MG/KG
CH2M HILL	NICKEL	SB89B	3 to 5	28.6	=	37	130	MG/KG
CH2M HILL	NICKEL	SB89B	8 to 10	28.3	=	37	130	MG/KG
CH2M HILL	NICKEL	SB89C	3 to 5	23.8	=	37	130	MG/KG
CH2M HILL	NICKEL	SB89C	8 to 10	48.2	=	37	130	MG/KG
CH2M HILL	NICKEL	SB89D	3 to 5	33.8	=	37	130	MG/KG
CH2M HILL	NICKEL	SB89D	8 to 10	26.2	=	37	130	MG/KG
CH2M HILL	SELENIUM	SB89C	8 to 10	1.5	=	.64	5	MG/KG
CH2M HILL	ZINC	SB89A	3 to 5	77.6	=	110	12000	MG/KG
CH2M HILL	ZINC	SB89A	8 to 10	52.5	=	110	12000	MG/KG
CH2M HILL	ZINC	SB89B	3 to 5	83.7	=	110	12000	MG/KG
CH2M HILL	ZINC	SB89B	3 to 5	119	=	110	12000	MG/KG
CH2M HILL	ZINC	SB89B	8 to 10	80.2	=	110	12000	MG/KG
CH2M HILL	ZINC	SB89C	3 to 5	64.9	=	110	12000	MG/KG

Table 89-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 89
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	ZINC	SB89C	8 to 10	107	=	110	12000	MG/KG
CH2M HILL	ZINC	SB89D	3 to 5	145	=	110	12000	MG/KG
CH2M HILL	ZINC	SB89D	8 to 10	50.9	=	110	12000	MG/KG

Notes:
1. Detected values are obtained from the *Draft Parcel 28 Report-Screening Sites Sampling Program for Defense Depot Memphis, TN*, CH2M HILL, 1997.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. RBC-GWP values are obtained from the *EPA Region III Risk-based Concentrations Table*, R. L. Smith, April, 1997.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
= - indicates unqualified detection
J - indicates estimated value above the detection limit but below the reporting limit.
RBC-GWP - Risk-Based Concentrations - Groundwater Protection

TAB

Parcel 29

Parcel 29

Screening Sites Sampling Program

for

Defense Distribution Depot Memphis, Tennessee

March 1998

Prepared for

U.S. Army Engineering and Support Center, Huntsville

Prepared by

CH2M HILL

2567 Fairlane Drive

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137449.RR.ZZ

Parcel 29
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Parcel 29 is a 7,771-square-foot (ft^2) parcel in the northwestern corner of the Main Installation in Operable Unit (OU)-4 (shown in Figure 1). Parcel 29 is made up of two open storage areas, X27 and X30, and the adjacent railroad tracks.

The screening sites in this document have been identified by the Defense Distribution Depot Memphis, Tennessee (DDMT) through a review of existing documents, interviews with facility personnel, and knowledge of the facility's operations. Screening sites are locations at the DDMT where there is a potential for materials to have been released to the environment from past operations. The following screening sites is in Parcel 29:

- Screening Site 56 – West Gate Storm Water Drainage Canal

Sites where there is a confirmed presence of contaminants from past operations are addressed in the Remedial Investigation Sampling Program. Other facilities have been addressed in the Base Realignment and Closure (BRAC) Sampling Program. Results of these programs are addressed in separate reports.

The purpose of the Screening Sites Sampling Program is to identify whether past activities at each site have resulted in releases from the site that would require further investigation. The intent is not to fully delineate the nature and extent of soil or groundwater contamination attributable to past operations, but to conduct technically based screening analyses sufficient to identify the likelihood of contamination.

The purpose of this letter report is to evaluate the results of the Screening Sites Sampling Program and sampling from previous investigations and to recommend No Further Action or further investigation at screening sites in this parcel. The remainder of this report presents the results of past investigations; Screening Sites Sampling Program strategy, procedures, and results; and recommendations for each site.

Surface soils, subsurface soils, surface water, and sediments were investigated as part of the Screening Sites Sampling Program. Surface soil samples (any sample whose lowest depth is two feet or less) were taken both as independent samples and as the upper interval of a soil boring profile. Thus, surface soil samples taken as part of a soil boring may have an "SB" designation and are initially discussed under Subsurface Soil Sampling Procedure (Section 2.2.2.2). However, the results from that upper interval are presented in the surface soil tables and discussions in Section 3.0.

Screening Site—56 West Gate Storm Water Drainage Canal

1.0 Introduction

The chart below presents the location and status information for this screening site.

Parcel	Building Number	RI/FS[1] OU	Site Number	CERCLA[2] Status
29	West Gate Canal	4	56	Screening

[1]RI/FS = Remedial Investigation/Feasibility Study
[2]CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act

Figure 1 illustrates Screening Site 56 on the western side of the Main Installation, adjacent to Perry Road and north of Gate 9. This site collects the storm water runoff from the pentachlorophenol (PCP) tank areas and the western portion of the Main Installation.

2.0 Study Area Investigation

2.1 Previous Investigations

According to the *Remedial Investigations at DDMT, Final Report* (Law Environmental, 1990), two surface water samples (SW2 and SW14) were collected at Screening Site 56 in 1989. In addition, according to the *Defense Distribution Depot Memphis, Tennessee Sediment Sampling Program; Sediment Sampling Analysis Report* (EDRW, Inc., 1996), one sediment sample (SD19) was collected at Screening Site 56 during the 1995 Sediment Sampling Program. Historical data from Screening Site 56 are summarized by media below. Contaminants of potential concern (COPCs) at historical sites are shown in Figure 1.

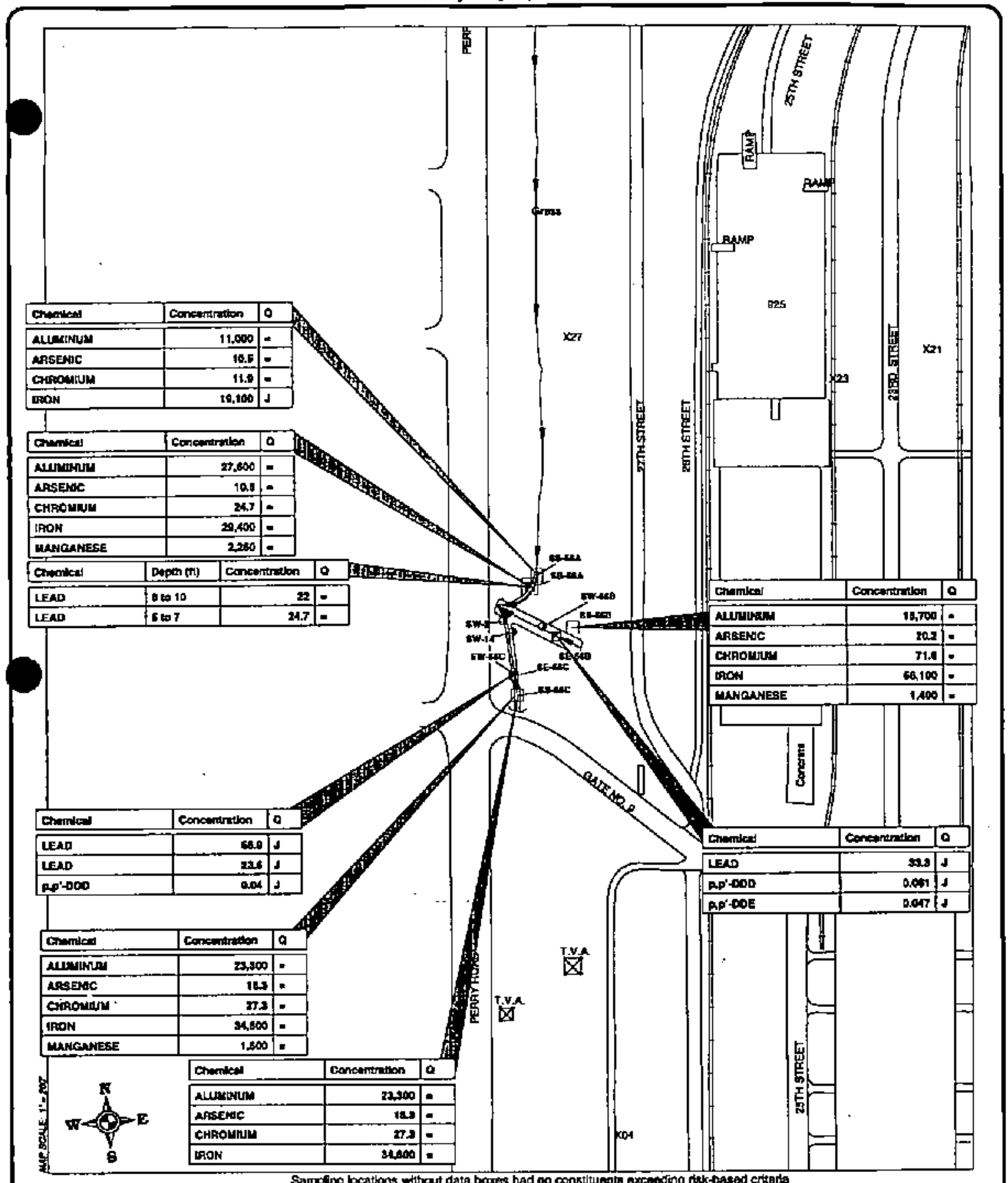
2.1.1 Surface Water

Acetone (detected in SW14 at 110 micrograms per liter [µg/L]) is the only volatile organic compound (VOC) that was detected at a concentration greater than the sample quantitation limit. Benzoic acid and bis(2-ethylhexyl)phthalate were the only semivolatile organic compounds (SVOCs) detected in the surface water. However, no SVOC concentrations were detected at greater than the sample quantitation limits.

Endosulfan-I (detected in SW2 at 0.16 µg/L) is the only pesticide that was found in surface water samples. This datum, however, is reported with a qualifier stating that it was not positively identified due to matrix interference. Several inorganic compounds common in soil were also detected in surface water. The concentrations of these compounds will be compared to established background concentrations and critical values in Section 3.1.

2.1.2 Sediment

Carbon tetrachloride (the only VOC detected above the sample quantitation limit) was detected in Sample SD19 at a concentration of 78 micrograms per kilogram (µg/kg). Several SVOCs were also detected in Sample SD19, but no concentrations were detected at greater than the sample quantitation limit. Although several dioxin concentrations were estimated at levels below sample quantitation limits, only total HPCDF (detected in sample SD19 at 0.01 µg/kg) was



Chemical	Concentration	Q
ALUMINUM	11,000	=
ARSENIC	16.5	=
CHROMIUM	11.9	=
IRON	19,100	J

Chemical	Concentration	Q
ALUMINUM	27,600	=
ARSENIC	19.8	=
CHROMIUM	24.7	=
IRON	29,400	=
MANGANESE	2,260	=

Chemical	Depth (ft)	Concentration	Q
LEAD	9 to 10	22	=
LEAD	5 to 7	24.7	=

Chemical	Concentration	Q
ALUMINUM	15,700	=
ARSENIC	20.2	=
CHROMIUM	71.6	=
IRON	56,100	=
MANGANESE	1,400	=

Chemical	Concentration	Q
LEAD	66.9	J
LEAD	23.6	J
p,p'-DDD	0.04	J

Chemical	Concentration	Q
LEAD	33.3	J
p,p'-DDD	0.061	J
p,p'-DDE	0.047	J

Chemical	Concentration	Q
ALUMINUM	23,300	=
ARSENIC	18.3	=
CHROMIUM	27.3	=
IRON	34,600	=
MANGANESE	1,500	=

Chemical	Concentration	Q
ALUMINUM	23,300	=
ARSENIC	18.3	=
CHROMIUM	27.3	=
IRON	34,600	=

Sampling locations without data boxes had no constituents exceeding risk-based criteria

LEGEND

- Surface Soil Sampling Location (mg/kg)
- Soil Boring Sampling Location (mg/kg)
- Surface Water Sampling Location (mg/L)
- Sediment Sampling Location (mg/kg)

(Q) Qualifier Definitions

= - Indicates unqualified detection

J - Indicates estimated value above detection limit, but below reporting limit.

Figure 1

Site 56, West Gate Water Storm Drainage Canal
Constituents Exceeding Risk-Based Criteria

Defense Distribution Depot Memphis, TN

CH2MHILL

SITE56.PRN

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detected at a quantifiable concentration. Several inorganic compounds common in soil were also detected in sediment. The concentrations of these compounds will be compared to established background concentrations and critical values in Section 3.1.

2.2 Screening Site Sampling Program

2.2.1 Sampling Strategy

The sampling strategy was developed to evaluate whether releases have occurred to surface soils, subsurface soils, sediment, and surface water. Samples were analyzed for SVOCs, VOCs, pesticides, dioxins, and metals. At least one sample from each media at each site was analyzed for target compound list/target analyte list (TCL/TAL) constituents in accordance with the *Screening Sites Field Sampling Plan* (CH2M HILL, 1995).

2.2.2 Sampling Procedures

Sections 2.2.2.1 through 2.2.2.3 describe the sampling procedures and laboratory analysis performed for surface soil, subsurface soil, sediment, and surface water.

2.2.2.1 Surface Soil Sampling Procedure

With the approval of the Tennessee Department of Environment and Conservation (TDEC) and the U.S. Environmental Protection Agency (EPA), surface soil samples were collected from four locations (SS56A, SS56B, SS56C, and SB56A) at this site (shown in Figure 1). Surface soil sample locations SS56A, SS56B, and SS56C were collected from the upstream end of each branch of the ditch system. The following details the location of each individual sample:

- Sample SS56A was taken at the drainage ditch that extends to the north. The sample was located 1 foot east of the eastern side of the drainage ditch and 57 feet north of the start of the fork in the drainage ditches that extend north and southeast.
- Sample SS56B was taken at the drainage ditch that extends to the southeast. The sample was located 4 feet north of the concrete headwall at the south end of the drainage ditch.
- Sample SS56C was taken at the drainage ditch that extends to the south. The sample was located 1 foot east of the eastern side of the drainage ditch and 6 feet north of the concrete headwall located at the south end of the drainage ditch.

The location of the surface soil samples associated with borings is described in Section 2.2.2.2.

The soil was removed from the ground using a standard stainless-steel hand auger. VOC samples were immediately collected from the top six inches of soil before being mixed. Part of the VOC sample was placed into a sealable plastic bag and allowed to equilibrate. The head space in the plastic bag was measured for VOCs using a hand-held photoionization detector (PID), and the results were used to determine which interval within each boring might be selected for Level 3 analyses. The soil was transferred into a stainless-steel bowl using stainless-steel trowels, mixed, and then placed into appropriate jars.

2.2.2.2 Subsurface Soil Sampling Procedures

With the approval of TDEC and EPA, subsurface soil samples were collected from one location (SB56A) at this site. At this location, samples were collected at three depths: zero to 1 foot, 5 to 7

feet, and 8 to 10 feet. Sample SB56A was located south of Sample SS56A between the fork of the tributary and main drainage ditch. The sample was taken 6 feet south of the tributary ditch and 7 feet north of the main ditch just east of the fork opening.

Samples were collected using a 2-inch-diameter, stainless-steel push sampler. VOC samples were collected directly from the continuous sampler using stainless-steel spoons. Part of the VOC sample was placed into a sealable plastic bag and allowed to equilibrate. The head space in the plastic bag was measured for VOCs using a hand-held PID, and the results were used to determine which interval within each boring might be selected for Level 3 analyses. The remaining soil was placed into a stainless-steel bowl, mixed, and then transferred into the appropriate sample jar.

2.2.2.3 Surface Water/Sediment Sampling Procedures

After a rainfall event of at least 0.75 inches following a 72-hour dry spell (as reported by local media and recorded in field notebooks 12/12/96), three storm water samples (SW56A, SW56B, and SW56C) were collected (locations are shown in Figure 1.) Sample SW56A was taken near the same location as Sample SS56A, downstream of a 6-inch clay pipe discharging into the ditch. Sample SW56B was taken west of Sample SS56B in the same drainage ditch 8 feet west of the fence line. Sample SW56C was taken north of SS56C in the same drainage ditch and just 1 foot north of the culvert opening.

These samples are intended to represent storm water drainage in the northwestern section of the facility. All surface water samples were collected within four hours of the end of the rainfall event. Each sample was collected from the center of the channel at mid-depth. The samples were not filtered.

Sediment samples were collected from three locations (SE56A, SE56B, and SE56C) within the storm water drainage system. Samples SE56A and SE56C were collected from the same location as Samples SW56A and SW56C. Sample SE56B was collected approximately 75 feet downstream of Sample SW56B.

2.2.3 Analytical Procedures

All samples were sent to CH2M HILL's Analytical Services in Montgomery, Alabama for analyses. Three surface soil, three subsurface soil, and one sediment samples were analyzed for VOCs, SVOCs, pesticides, TAL metals, and dioxins. The surface water sample was analyzed for VOCs, SVOCs, pesticides, total metals, soluble metals, and dioxins. Samples received at the laboratory were analyzed in accordance with the procedures outlined in the *Generic Quality Assurance Project Plan* (CH2M HILL, 1995) for the RI/FS currently being conducted at the DDMT.

A United States Army Corps of Engineers (COE) split sample was collected from the zero- to one-foot interval of Sample SB56A. This one surface soil sample was sent to COE's Atlanta, Georgia laboratory for analysis of VOCs, SVOCs, pesticides, TAL metals, and dioxins.

A data quality evaluation (DQE) was performed to assess the effect of the overall analytical process on the usability of the data CH2M HILL collected in 1997. The DQE established that the detection of acetone and bis(2-ethylhexyl)phthalate can be attributed to field sampling and laboratory contamination rather than to environmental conditions at the site. Also, low concentrations of dioxins and furans can be attributed to background or instrument noise and

are not indicative of environmental conditions. With the exception of the qualifications listed above, the DQE concluded that data can be used in the project decision-making process.

3.0 Interpretation of Sampling Results

3.1 Presentation of Results

Sections 3.1.1 through 3.1.4 present the results of the Screening Sites Sampling Program for Screening Site 56. Data are presented separately by media for surface soil, subsurface soil, surface water, and sediment. Data are compared with appropriate screening criteria in five summary tables: Tables 56-A, 56-B, 56-C, 56-D, and 56-E. Data from the 1997 CH2M HILL investigation are presented along with historical data from the *Remedial Investigations at DDMT, Final Report* (Law Environmental, 1990). If a value from a sampling location exceeds one of the comparison criteria, that value and the comparison criterion are shown in bold on the summary table.

COPCs are those parameters that exceed both background values and the screening criteria. Where concentrations exceed the selected background value, a comparison is made with the observed range of background values as reviewed and established by the BRAC Cleanup Team (BCT).

Nine COPCs have been identified for Screening Site 56: aluminum, arsenic, chromium, iron, lead, manganese, dichlorodiphenyldichloroethane (DDD), dichlorodiphenyldichloroethylene (DDE), and selenium. There are three other contaminants that exceeded screening level criteria values but had no background value for comparison: alpha endosulfan, dichlorodiphenyltrichloroethane (DDT), and silver; therefore, these are also identified as COPCs. Dieldrin, a sitewide COPC, was detected at this site as well, but will be evaluated on a sitewide basis. Benzo(a)pyrene, another sitewide COPC, was not detected in any of the media evaluated at Screening Site 56. Bis(2-ethylhexyl)phthalate can be attributed to field sampling and laboratory contamination rather than to environmental conditions at the site as established in the DQE.

3.1.1 Surface Soil

Results of the surface soil analyses with values above detection limits are shown in Tables 56-A and 56-B.

3.1.1.1 BCT Screening Criteria

Table 56-A shows a summary of constituents for which the BCT had selected screening criteria. Aluminum, arsenic, chromium, iron, and manganese were detected at concentrations exceeding the BCT criteria and background values.

Aluminum, arsenic, chromium and iron were detected in all four surface soil sample locations. For each of these chemicals, only one sample concentration of the four detected exceeded background and BCT criteria values.

Aluminum was detected in Sample SB56A at 27,600 milligrams per kilogram (mg/kg), which exceeds the BCT criteria (background) value of 24,000 mg/kg. Arsenic was detected in Sample SS56A at 20.2 mg/kg, which slightly exceeds the BCT criteria (background) value of 20 mg/kg.

Aluminum and arsenic concentrations in surface soil at Screening Site 56 are considered to be typical of background values.

Chromium was detected in Sample SS56B at 71.6 mg/kg. This concentration exceeds the background value of 24.8 mg/kg and the BCT criteria value of 39 mg/kg. Iron was detected in Sample SS56B at 66,100 mg/kg, which exceeds the BCT criteria (background) value of 37,000 mg/kg.

Manganese was detected in all four surface soil sample locations as well. Three of the concentrations detected exceed the BCT criteria (background) value of 1,300 mg/kg. The highest exceedance was detected in Sample SB56A at 2,260 mg/kg. The other two exceedances were detected in Samples SS56B and SS56C at 1400 mg/kg and 1,500 mg/kg, respectively.

3.1.1.2 Other Screening Criteria

Table 56-B compares the remaining constituents with the soil ingestion screening criteria for both residential and industrial exposure scenarios. None of the constituents were detected at concentrations exceeding the background and soil ingestion screening criteria values.

Note that dieldrin, a sitewide COPC, was detected in Sample SS56A at 0.0027 mg/kg, which is below the background value of 0.086 mg/kg and the residential and industrial soil ingestion screening level values of 0.04 mg/kg and 0.36 mg/kg, respectively.

3.1.2 Subsurface Soils

Table 56-C summarizes subsurface soil sampling data. Lead was the only constituent detected at concentrations exceeding the background and groundwater protection criteria values.

Lead was detected in Sample SB56A at the sample depth of 5 to 7 feet and 8 to 10 feet. Sample concentrations were at 24.7 mg/kg and 22 mg/kg, respectively. Since the background value for lead in subsurface soil is 24 mg/kg, samples show that lead concentrations in subsurface soils at Screening Site 56 are typical of background values and may not be site related.

3.1.3 Surface Water

Table 56-D summarizes surface water sampling data. Samples from the CH2M HILL study show dissolved arsenic and dissolved selenium exceeding the background and screening criteria values. Other constituents, including alpha endosulfan, bis(2-ethylhexyl)phthalate, and silver, were detected in concentrations exceeding screening criteria values; however, there are no background values available for comparison. Dieldrin was also detected in the surface water samples.

Dissolved arsenic was detected in two samples. The highest detection was found in Sample SW56B at 0.0892 milligrams per liter (mg/L), which exceeds the Tennessee value of 0.05 mg/L, the ambient water quality criteria for the protection of human health value of 0.000018, and the background value of 0.012 mg/L.

Dissolved selenium was detected only in Sample SW56B at 0.0101 mg/L, which exceeds the Tennessee value of 0.01 mg/L, the ambient water quality criteria for the protection of freshwater aquatic life value of 0.005 mg/L, and the background value of 0.003 mg/L.

The Law study detected alpha endosulfan concentrations in Sample SW2 at 0.00016 mg/L, which exceeds the ambient water quality criteria for the protection of aquatic life value of 0.000056 mg/L. Alpha endosulfan was not detected in the most recent sampling effort.

Bis(2-ethylhexyl)phthalate was detected in the CH2M HILL study Sample SW56C at 0.019 mg/kg and in the Law study Sample SW14 at 0.003 mg/L (estimated). Both sample concentrations exceed the ambient water quality criteria for the protection of human health value of 0.0018 mg/L. Bis(2-ethylhexyl)phthalate can be attributed to field sampling and laboratory contamination rather than to environmental conditions at the site as established in the DQE.

Silver was detected in Sample SW56C at 0.0023 mg/L (estimated), which exceeds the ambient water quality criteria for the protection of aquatic life value of 0.000012 mg/L. There are no background values for any of these constituents (alpha endosulfan, bis[2-ethylhexyl]phthalate, and silver).

Dieldrin was detected in surface water samples SW56A, SW56B, and SW56C at concentrations of 0.00016 mg/L, 0.000057 mg/L (estimated), and 0.000034 mg/L (estimated), respectively. These values exceed the EPA Region IV surface water screening criteria of 0.0000019 mg/L. Dieldrin exists in surface soils sitewide at the DDMT and is found at low concentrations in surface water runoff, possibly from suspended particulates.

3.1.4 Sediment

Table 51-E summarizes the sediment sampling data. The constituents DDD, DDE, and lead were detected at concentrations exceeding background values, and sediment quality screening criteria values. Several polycyclic aromatic hydrocarbons (PAH) compounds--including benzo(a)anthracene, benzo(a)pyrene, and chrysene—were found at concentrations below background but exceeding screening criteria.

The constituent DDD was detected in Samples SE56B and SE56C at estimated concentrations of 0.061 mg/kg and 0.04 mg/kg, respectively. Both samples exceed the background value of 0.0061 mg/kg and the NOAA value of 0.002 mg/kg.

The constituent DDE was detected in Sample SE56B at an estimated concentration of 0.047 mg/kg, which exceeds the background value of 0.0072 mg/kg, the PRG value of 0.0017 mg/kg, and the NOAA value of 0.002 mg/kg.

DDT was detected in Sample SE56A at an estimated concentration of 0.034 mg/kg, which exceeds the NOAA sediment value of 0.001 mg/kg. There is no background value for DDT in sediment for comparison.

Lead was detected in Samples SE56A, SE56B, and SE56C (twice) at estimated concentrations of 25.6 mg/kg, 33.3 mg/kg, 23.6 mg/kg, and 66.9 mg/kg, respectively. The detection of 66.9 mg/kg in SE56C exceeds the background value of 35.2 mg/kg, the PRG value of 21 mg/kg, and the NOAA value of 35 mg/kg.

3.2 Vertical and Lateral Extent

Soil, surface water, and sediment samples were collected at the downstream location of the northern ditch, and the other two ditches were sampled along their entire length. Metals and

pesticides are slightly elevated above the background and or criteria values in the sampling location upstream, indicating, contamination is low, localized and runoff is not active.

Based on the limited data collected so far, it appears that metals (aluminum, chromium, iron, lead, and manganese, with the exception of selenium and silver), persist across all four media evaluated at concentrations similar to background. The highest concentration of metals, those resulting in exceedances, were found in surface soils, among all three drainage ditches. However, lead in all media did not result in any screening criteria exceedances. Although lead levels are slightly above background levels, they are not considered important.

Selenium and silver concentrations were detected only in surface water samples. Selenium was detected in the southeastern drainage ditch, and silver was detected in the southern drainage ditch.

Arsenic was detected in all four media evaluated, with detected concentrations exceeding screening level criteria for surface soils, surface water, and sediment.

In surface water, arsenic was not detected in the southern ditch, which contained high concentrations of arsenic in the surface soil. Dissolved arsenic was detected in surface water at the southeastern drainage ditch and the northern drainage ditch. Detections in the southeastern drainage ditch exceeds background and screening level criteria values.

In sediment, arsenic concentrations were similar in the northern, southern, and southeastern drainage ditches, and all concentrations were below the background value. In summary, arsenic exists at low levels at this site, similar to the background levels.

The COPCs, DDD and DDE were detected only in sediment samples. The constituent DDD was detected in the southern and southeastern drainage ditches, and the concentrations detected in both ditches exceed background and NOAA sediment values. The constituent DDE was detected in the southeastern ditch only, exceeding background and sediment criteria.

The constituent DDT was detected in all three ditches, and concentrations exceed NOAA sediment screening values. There is no background value for DDT in sediment.

Observed metal concentrations were within background levels.

3.3 Potential Migration Pathways

The potential migration pathway for the pesticides and metals detected in this drainage ditch is the runoff through the ditch to the off-site areas. The following paragraphs provide a general discussion of potential migration pathways for COPCs found at Screening Site 56.

Aluminum is a naturally occurring, extremely inert mineral that is a primary component of the native soils in the area. If present as a contaminant, it will only migrate as a soil particle via physical erosion methods and potentially be present as a soil particle in sediment or suspended in surface water during periods of high velocity. Presence in surface soils at the DDMT at concentrations above background for the Memphis area is likely due to the bauxite stockpiles on site; the aluminum-rich bauxite soils having been blown by dust or moved by rain water to the surface soils near where the bauxite was stored or handled.

Lead exists at concentrations greater than screening criteria in subsurface soils, surface water, and sediment at Screening Site 56. Lead is moderately soluble and potentially can be leached from any of these forms of occurrence, reaching concentrations in aqueous solution in both groundwater and surface water that would be of concern to both human and ecological receptors. Additionally, lead in surface soils and sediment potentially may move as suspended particulate matter in surface waters and impact aquatic organisms.

Dieldrin exists at the DDMT in surface and subsurface soils. Since this compound is only minutely soluble in water, its most likely potential migration pathway at this site is via erosion as suspended soil particles in the surface water, where it potentially would be available to aquatic organisms. Dieldrin in the subsurface soils should be relatively immobile and not impact groundwater quality.

DDT and two of its degradation breakdown products, DDD and DDE, exist in sediment at Screening Site 56, indicating migration via uncovered surface soil has occurred. These compounds have an extremely high affinity for soil and are essentially insoluble in water. If soil contaminated with these compounds is uncovered, they potentially are able to be moved through wind action and/or as suspended material in sediments. These compounds can bioaccumulate and become more concentrated as they move up in the food chain and could potentially affect receptors via this migration pathway. As long as they are buried and the potential for direct contact is controlled, the potential to migrate is minimal.

Arsenic is present at Screening Site 56 in surface soils, subsurface soils, surface water, and sediment at concentrations above screening levels. Arsenic's mobility and toxicity are tied to its complex geochemistry and its ability to readily form soluble complexes. Arsenic may also readily be adsorbed onto clays, oxides, or humic organic material and may migrate as suspended soil in surface water or as a sediment. Arsenic can exist in four common oxidation states, and these control its solubility. It readily transports through aquatic environments as a dissolved salt or as a complex with an organic compound.

Chromium has been reported from surface soils, subsurface soils, surface water, and sediment at the DDMT in concentrations greater than the screening levels. Chromium occurs in two oxidation states: +3 and +6. The trivalent form readily combines with aqueous hydroxide to form insoluble chromium hydroxide and is of little risk. The hexavalent form is soluble and tends to stay in solution, unless some activated carbon material is present for it to sorb onto. Dissolved chromium is readily adsorbed onto sediments but may be bioaccumulated through aquatic organisms.

Some manganese compounds are water soluble and may be readily leachable from soil to groundwater. Leachability depends on the characteristics of the soil as well as the chemical form. Adsorption of manganese is highly variable and depends on organic content and the ion exchange potential. Manganese in surface water may oxidize or adsorb to particulate matter and distribute in sediments.

3.4 Additional Data Needs

Evaluation of off-site data should be performed to determine if there has been transport of constituents off site. Additional downgradient sediment and surface water samples may have to be collected if existing data is not sufficient.

4.0 Interpretation of Screening Criteria Comparisons

4.1 Methodology

The Preliminary Risk Evaluation (PRE) was performed in accordance with the *Guidance on Preliminary Risk Evaluations for the Purpose of Reaching a Finding of Suitability to Lease (FOSL)* (EPA Region IV, 1994). A discussion of the PRE methodology is provided as Appendix A to this document.

4.2 Screening Site 56 Risk

Carcinogenic risks and noncarcinogenic ratios for Screening Site 56 are presented Table 4-52 of the draft PRE (USAESC, 1998), and detailed chemical-specific PRE estimates are presented in Appendix A of the PRE.

The PRE risk ratios are above a level of one in a million for both industrial and residential scenarios, from arsenic at 20.2 mg/kg concentration compared to a background level at 20 mg/kg.

The noncarcinogenic PRE ratio was above a value of 1.0 for both industrial and residential scenarios due to the presence of several metals in the soils.

No site-related chemicals are present at the site. Several naturally occurring, nutritionally essential metals were observed in the site soils. No further characterization/investigations are suggested for this site.

5.0 Summary and Recommendations

5.1 Summary

There appears to be slight risks associated with Screening Site 56 because of arsenic being just above background levels. According to Table 5-2, the PRE results indicate that the carcinogenic PRE risk ratio is above 10^{-6} for both residential and industrial scenarios due to arsenic being just above background levels. The PRE results also indicate that noncarcinogenic ratios are above one due to metals. Furthermore, one BRAC boring (A29.2) detected concentrations of dieldrin and chromium above residential risk-based concentrations (RBCs).

5.2 Recommendations

It is recommended that a risk assessment be performed to confirm that No Further Action is required at Screening Site 56. Downgradient, off-site data should be evaluated to determine if transport of sediment and surface water constituents present an ecological health concern.

Table 56-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 56
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
CH2M HILL	ALUMINUM	SB56A	27600	=	24000	24000	Bkgd	MG/KG
CH2M HILL	ALUMINUM	SS56A	11000	=	24000	24000	Bkgd	MG/KG
CH2M HILL	ALUMINUM	SS56B	15700	=	24000	24000	Bkgd	MG/KG
CH2M HILL	ALUMINUM	SS56C	23300	=	24000	24000	Bkgd	MG/KG
CH2M HILL	ARSENIC	SB56A	10.5	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SS56A	10.5	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SS56B	20.2	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SS56C	18.3	=	20	20	Bckg	MG/KG
CH2M HILL	BERYLLIUM	SS56A	0.36	J	1.1	1.1	Bckg	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB56A	24.7	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS56A	11.9	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS56B	71.6	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS56C	27.3	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	IRON	SB56A	29400	=	37000	37000	Bckg	MG/KG
CH2M HILL	IRON	SS56A	19100	J	37000	37000	Bckg	MG/KG
CH2M HILL	IRON	SS56B	66100	=	37000	37000	Bckg	MG/KG
CH2M HILL	IRON	SS56C	34800	=	37000	37000	Bckg	MG/KG
CH2M HILL	LEAD	SB56A	23.7	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SS56A	21.4	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SS56B	308	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SS56C	44.9	=	30	400	CERCLA	MG/KG
CH2M HILL	MANGANESE	SB56A	2260	=	1300	1300	Bckg	MG/KG
CH2M HILL	MANGANESE	SS56A	611	=	1300	1300	Bckg	MG/KG
CH2M HILL	MANGANESE	SS56B	1400	=	1300	1300	Bckg	MG/KG
CH2M HILL	MANGANESE	SS56C	1500	=	1300	1300	Bckg	MG/KG
CH2M HILL	TCDD Equivalent	SB56A	0.00000456	=	.000011	0.00001	Bckg	MG/KG
CH2M HILL	TCDD Equivalent	SS56A	5.343E-06	=	.000011	0.00001	Bckg	MG/KG
CH2M HILL	TCDD Equivalent	SS56B	1.078E-06	=	.000011	0.00001	Bckg	MG/KG
CH2M HILL	TCDD Equivalent	SS56C	2.825E-06	=	.000011	0.00001	Bckg	MG/KG
CH2M HILL	ZINC	SB56A	105	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SS56A	59.8	J	130	23000	Residential RBC	MG/KG

Table 56-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 56
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
CH2M HILL	ZINC	SS56B	158	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SS56C	119	=	130	23000	Residential RBC	MG/KG

Notes:
1. Detected values are obtained from the *Draft Parcel 29 Report-Screening Sites Sampling Program for Defense Depot* Memphis, TN, CH2M HILL, 1997.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. Based on values selected by the BRAC Cleanup Team in the August 1997 BCT meeting minutes, Memphis, Tennessee.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
J - indicates estimated value above the detection limit but below the reporting limit.
BCT - BRAC Cleanup Team

Table 56-B
Summary of Detected Compounds in Surface Soils
Compared to Non-BCT Screening Levels for Site 56
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	Risk-Based Concentrations Soil Ingestion[4]		Units
						Residential	Industrial	
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZO-p-DIOXIN	SB56A	0.000018	J	.00039	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZO-p-DIOXIN	SS56C	0.000421	J	.00039	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZOFURAN	SB56A	0.000003	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZOFURAN	SS56A	0.000005	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZOFURAN	SS56C	0.000049	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,7,8,9-HEXACHLORODIBENZOFURAN	SB56A	0.000012	J	NA	NA	NA	MG/KG
CH2M HILL	2,3,4,6,7,8-HEXACHLORODIBENZOFURAN	SB56A	0.000414	J	NA	NA	NA	MG/KG
CH2M HILL	ACETONE	SS56B	0.013	=	NA	780	20000	MG/KG
CH2M HILL	ACETONE	SS56C	0.006	J	NA	780	20000	MG/KG
CH2M HILL	BARIUM	SB56A	161	=	234	550	14000	MG/KG
CH2M HILL	BARIUM	SS56A	117	=	234	550	14000	MG/KG
CH2M HILL	BARIUM	SS56B	200	=	234	550	14000	MG/KG
CH2M HILL	BARIUM	SS56C	238	=	234	550	14000	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB56A	0.058	J	NA	46	410	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SS56B	0.13	J	NA	46	410	MG/KG
CH2M HILL	CALCIUM	SB56A	1460	=	5840	NA	NA	MG/KG
CH2M HILL	CALCIUM	SS56A	1800	=	5840	NA	NA	MG/KG
CH2M HILL	CALCIUM	SS56B	63500	=	5840	NA	NA	MG/KG
CH2M HILL	CALCIUM	SS56C	6990	=	5840	NA	NA	MG/KG
CH2M HILL	COBALT	SB56A	18.9	=	18.3	470	12000	MG/KG
CH2M HILL	COBALT	SS56A	8.7	=	18.3	470	12000	MG/KG
CH2M HILL	COBALT	SS56B	17.8	=	18.3	470	12000	MG/KG
CH2M HILL	COBALT	SS56C	16.9	=	18.3	470	12000	MG/KG
CH2M HILL	COPPER	SB56A	26.3	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SS56A	18.5	J	33	310	8200	MG/KG
CH2M HILL	COPPER	SS56B	78.4	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SS56C	31.2	=	33	310	8200	MG/KG

Table 56-B
Summary of Detected Compounds in Surface Soils
Compared to Non-BCT Screening Levels for Site 56
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	Risk-Based Concentrations Soil Ingestion[4]		Units
						Residential	Industrial	
CH2M HILL	DIELDRIN	SS56A	0.0027	J	.086	.04	.36	MG/KG
CH2M HILL	MAGNESIUM	SB56A	3270	=	4600	NA	NA	MG/KG
CH2M HILL	MAGNESIUM	SS56A	2120	=	4600	NA	NA	MG/KG
CH2M HILL	MAGNESIUM	SS56B	5360	=	4600	NA	NA	MG/KG
CH2M HILL	MAGNESIUM	SS56C	4250	=	4600	NA	NA	MG/KG
CH2M HILL	NICKEL	SB56A	24.4	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SS56A	15.7	J	30	160	4100	MG/KG
CH2M HILL	NICKEL	SS56B	43.8	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SS56C	30	=	30	160	4100	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SB56A	0.004557	J	.01	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SS56A	0.005337	=	.01	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SS56B	0.001078	J	.01	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SS56C	0.002664	J	.01	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	SB56A	0.000003	J	.00039	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	SS56A	0.000006	J	.00039	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	SS56C	0.000161	J	.00039	NA	NA	MG/KG
CH2M HILL	POTASSIUM	SB56A	1700	=	1820	NA	NA	MG/KG
CH2M HILL	POTASSIUM	SS56A	826	=	1820	NA	NA	MG/KG
CH2M HILL	POTASSIUM	SS56B	1120	=	1820	NA	NA	MG/KG
CH2M HILL	POTASSIUM	SS56C	2450	=	1820	NA	NA	MG/KG
CH2M HILL	SODIUM	SB56A	384	=	NA	NA	NA	MG/KG
CH2M HILL	SODIUM	SS56A	175	J	NA	NA	NA	MG/KG
CH2M HILL	SODIUM	SS56B	402	=	NA	NA	NA	MG/KG
CH2M HILL	VANADIUM	SB56A	44.9	=	48.4	55	1400	MG/KG
CH2M HILL	VANADIUM	SS56A	24.3	=	48.4	55	1400	MG/KG
CH2M HILL	VANADIUM	SS56B	39.2	=	48.4	55	1400	MG/KG

Table 56-B
Summary of Detected Compounds in Surface Soils
Compared to Non-BCT Screening Levels for Site 56
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	Risk-Based Concentrations Soil Ingestion[4]		Units
						Residential	Industrial	
CH2M HILL	VANADIUM	SS56C	50.9	=	48.4	55	1400	MG/KG

Notes:
1. Detected values are obtained from the *Draft Parcel 29 Report-Screening Sites Sampling Program for Defense Depot Memphis, TN*, CH2M HILL, 1997.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. Risk-Based Concentrations are obtained from the *EPA Region III Risk-based Concentrations Table*, R.L. Smith, April, 1997.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
= - indicates unqualified detection.
J - indicates estimated value above the detection limit but below the reporting limit.

Table 56-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 56
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	2,3,4,6,7,8-HEXACHLORODIBENZOFURAN	SB56A	8 to 10	0.000111	J	NA	NA	MG/KG
CH2M HILL	ALDRIN	SB56A	8 to 10	0.0031	=	NA	.5	MG/KG
CH2M HILL	ALUMINUM	SB56A	5 to 7	26800	=	21829	NA	MG/KG
CH2M HILL	ALUMINUM	SB56A	8 to 10	18200	=	21829	NA	MG/KG
CH2M HILL	ARSENIC	SB56A	5 to 7	13	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB56A	8 to 10	25.9	=	17	29	MG/KG
CH2M HILL	BARIUM	SB56A	5 to 7	422	=	300	1600	MG/KG
CH2M HILL	BARIUM	SB56A	8 to 10	280	=	300	1600	MG/KG
CH2M HILL	BERYLLIUM	SB56A	5 to 7	1.1	=	1.2	63	MG/KG
CH2M HILL	CALCIUM	SB56A	5 to 7	2540	=	2400	NA	MG/KG
CH2M HILL	CALCIUM	SB56A	8 to 10	5670	=	2400	NA	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB56A	5 to 7	30.8	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB56A	8 to 10	35	=	26	38	MG/KG
CH2M HILL	COBALT	SB56A	5 to 7	28	=	20	NA	MG/KG
CH2M HILL	COBALT	SB56A	8 to 10	23.4	=	20	NA	MG/KG
CH2M HILL	COPPER	SB56A	5 to 7	27.6	=	33	NA	MG/KG
CH2M HILL	COPPER	SB56A	8 to 10	41.9	=	33	NA	MG/KG
CH2M HILL	IRON	SB56A	5 to 7	32200	=	38000	NA	MG/KG
CH2M HILL	IRON	SB56A	8 to 10	40800	=	38000	NA	MG/KG
CH2M HILL	LEAD	SB56A	5 to 7	24.7	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB56A	8 to 10	22	=	24	1.5	MG/KG
CH2M HILL	MAGNESIUM	SB56A	5 to 7	4600	=	4900	NA	MG/KG
CH2M HILL	MAGNESIUM	SB56A	8 to 10	6410	=	4900	NA	MG/KG
CH2M HILL	MANGANESE	SB56A	5 to 7	2960	=	1500	NA	MG/KG
CH2M HILL	MANGANESE	SB56A	8 to 10	610	=	1500	NA	MG/KG
CH2M HILL	NICKEL	SB56A	5 to 7	31.7	=	37	130	MG/KG
CH2M HILL	NICKEL	SB56A	8 to 10	38.9	=	37	130	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SB56A	5 to 7	0.000767	J	.009	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SB56A	8 to 10	0.000053	J	.009	NA	MG/KG
CH2M HILL	POTASSIUM	SB56A	5 to 7	1430	=	1800	NA	MG/KG
CH2M HILL	POTASSIUM	SB56A	8 to 10	1310	=	1800	NA	MG/KG

Table 56-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 56
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	SODIUM	SB56A	5 to 7	450	=	NA	NA	MG/KG
CH2M HILL	SODIUM	SB56A	8 to 10	451	=	NA	NA	MG/KG
CH2M HILL	TCDD Equivalent	SB56A	5 to 7	7.67E-07	=	.000006	NA	MG/KG
CH2M HILL	TCDD Equivalent	SB56A	8 to 10	5.3E-08	=	.000006	NA	MG/KG
CH2M HILL	VANADIUM	SB56A	5 to 7	42.1	=	51	6000	MG/KG
CH2M HILL	VANADIUM	SB56A	8 to 10	65.1	=	51	6000	MG/KG
CH2M HILL	ZINC	SB56A	5 to 7	128	=	110	12000	MG/KG
CH2M HILL	ZINC	SB56A	8 to 10	134	=	110	12000	MG/KG

Notes:
1. Detected values are obtained from the *Draft Parcel 29 Report-Screening Sites Sampling Program for Defense Depot Memphis, TN*, CH2M HILL, 1997.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. RBC-GWP values are obtained from the *EPA Region III Risk-based Concentrations Table*, R. L. Smith, April, 1997.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
= - indicates unqualified detection
J - indicates estimated value above the detection limit but below the reporting limit.
RBC-GWP - Risk-Based Concentrations - Groundwater Protection

Table 56-D
Summary of Detected Compounds in Surface Water
Compared to Screening Levels for Site 56
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	TN State[4]	AWQC-HH[5]	AWQC-AO[5]	Units
CH2M HILL	1,2,3,4,6,7,8-	SW56A	1.16E-07	J	NA	NA	NA	NA	MG/L
CH2M HILL	1,2,3,4,6,7,8-	SW56B	7.1E-08	J	NA	NA	NA	NA	MG/L
CH2M HILL	1,2,3,7,8,9-HEXACHLORODIBENZOFURAN	SW56B	2.25E-07	J	NA	NA	NA	NA	MG/L
CH2M HILL	1,2,3,7,8,9-HEXACHLORODIBENZOFURAN	SW56C	0.00000026	J	NA	NA	NA	NA	MG/L
CH2M HILL	2,3,4,6,7,8-HEXACHLORODIBENZOFURAN	SW56A	2.286E-06	J	NA	NA	NA	NA	MG/L
CH2M HILL	2,3,4,6,7,8-HEXACHLORODIBENZOFURAN	SW56B	5.065E-06	J	NA	NA	NA	NA	MG/L
CH2M HILL	2,3,4,6,7,8-HEXACHLORODIBENZOFURAN	SW56C	4.822E-06	J	NA	NA	NA	NA	MG/L
CH2M HILL	ALUMINUM	SW56A	0.602	=	5.1	NA	NA	.087	MG/L
CH2M HILL	ALUMINUM	SW56B	0.302	=	5.1	NA	NA	.087	MG/L
CH2M HILL	ALUMINUM	SW56C	0.228	=	5.1	NA	NA	.087	MG/L
CH2M HILL	ALUMINUM	SW56C	0.319	=	5.1	NA	NA	.087	MG/L
CH2M HILL	ARSENIC	SW56A	0.0068	J	.018	.05	.000018	.19	MG/L
CH2M HILL	ARSENIC	SW56B	0.0051	J	.018	.05	.000018	.19	MG/L
CH2M HILL	Arsenic, Dissolved	SW56A	0.006	J	.012	.05	.000018	.19	MG/L
CH2M HILL	Arsenic, Dissolved	SW56B	0.0892	=	.012	.05	.000018	.19	MG/L
CH2M HILL	BARIUM	SW56A	0.0229	J	.13	1	NA	NA	MG/L
CH2M HILL	BARIUM	SW56B	0.0203	J	.13	1	NA	NA	MG/L
CH2M HILL	BARIUM	SW56C	0.0282	J	.13	1	NA	NA	MG/L
CH2M HILL	BARIUM	SW56C	0.0309	J	.13	1	NA	NA	MG/L
CH2M HILL	Barium, Dissolved	SW56A	0.0195	J	.876	1	NA	NA	MG/L
CH2M HILL	Barium, Dissolved	SW56B	0.0189	J	.876	1	NA	NA	MG/L
CH2M HILL	Barium, Dissolved	SW56C	0.0286	J	.876	1	NA	NA	MG/L
CH2M HILL	Barium, Dissolved	SW56C	0.0288	J	.876	1	NA	NA	MG/L
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SW56C	0.019	=	NA	15	.0018	NA	MG/L
CH2M HILL	CALCIUM	SW56A	17	=	32	NA	NA	NA	MG/L
CH2M HILL	CALCIUM	SW56B	17.5	=	32	NA	NA	NA	MG/L
CH2M HILL	CALCIUM	SW56C	6.19	=	32	NA	NA	NA	MG/L
CH2M HILL	CALCIUM	SW56C	7.13	=	32	NA	NA	NA	MG/L
CH2M HILL	Calcium, Dissolved	SW56A	18.5	=	30	NA	NA	NA	MG/L
CH2M HILL	Calcium, Dissolved	SW56B	18.1	=	30	NA	NA	NA	MG/L
CH2M HILL	Calcium, Dissolved	SW56C	7.33	=	30	NA	NA	NA	MG/L
CH2M HILL	Calcium, Dissolved	SW56C	7.28	=	30	NA	NA	NA	MG/L
CH2M HILL	Chromium, Dissolved	SW56B	0.004	J	.033	.05	NA	.011	MG/L
CH2M HILL	CHROMIUM, TOTAL	SW56B	0.0042	J	.036	.05	NA	.011	MG/L

Table 56-D
Summary of Detected Compounds in Surface Water
Compared to Screening Levels for Site 56
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	TN State[4]	AWQC-HH[5]	AWQC-AO[6]	Units
CH2M HILL	DIELDRIN	SW56A	0.00016	=	NA	NA	NA	NA	MG/L
CH2M HILL	DIELDRIN	SW56B	0.000057	J	NA	NA	NA	NA	MG/L
CH2M HILL	DIELDRIN	SW56C	0.000034	J	NA	NA	NA	NA	MG/L
CH2M HILL	IRON	SW56A	0.531	=	6.1	NA	NA	1	MG/L
CH2M HILL	IRON	SW56B	0.312	=	6.1	NA	NA	1	MG/L
CH2M HILL	IRON	SW56C	0.329	=	6.1	NA	NA	1	MG/L
CH2M HILL	IRON	SW56C	0.458	=	6.1	NA	NA	1	MG/L
CH2M HILL	Iron, Dissolved	SW56A	0.0719	J	.12	NA	NA	1	MG/L
CH2M HILL	Iron, Dissolved	SW56B	0.108	J	.12	NA	NA	1	MG/L
CH2M HILL	Iron, Dissolved	SW56C	0.223	J	.12	NA	NA	1	MG/L
CH2M HILL	Iron, Dissolved	SW56C	0.207	J	.12	NA	NA	1	MG/L
CH2M HILL	LEAD	SW56A	0.0045	=	.019	.05	NA	.0032	MG/L
CH2M HILL	LEAD	SW56B	0.0026	J	.019	.05	NA	.0032	MG/L
CH2M HILL	LEAD	SW56C	0.0036	=	.019	.05	NA	.0032	MG/L
CH2M HILL	LEAD	SW56C	0.0029	J	.019	.05	NA	.0032	MG/L
CH2M HILL	Lead, Dissolved	SW56B	0.0028	J	.023	.05	NA	.0032	MG/L
CH2M HILL	MAGNESIUM	SW56A	1.82	J	7.7	NA	NA	NA	MG/L
CH2M HILL	MAGNESIUM	SW56B	2.14	J	7.7	NA	NA	NA	MG/L
CH2M HILL	MAGNESIUM	SW56C	1.46	J	7.7	NA	NA	NA	MG/L
CH2M HILL	MAGNESIUM	SW56C	1.6	J	7.7	NA	NA	NA	MG/L
CH2M HILL	Magnesium, Dissolved	SW56A	1.91	J	6.9	NA	NA	NA	MG/L
CH2M HILL	Magnesium, Dissolved	SW56B	2.2	J	6.9	NA	NA	NA	MG/L
CH2M HILL	Magnesium, Dissolved	SW56C	1.65	J	6.9	NA	NA	NA	MG/L
CH2M HILL	Magnesium, Dissolved	SW56C	1.63	J	6.9	NA	NA	NA	MG/L
CH2M HILL	MANGANESE	SW56A	0.0147	J	.66	NA	NA	NA	MG/L
CH2M HILL	MANGANESE	SW56B	0.0151	=	.66	NA	NA	NA	MG/L
CH2M HILL	MANGANESE	SW56C	0.0108	J	.66	NA	NA	NA	MG/L
CH2M HILL	MANGANESE	SW56C	0.0131	J	.66	NA	NA	NA	MG/L
CH2M HILL	Manganese, Dissolved	SW56A	0.0031	J	.35	NA	NA	NA	MG/L
CH2M HILL	Manganese, Dissolved	SW56B	0.0068	J	.35	NA	NA	NA	MG/L
CH2M HILL	Manganese, Dissolved	SW56C	0.007	J	.35	NA	NA	NA	MG/L
CH2M HILL	Manganese, Dissolved	SW56C	0.007	J	.35	NA	NA	NA	MG/L
CH2M HILL	NICKEL	SW56A	0.0071	J	.023	.0134	.61	.16	MG/L
CH2M HILL	NICKEL	SW56B	0.0109	J	.023	.0134	.61	.16	MG/L

Table 56-D
Summary of Detected Compounds in Surface Water
Compared to Screening Levels for Site 56
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	TN State[4]	AWQC-HH[5]	AWQC-AO[6]	Units
CH2M HILL	NICKEL	SW56C	0.0121	J	.023	.0134	.61	.16	MG/L
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SW56A	7.035E-06	J	.000001225	NA	NA	NA	MG/L
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SW56B	6.413E-06	J	.000001225	NA	NA	NA	MG/L
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SW56C	1.63E-07	J	.000001225	NA	NA	NA	MG/L
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SW56C	2.36E-07	J	.000001225	NA	NA	NA	MG/L
CH2M HILL	OCTACHLORODIBENZOFURAN	SW56A	2.24E-07	J	NA	NA	NA	NA	MG/L
CH2M HILL	OCTACHLORODIBENZOFURAN	SW56B	1.79E-07	J	NA	NA	NA	NA	MG/L
CH2M HILL	POTASSIUM	SW56A	2.59	J	7.3	NA	NA	NA	MG/L
CH2M HILL	POTASSIUM	SW56B	1.79	J	7.3	NA	NA	NA	MG/L
CH2M HILL	POTASSIUM	SW56C	1.7	J	7.3	NA	NA	NA	MG/L
CH2M HILL	POTASSIUM	SW56C	1.53	J	7.3	NA	NA	NA	MG/L
CH2M HILL	Potassium, Dissolved	SW56A	2.45	J	6.7	NA	NA	NA	MG/L
CH2M HILL	Potassium, Dissolved	SW56B	1.53	J	6.7	NA	NA	NA	MG/L
CH2M HILL	Potassium, Dissolved	SW56C	1.59	J	6.7	NA	NA	NA	MG/L
CH2M HILL	Potassium, Dissolved	SW56C	2.5	J	6.7	NA	NA	NA	MG/L
CH2M HILL	Selenium, Dissolved	SW56B	**0.0101**	=	.003	**.01**	NA	.005	MG/L
CH2M HILL	Silver, Dissolved	SW56C	**0.0023**	**J**	NA	.05	NA	**.000012**	MG/L
CH2M HILL	SODIUM	SW56A	0.74	J	21	NA	NA	NA	MG/L
CH2M HILL	SODIUM	SW56B	0.859	J	21	NA	NA	NA	MG/L
CH2M HILL	SODIUM	SW56C	0.584	J	21	NA	NA	NA	MG/L
CH2M HILL	SODIUM	SW56C	0.692	J	21	NA	NA	NA	MG/L
CH2M HILL	Sodium, Dissolved	SW56A	0.57	J	22	NA	NA	NA	MG/L
CH2M HILL	Sodium, Dissolved	SW56B	0.777	J	22	NA	NA	NA	MG/L
CH2M HILL	Sodium, Dissolved	SW56C	0.661	J	22	NA	NA	NA	MG/L
CH2M HILL	Sodium, Dissolved	SW56C	0.598	J	22	NA	NA	NA	MG/L
CH2M HILL	TCDD Equivalent	SW56A	7.259E-09	=	.0000000082	NA	NA	NA	MG/L
CH2M HILL	TCDD Equivalent	SW56B	6.592E-09	=	.0000000082	NA	NA	NA	MG/L
CH2M HILL	TCDD Equivalent	SW56C	1.63E-10	=	.0000000082	NA	NA	NA	MG/L
CH2M HILL	TCDD Equivalent	SW56C	2.36E-10	=	.0000000082	NA	NA	NA	MG/L
CH2M HILL	VANADIUM	SW56B	0.0032	J	.039	NA	NA	NA	MG/L
CH2M HILL	Vanadium, Dissolved	SW56B	0.0093	J	NA	NA	NA	NA	MG/L
CH2M HILL	ZINC	SW56A	0.03	J	.29	5	NA	.11	MG/L
CH2M HILL	ZINC	SW56B	0.0251	J	.29	5	NA	.11	MG/L
CH2M HILL	ZINC	SW56C	0.0634	J	.29	5	NA	.11	MG/L

Table 56-D
Summary of Detected Compounds in Surface Water
Compared to Screening Levels for Site 56
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	TN State[4]	AWQC-HH[5]	AWQC-AO[6]	Units
CH2M HILL	ZINC	SW56C	0.0702	J	.29	5	NA	.11	MG/L
CH2M HILL	Zinc, Dissolved	SW56C	0.0588	=	.41	5	NA	.11	MG/L
CH2M HILL	Zinc, Dissolved	SW56C	0.064	=	.41	5	NA	.11	MG/L
LAW	ACETONE	SW14	0.11	=	NA	NA	NA	NA	MG/L
LAW	ACETONE	SW2	0.005	J	NA	NA	NA	NA	MG/L
LAW	ALPHA ENDOSULFAN	SW2	0.00016	=	NA	NA	NA	.000056	MG/L
LAW	BARIUM	SW14	0.042	=	.13	1	NA	NA	MG/L
LAW	BARIUM	SW2	0.076	=	.13	1	NA	NA	MG/L
LAW	BENZOIC ACID	SW14	0.003	J	NA	NA	NA	NA	MG/L
LAW	bis(2-ETHYLHEXYL) PHTHALATE	SW14	0.003	J	NA	15	.0018	NA	MG/L
LAW	CHROMIUM, TOTAL	SW14	0.01	=	.036	.05	NA	.011	MG/L
LAW	CHROMIUM, TOTAL	SW2	0.02	=	.036	.05	NA	.011	MG/L
LAW	COPPER	SW2	0.023	=	.075	1	NA	.012	MG/L
LAW	METHYL ETHYL KETONE (2-BUTANONE)	SW14	0.004	J	.002	NA	NA	NA	MG/L
LAW	METHYLENE CHLORIDE	SW2	0.001	J	NA	1.5	.0047	1.93	MG/L
LAW	ZINC	SW14	0.036	=	.29	5	NA	.11	MG/L
LAW	ZINC	SW2	0.029	=	.29	5	NA	.11	MG/L

Notes:
1. Detected values are obtained from the *Draft Parcel 29 Report-Screening Sites Sampling Program for Defense Depot Memphis, TN*, CH2M HILL, 1997, and the *Remedial Investigation at DDMT Final Report*, Law Environmental, August 1990.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. Tennessee State values are from Table 3-8 of the *Generic Remedial Investigation/Feasibility Study Work Plan*, CH2M HILL, August 1995.
5. Federal Ambient Water Quality Criteria for the Protection of Human Health for the Ingestion of Organisms and Water (AWQC-HH) values are from Table 3-8 of the *Generic Remedial Investigation/Feasibility Study Work Plan*, CH2M HILL, August 1995.
6. Federal Ambient Water Quality Criteria, Chronic for the Protection of Freshwater Aquatic Life (AWQC-AO) values are from Table 3-8 of the *Generic Remedial Investigation/Feasibility Study Work Plan*, CH2M HILL, August 1995.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
= - indicates unqualified detection.
J - indicates estimated value above the detection limit but below the reporting limit.

Table 56-E
Summary of Detected Compounds in Sediment
Compared to Screening Levels for Site 56
Screening Sites Sampling Program
Defense Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	PRG-Sed[4]	NOAA-Sed[5]	Units
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZO-p-	SE56A	0.007862	=	.00058	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZO-p-	SE56B	0.000384	J	.00058	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZO-p-	SE56C	0.00018	J	.00058	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZOFURAN	SE56A	0.0014	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZOFURAN	SE56B	0.000092	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZOFURAN	SE56C	0.00048	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,7,8,9-HEPTACHLORODIBENZOFURAN	SE56A	0.000021	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,7,8-HEXACHLORODIBENZO-p-DIOXIN	SE56A	0.000014	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,7,8-HEXACHLORODIBENZOFURAN	SE56A	0.000018	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,6,7,8-HEXACHLORODIBENZO-P-DIOXIN	SE56A	0.000007	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,6,7,8-HEXACHLORODIBENZO-P-DIOXIN	SE56C	0.000025	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,6,7,8-HEXACHLORODIBENZOFURAN	SE56A	0.000012	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,6,7,8-HEXACHLORODIBENZOFURAN	SE56C	0.000008	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,7,8,9-HEXACHLORODIBENZO-P-DIOXIN	SE56A	0.000025	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,7,8,9-HEXACHLORODIBENZO-P-DIOXIN	SE56C	0.000018	J	NA	NA	NA	MG/KG
CH2M HILL	ACENAPHTHYLENE	SE56A	0.038	J	NA	NA	NA	MG/KG
CH2M HILL	ALPHA-CHLORDANE	SE56B	0.032	J	2.4	NA	NA	MG/KG
CH2M HILL	ALUMINUM	SE56A	1960	=	10000	NA	NA	MG/KG
CH2M HILL	ALUMINUM	SE56B	2180	=	10000	NA	NA	MG/KG
CH2M HILL	ALUMINUM	SE56C	1630	=	10000	NA	NA	MG/KG
CH2M HILL	ALUMINUM	SE56C	2700	=	10000	NA	NA	MG/KG
CH2M HILL	ANTHRACENE	SE56A	0.094	J	1.6	.085	.085	MG/KG
CH2M HILL	ANTHRACENE	SE56C	1.1	J	1.6	.085	.085	MG/KG
CH2M HILL	ARSENIC	SE56A	3.9	=	12	8	3.3	MG/KG
CH2M HILL	ARSENIC	SE56B	3.1	J	12	8	3.3	MG/KG
CH2M HILL	ARSENIC	SE56C	2	=	12	8	3.3	MG/KG
CH2M HILL	ARSENIC	SE56C	4.5	=	12	8	3.3	MG/KG
CH2M HILL	BARIUM	SE56A	24.6	=	118	NA	NA	MG/KG
CH2M HILL	BARIUM	SE56B	71.2	=	118	NA	NA	MG/KG
CH2M HILL	BARIUM	SE56C	17	J	118	NA	NA	MG/KG
CH2M HILL	BARIUM	SE56C	48.6	=	118	NA	NA	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	SE56A	0.53	=	2.9	.16	.23	MG/KG

Table 56-E
Summary of Detected Compounds in Sediment
Compared to Screening Levels for Site 56
Screening Sites Sampling Program
Defense Depot Memphis, Tennessee

Data	Parameter[2]	StationID	Detected	Project	Background	PRG-Sed[4]	NOAA-Sed[5]	Units
CH2M HILL	BENZO(a)ANTHRACENE	SE56B	0.44	J	2.9	.16	.23	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	SE56C	0.9	J	2.9	.16	.23	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	SE56C	1.3	J	2.9	.16	.23	MG/KG
CH2M HILL	BENZO(a)PYRENE	SE56A	0.32	J	2.5	.23	.4	MG/KG
CH2M HILL	BENZO(a)PYRENE	SE56B	0.4	J	2.5	.23	.4	MG/KG
CH2M HILL	BENZO(a)PYRENE	SE56C	0.72	J	2.5	.23	.4	MG/KG
CH2M HILL	BENZO(a)PYRENE	SE56C	1.7	J	2.5	.23	.4	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	SE56A	0.83	=	2.2	NA	NA	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	SE56B	0.5	J	2.2	NA	NA	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	SE56C	1.1	J	2.2	NA	NA	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	SE56C	1.6	J	2.2	NA	NA	MG/KG
CH2M HILL	BENZO(g,h,i)PERYLENE	SE56A	0.18	J	1.8	NA	NA	MG/KG
CH2M HILL	BENZO(g,h,i)PERYLENE	SE56B	0.27	J	1.8	NA	NA	MG/KG
CH2M HILL	BENZO(g,h,i)PERYLENE	SE56C	0.32	J	1.8	NA	NA	MG/KG
CH2M HILL	BENZO(k)FLUORANTHENE	SE56A	0.64	=	2.3	NA	NA	MG/KG
CH2M HILL	BENZO(k)FLUORANTHENE	SE56B	0.45	J	2.3	NA	NA	MG/KG
CH2M HILL	BENZO(k)FLUORANTHENE	SE56C	0.94	J	2.3	NA	NA	MG/KG
CH2M HILL	BENZO(k)FLUORANTHENE	SE56C	1.6	J	2.3	NA	NA	MG/KG
CH2M HILL	BERYLLIUM	SE56A	0.07	J	1.3	NA	NA	MG/KG
CH2M HILL	BERYLLIUM	SE56B	0.05	J	1.3	NA	NA	MG/KG
CH2M HILL	BERYLLIUM	SE56C	0.04	J	1.3	NA	NA	MG/KG
CH2M HILL	CALCIUM	SE56A	25900	=	15000	NA	NA	MG/KG
CH2M HILL	CALCIUM	SE56B	243000	=	15000	NA	NA	MG/KG
CH2M HILL	CALCIUM	SE56C	51400	=	15000	NA	NA	MG/KG
CH2M HILL	CALCIUM	SE56C	39300	=	15000	NA	NA	MG/KG
CH2M HILL	CARBAZOLE	SE56A	0.18	J	1.1	NA	NA	MG/KG
CH2M HILL	CARBAZOLE	SE56C	0.33	J	1.1	NA	NA	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SE56A	12.1	J	20	33	80	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SE56B	26.5	J	20	33	80	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SE56C	16.7	J	20	33	80	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SE56C	28.1	J	20	33	80	MG/KG
CH2M HILL	CHRYSENE	SE56A	1	=	3.2	.22	.4	MG/KG
CH2M HILL	CHRYSENE	SE56B	0.72	J	3.2	.22	.4	MG/KG

Table 56-E
Summary of Detected Compounds in Sediment
Compared to Screening Levels for Site 56
Screening Sites Sampling Program
Defense Depot Memphis, Tennessee

Data	Parameter[2]	StationID	Detected	Project	Background	PRG-Sed[4]	NOAA-Sed[5]	Units
CH2M HILL	CHRYSENE	SE56C	1.6	J	3.2	.22	.4	MG/KG
CH2M HILL	CHRYSENE	SE56C	1.8	J	3.2	.22	.4	MG/KG
CH2M HILL	COBALT	SE56A	2.1	J	14	NA	NA	MG/KG
CH2M HILL	COBALT	SE56B	2.3	J	14	NA	NA	MG/KG
CH2M HILL	COBALT	SE56C	3.3	J	14	NA	NA	MG/KG
CH2M HILL	COBALT	SE56C	3.6	J	14	NA	NA	MG/KG
CH2M HILL	COPPER	SE56A	6.8	J	58	28	70	MG/KG
CH2M HILL	COPPER	SE56B	22.8	J	58	28	70	MG/KG
CH2M HILL	COPPER	SE56C	5	J	58	28	70	MG/KG
CH2M HILL	COPPER	SE56C	11.1	J	58	28	70	MG/KG
CH2M HILL	DIELDRIN	SE56A	0.077	J	.011	NA	NA	MG/KG
CH2M HILL	DIELDRIN	SE56C	0.038	J	.011	NA	NA	MG/KG
CH2M HILL	DIELDRIN	SE56C	0.064	J	.011	NA	NA	MG/KG
CH2M HILL	FLUORANTHENE	SE56A	1.2	=	7.1	.38	.6	MG/KG
CH2M HILL	FLUORANTHENE	SE56B	1	J	7.1	.38	.6	MG/KG
CH2M HILL	FLUORANTHENE	SE56C	2.2	J	7.1	.38	.6	MG/KG
CH2M HILL	FLUORANTHENE	SE56C	2.8	J	7.1	.38	.6	MG/KG
CH2M HILL	GAMMA-CHLORDANE	SE56B	0.048	J	2	NA	NA	MG/KG
CH2M HILL	INDENO(1,2,3-c,d)PYRENE	SE56A	0.21	J	1.7	NA	NA	MG/KG
CH2M HILL	INDENO(1,2,3-c,d)PYRENE	SE56B	0.31	J	1.7	NA	NA	MG/KG
CH2M HILL	INDENO(1,2,3-c,d)PYRENE	SE56C	0.39	J	1.7	NA	NA	MG/KG
CH2M HILL	IRON	SE56A	6080	=	23000	NA	NA	MG/KG
CH2M HILL	IRON	SE56B	9770	=	23000	NA	NA	MG/KG
CH2M HILL	IRON	SE56C	4880	=	23000	NA	NA	MG/KG
CH2M HILL	IRON	SE56C	8510	=	23000	NA	NA	MG/KG
CH2M HILL	LEAD	SE56A	25.6	J	35.2	21	35	MG/KG
CH2M HILL	LEAD	SE56B	33.3	J	35.2	21	35	MG/KG
CH2M HILL	LEAD	SE56C	23.6	J	35.2	21	35	MG/KG
CH2M HILL	LEAD	SE56C	66.9	J	35.2	21	35	MG/KG
CH2M HILL	MAGNESIUM	SE56A	1620	=	2400	NA	NA	MG/KG
CH2M HILL	MAGNESIUM	SE56B	7780	=	2400	NA	NA	MG/KG
CH2M HILL	MAGNESIUM	SE56C	1930	=	2400	NA	NA	MG/KG
CH2M HILL	MAGNESIUM	SE56C	1990	=	2400	NA	NA	MG/KG

Table 56-E
Summary of Detected Compounds in Sediment
Compared to Screening Levels for Site 56
Screening Sites Sampling Program
Defense Depot Memphis, Tennessee

Data	Parameter[2]	StationID	Detected	Project	Background	PRG-Sed[4]	NOAA-Sed[5]	Units
CH2M HILL	MANGANESE	SE56A	72.5	J	870	NA	NA	MG/KG
CH2M HILL	MANGANESE	SE56B	160	J	870	NA	NA	MG/KG
CH2M HILL	MANGANESE	SE56C	64.9	J	870	NA	NA	MG/KG
CH2M HILL	MANGANESE	SE56C	177	J	870	NA	NA	MG/KG
CH2M HILL	MERCURY	SE56B	0.12	=	4	.1	.15	MG/KG
CH2M HILL	METHYL ETHYL KETONE (2-BUTANONE)	SE56C	0.014	J	.01	NA	NA	MG/KG
CH2M HILL	NICKEL	SE56A	4.4	=	30	NA	30	MG/KG
CH2M HILL	NICKEL	SE56B	19.1	=	30	NA	30	MG/KG
CH2M HILL	NICKEL	SE56C	3.6	J	30	NA	30	MG/KG
CH2M HILL	NICKEL	SE56C	7.5	=	30	NA	30	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SE56A	0.06677	=	.0086	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SE56B	0.005248	=	.0086	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SE56C	0.002896	J	.0086	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SE56C	0.029301	=	.0086	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	SE56A	0.002989	J	NA	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	SE56B	0.000153	J	NA	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	SE56C	0.001085	J	NA	NA	NA	MG/KG
CH2M HILL	p,p'-DDD	SE56B	0.061	J	.0061	NA	.002	MG/KG
CH2M HILL	p,p'-DDD	SE56C	0.04	J	.0061	NA	.002	MG/KG
CH2M HILL	p,p'-DDE	SE56B	0.047	J	.0072	.0017	.002	MG/KG
CH2M HILL	p,p'-DDT	SE56A	0.034	J	NA	NA	.001	MG/KG
CH2M HILL	p,p'-DDT	SE56B	0.16	J	NA	NA	.001	MG/KG
CH2M HILL	p,p'-DDT	SE56C	0.071	J	NA	NA	.001	MG/KG
CH2M HILL	p,p'-DDT	SE56C	0.11	J	NA	NA	.001	MG/KG
CH2M HILL	PENTACHLOROPHENOL	SE56A	0.08	J	NA	NA	NA	MG/KG
CH2M HILL	PHENANTHRENE	SE56A	0.29	J	6.9	.14	.225	MG/KG
CH2M HILL	PHENANTHRENE	SE56B	0.57	J	6.9	.14	.225	MG/KG
CH2M HILL	PHENANTHRENE	SE56C	1	J	6.9	.14	.225	MG/KG
CH2M HILL	PHENANTHRENE	SE56C	1.7	J	6.9	.14	.225	MG/KG
CH2M HILL	POTASSIUM	SE56A	257	J	1560	NA	NA	MG/KG
CH2M HILL	POTASSIUM	SE56B	419	J	1560	NA	NA	MG/KG
CH2M HILL	POTASSIUM	SE56C	194	J	1560	NA	NA	MG/KG
CH2M HILL	POTASSIUM	SE56C	350	J	1560	NA	NA	MG/KG

Table 56-E
Summary of Detected Compounds in Sediment
Compared to Screening Levels for Site 56
Screening Sites Sampling Program
Defense Depot Memphis, Tennessee

Data	Parameter[2]	StationID	Detected	Project	Background	PRG-Sed[4]	NOAA-Sed[5]	Units
CH2M HILL	PYRENE	SE56A	1.2	=	2.9	.29	NA	MG/KG
CH2M HILL	PYRENE	SE56B	0.89	J	2.9	.29	NA	MG/KG
CH2M HILL	PYRENE	SE56C	2	J	2.9	.29	NA	MG/KG
CH2M HILL	PYRENE	SE56C	2.3	J	2.9	.29	NA	MG/KG
CH2M HILL	SODIUM	SE56A	136	J	240	NA	NA	MG/KG
CH2M HILL	SODIUM	SE56B	149	J	240	NA	NA	MG/KG
CH2M HILL	TCDD Equivalent	SE56A	6.98E-05	=	.0000054	NA	NA	MG/KG
CH2M HILL	TCDD Equivalent	SE56B	5.4E-06	=	.0000054	NA	NA	MG/KG
CH2M HILL	TCDD Equivalent	SE56C	2.9E-06	=	.0000054	NA	NA	MG/KG
CH2M HILL	TCDD Equivalent	SE56C	3.04E-05	=	.0000054	NA	NA	MG/KG
CH2M HILL	VANADIUM	SE56A	8.2	=	30	NA	NA	MG/KG
CH2M HILL	VANADIUM	SE56B	17.5	=	30	NA	NA	MG/KG
CH2M HILL	VANADIUM	SE56C	7.4	=	30	NA	NA	MG/KG
CH2M HILL	VANADIUM	SE56C	13.1	=	30	NA	NA	MG/KG
CH2M HILL	ZINC	SE56A	37.1	J	797	68	120	MG/KG
CH2M HILL	ZINC	SE56B	117	J	797	68	120	MG/KG
CH2M HILL	ZINC	SE56C	53.8	J	797	68	120	MG/KG
CH2M HILL	ZINC	SE56C	115	J	797	68	120	MG/KG

Notes:

1. Detected values are obtained from the *Draft Parcel 29 Report-Screening Sites Sampling Program for Defense Depot Memphis, TN*, CH2M HILL, 1997.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. Sediment Preliminary Remediation Goal (PRG) values are from Table 3-10 of the *Generic Remedial Investigation/Feasibility Study Work Plan*, CH2M HILL, August 1995.
5. National Oceanic and Atmospheric Administration (NOAA) values are from Table 3-10 of the *Generic Remedial Investigation/Feasibility Study Work Plan*, CH2M HILL, August 1995.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
=, - indicates unqualified detection
J - indicates estimated value above the detection limit but below the reporting limit.

TAB

Parcel 30

Parcel 30

Screening Sites Sampling Program

for

Defense Distribution Depot Memphis, Tennessee

March 1998

Prepared for

U.S. Army Engineering and Support Center, Huntsville

Prepared by

CH2M HILL

2567 Fairlane Drive

Montgomery, Alabama 36116

137449.RR.ZZ

Parcel 30
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Parcel 30 is a 1,679-square-foot (ft^2) parcel in the northwestern portion of the Main Installation in Operable Unit (OU)-4 (shown in Figure 1). Parcel 30 consists of Buildings 925 and 949 and the adjacent railroad tracks.

The screening sites in this document have been identified by the Defense Distribution Depot Memphis, Tennessee (DDMT) through a review of existing documents, interviews with facility personnel, and knowledge of the facility's operations. Screening sites are locations at the DDMT where there is a potential for materials to have been released to the environment from past operations. The following screening site is in Parcel 30:

- Screening Site 83–Dried Paint Disposal Area

Although Building 925 is not a screening site and is not further discussed in the screening site letter report, it was the scene of a volatile organic compound (VOC) spill in 1988. The building was rebuilt, and the spill area formerly inside of the building is now primarily outside of the building to the south. Because the spill occurred in 1988 and was cleaned up, there should be no more VOCs remaining. Nonetheless, the BCT recommends that additional sampling occur south of Building 925, which is Parcel 30.2.

Sites where there is a confirmed presence of contaminants from past operations are addressed in the Remedial Investigation Sampling Program. Other facilities have been addressed in the Base Realignment and Closure (BRAC) Sampling Program. Results of these programs are addressed in separate reports.

The purpose of the Screening Sites Sampling Program is to identify whether past activities at each site have resulted in releases from the site that would require further investigation. The intent is not to fully delineate the nature and extent of soil or groundwater contamination attributable to past operations, but to conduct technically based screening analyses sufficient to identify the likelihood of contamination.

The purpose of this letter report is to evaluate the results of the Screening Sites Sampling Program and sampling from previous investigations and to recommend No Further Action or further investigation at screening sites in this parcel. The remainder of the report presents the results of past investigations; Screening Sites Sampling Program strategy, procedures, and results; and recommendations for each site.

Surface soils, subsurface soils, surface water, and sediments were investigated as part of the Screening Sites Sampling Program. Surface soil samples (any sample whose lowest depth is two feet or less) were taken both as independent samples and as the upper interval of a soil boring profile. Thus, surface soil samples taken as part of a soil boring may have an "SB" designation, and are initially discussed under Subsurface Soil Sampling Procedure (Section 2.2.2.2).

However, the results from that upper interval are presented in the surface soil tables and discussions in Section 3.0.

Screening Site 83–Dried Paint Disposal Area

1.0 Introduction

The chart below presents the location and status information for this screening site.

Parcel	Building Number	RI/FS[1] OU	Site Number	CERCLA[2] Status
30	Dried Paint Disposal Area	4	83	Screening

[1]RI/FS = Remedial Investigation/Feasibility Study
[2]CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act

Screening Site 83, apparently used as a disposal site for dried paint residues, is adjacent to the south side of Building 949 (Figure 1).

2.0 Study Area Investigation

2.1 Previous Investigations

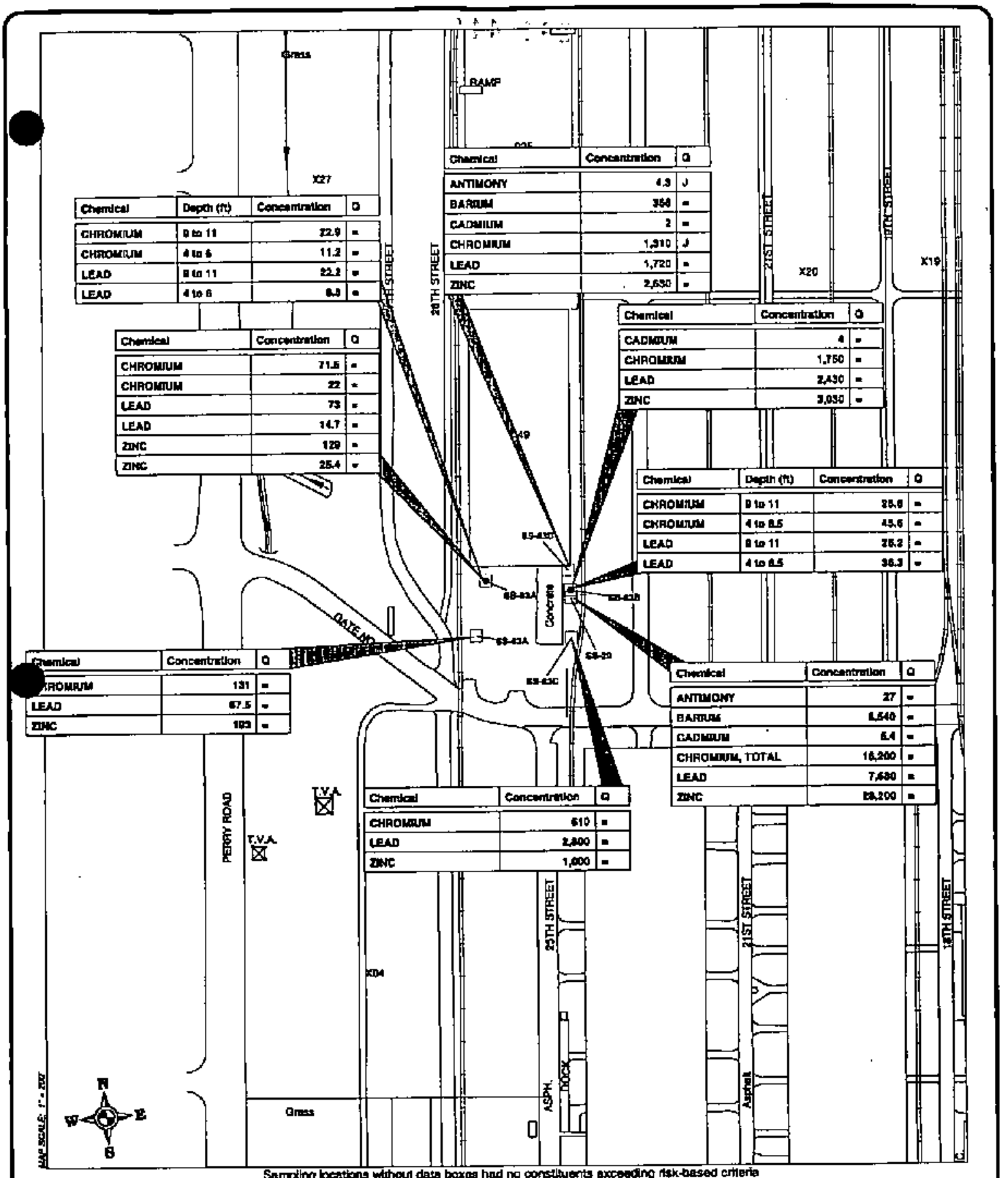
Table B-8 and Figure 4-36 in the *Screening Sites Field Sampling Plan* (CH2M HILL, 1995) present the historical data for the site. One sample was previously collected at the site.

According to the *Remedial Investigations at DDMT, Final Report* (Law Environmental, 1990), one surface soil sample (SS20) was collected at Screening Site 83 in 1989. This sample detected metals, pesticide, volatile organic compounds (VOCs), and semivolatile organic compounds (SVOCs). Historical data from Screening Site 83 is summarized by media below. Contaminants of potential concern (COPC) at historical sites are shown in Figure 1.

2.1.1 Surface Soil

In Sample SS20, methylene chloride, total xylenes, toluene, and acetone were the VOCs that were detected. However, methylene chloride, a common laboratory contaminant, and toluene were detected at concentrations greater than sample quantitation limits, and methylene chloride is qualified as having been found in the method blank. Bis(2-Ethylhexyl)phthalate (BEHP) and 2-methylnaphthalene (reported in Sample SS20 at 2,300 micrograms per kilogram [µg/kg] and 2,600 µg/kg, respectively) were the SVOC, detected in surface soil at the site at concentrations less than sample quantitation limits. BEHP has been found in several of the project blanks and has been eliminated from being a site-related chemical in the data quality evaluations.

Dichlorodiphenyldichloroethylene (DDE) and dichlorodiphenyltrichloroethane (DDT) (reported in Sample SS20 at 490 µg/kg and 1800 µg/kg, respectively) were the only two pesticides that were detected in surface soil at Screening Site 83. Sample SS20 was analyzed for polychlorinated biphenyls (PCBs), but none were detected. Several inorganic compounds commonly found in soil were also detected at elevated concentrations in Sample SS20. Among these inorganic compounds are lead, barium, chromium, and zinc at concentrations of 7,680,



Sampling locations without data boxes had no constituents exceeding risk-based criteria

LEGEND

- Surface Soil Sampling Location (mg/kg)
- Soil Boring Sampling Location (mg/kg)

(Q) Qualifier Definitions
= - Indicates unqualified detection
J - Indicates estimated value above detection limit, but below reporting limit

Figure 1
Site 83, Dried Paint Disposal Area
Constituents Exceeding Risk-Based Criteria
Defense Distribution Depot Memphis, TN

CH2MHILL

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5,640, 16,200 and 28,200 µg/kg, respectively. The concentrations of all detected inorganic compounds will be compared to established background concentrations and critical values in Section 3.1.

2.2 Screening Site Sampling Program

2.2.1 Sampling Strategy

The sampling strategy was developed to evaluate whether releases have occurred to surface soils and subsurface soils. Samples were analyzed for SVOCs, VOCs, and metals. At least one sample from each media was analyzed for target compound list/target analyte list (TCL/TAL) constituents in accordance with the *Screening Sites Field Sampling Plan* (CH2M HILL, 1995).

2.2.2 Sampling Procedures

Sections 2.2.2.1 and 2.2.2.2 describe the sampling procedures and laboratory analyses performed for surface and subsurface soil.

2.2.2.1 Surface Soil Sampling Procedures

With the approval of the Tennessee Department of Environment and Conservation (TDEC) and the U.S. Environmental Protection Agency (EPA), surface soil samples were collected from five locations (SS83A, SS83B, SS83C, SB83A, and SB83B) at this site (shown in Figure 1). The following details the sample locations:

- Sample SS83A was taken east of 27th Street and the railroad tracks that parallel it and south of the southwest corner of Building 949 in a gravel area just 4 feet west and 2 feet south of the concrete pad (not shown on Figure 1).
- Sample SS83B was taken 18 feet south of Building 949 and 3 feet east of the eastern side of the concrete pad that extends south of Building 949.
- Sample SS83C was taken north of G Street and south of Building 949 just 12 feet north of where the concrete starts from G Street and 2 feet east of the eastern side of the concrete.

Locations of surface soil samples associated with borings are described in Section 2.2.2.2.

The soil was removed from the ground using a standard stainless-steel hand auger. VOC samples were immediately collected from the top six inches before being mixed. Part of the VOC sample was placed into a sealable plastic bag and allowed to equilibrate. The head space in the plastic bag was measured for VOCs using a hand-held photoionization detector (PID), and the results were used to determine which interval within each boring might be selected for Level 3 analyses. The soil was transferred into a stainless-steel bowl using stainless-steel trowels, mixed, and then placed into the appropriate sample jars.

2.2.2.2 Subsurface Soil Sampling Procedures

With the approval of the TDEC and EPA, subsurface soil samples were collected from two locations (SB83A and SB83B) at this site. At both locations, samples were taken at three depths: 0 to 1 foot, 4 to 6 feet, and 9 to 11 feet. The following details the sample locations:

- Sample SB83A was located in a gravel area southwest of Building 949 (not shown on Figure 1). The sample was taken 1 feet west of the concrete pad south of Building 949 and 14 feet north of a telephone pole west of the concrete pad.
- Sample SB83B was located southeast of Building 949, 37 feet south of the southeast corner of Building 949 and 1 feet east of the concrete pad south of Building 949.

The samples were collected using a 2-inch-diameter, stainless-steel push sampler. VOC soil samples were collected directly from the continuous sampler using stainless-steel spoons. Part of the VOC sample was placed into a sealable plastic bag and allowed to equilibrate. The head space in the plastic bag was measured for VOCs using a hand-held PID, and the results were used to determine which interval within each boring might be selected for Level 3 analyses. The remaining soil was placed into a stainless-steel bowl, mixed, and then transferred into the appropriate sample jar.

All sampling tools are decontaminated before use according to the *Generic Quality Assurance Project Plan* (CH2M HILL, 1995) for the RI/FS currently being conducted at the DDMT.

2.2.3 Analytical Procedures

All samples were sent to CH2M HILL's Analytical Services in Montgomery, Alabama for analyses. Three surface and six subsurface soil samples were analyzed for VOCs, SVOCs, metals, and TCL/TAL. Samples received at the laboratory were analyzed in accordance with procedures outlined in the *Generic Quality Assurance Project Plan* (CH2M HILL, 1995).

A data quality evaluation (DQE) was performed to assess the effect of the overall analytical process on the usability of the data CH2M HILL collected in 1997. The DQE established that the detection of acetone and bis(2-ethylhexyl)phthalate can be attributed to field sampling and laboratory contamination rather than to environmental conditions at the site. Also, low concentrations of dioxins and furans can be attributed to background or instrument noise and are not indicative of environmental conditions. With the exception of the qualifications listed above, the DQE concluded that data can be used in the project decision-making process.

3.0 Interpretation of Sampling Results

3.1 Presentation of Results

Sections 3.1.1 and 3.1.2 present the results of the Screening Sites Sampling Program for Screening Site 83. Data are presented separately for surface soil and subsurface soil and are compared with appropriate screening criteria in three summary tables: Tables 83-A, 83-B, and 83-C. Data from the 1997 CH2M HILL investigation are presented along with historical data from the *Remedial Investigations at DDMT, Final Report* (Law Environmental, 1990). If a value from a sampling location exceeds one of the comparison criteria, that value and the comparison criterion are shown in **bold** on the summary table.

COPCs are those parameters that exceed both background values and the screening criteria. Where concentrations exceed the selected background value, a comparison is made with the observed range of background values as reviewed and established by the BRAC Cleanup Team (BCT).

There are eight COPCs identified for Screening Site 83: antimony, barium, beryllium, cadmium, chromium, iron, lead, and zinc. Dieldrin and benzo(a)pyrene, which have been identified by the BCT as sitewide COPCs, will be evaluated on a sitewide basis. However, it should be noted that no concentrations of dieldrin or benzo(a)pyrene were detected at Screening Site 83 sample locations.

3.1.1 Surface Soil

Results of the surface soil analyses with values above detection limits are shown in Tables 83-A and 83-B.

3.1.1.1 BCT Screening Criteria

Table 83-A summarizes constituents for which the BCT has selected a screening criteria. Antimony, beryllium, chromium, lead, and zinc were detected at concentrations exceeding the BCT criteria and background values.

Antimony, beryllium, and iron were detected in the CH2M HILL study in one sample only. Antimony was detected in Sample SS83B at 4.3 milligrams per kilogram (mg/kg), which is below background and BCT criteria values of 7 mg/kg each. The Law study shows that antimony was found in Sample SS20 at 27 mg/kg, which exceeds background and BCT criteria values. The more recent samples show that antimony concentrations in surface soil at Screening Site 83 are below background values. Beryllium was detected in Sample SS83B at 1.6 mg/kg, which slightly exceeds the background and BCT criteria values of 1.1 mg/kg each. Iron was detected in Sample SS83B at 54,500 mg/kg, which exceeds the background and BCT criteria values of 37,000 mg/kg each.

The CH2M HILL study detected six chromium concentrations ranging from 22 to 1,750 mg/kg in six surface soil samples. Five of these detections exceeded the background value of 24.8 mg/kg and the BCT criteria value of 39 mg/kg, with the lowest exceedance at 71.5 mg/kg in Sample SB83A and the highest exceedance at 1750 mg/kg in Sample SB83B.

Lead was detected in six CH2M HILL surface soil samples ranging in concentration from 14.7 mg/kg to 2430 mg/kg. Three of these detections greatly exceeded the background value of 30 mg/kg and the BCT value of 400 mg/kg. The previous sampling conducted by Law detected lead in Sample SS20 at 7680 mg/kg.

The zinc concentrations in six surface soil samples were well below the BCT criteria value of 23,000 mg/kg. However, the Law study detected zinc in Sample SS20 at 28,200 mg/kg.

3.1.1.2 Other Screening Criteria

Table 83-B compares the remaining constituents with the soil ingestion screening criteria for both residential and industrial exposure scenarios. Cadmium and barium were the only compounds detected at concentrations exceeding the screening level values.

Cadmium concentrations were detected in the CH2M HILL Sample SB83B at 4 mg/kg, which slightly exceeds the residential soil ingestion screening criteria value of 3.9 mg/kg and the background value of 1.4 mg/kg. The Law study detected concentrations of cadmium in Sample SS20 at 5.4 mg/kg.

Barium was detected in Sample SS83B at 366 mg/kg, which is below residential (550 mg/kg) and industrial (14000 mg/kg) soil ingestion screening criteria values. Nonetheless, the Law study detected barium concentrations at 6540 mg/kg in Sample SS20, which exceeds the residential soil ingestion screening criteria value.

3.1.2 Subsurface Soils

Table 83-C summarizes subsurface soil sampling data. Chromium and lead were detected at concentrations exceeding groundwater protection screening level values.

Chromium concentrations were detected in four CH2M HILL samples ranging from 11.2 mg/kg to 45.6 mg/kg. The highest detection of 45.6 mg/kg in Sample SB83B (at the 4- to 6-foot depth) exceeded the groundwater protection criteria value of 38 mg/kg and the background value of 26 mg/kg. Chromium concentrations were observed to both increase and decrease with depth.

Lead concentrations were detected in the same four samples as chromium ranging from 8.8 to 36.3 mg/kg. These concentrations exceed the screening level value of 1.5 mg/kg. The highest detection of 36.3 mg/kg in Sample SB83B also exceeds the background value of 24 mg/kg. Lead concentrations at Sample SB83B decreased from the upper borehole sample (36.3 mg/kg between 4 and 6.5 feet) to the lower interval sample (26.6 mg/kg between 9 and 11 feet), while lead concentrations at Sample SB83A were observed to increase from the upper sample (8.8 mg/kg between 4 and 6 feet) to the lower sample (22.2 mg/kg between 9 and 11 feet).

3.2 Vertical and Lateral Extent

Because the Screening Site Sampling Program was designed only to show the presence or absence of contamination, a complete characterization of vertical and lateral extent could not be conducted.

Six soil samples were collected from contaminated soils around the concrete pad near Building 949. Metals expected in the paint material were detected at concentrations well above screening criteria in a localized area south the building and east of the concrete pad. The elevated concentration of inorganic chemicals is limited to the surface soil. However, the highest detected metals concentration was located in the southeast corner of the building. The extent of metals in soil to the north and east of Sample SS-83B, south of Sample SS83C, and east of Sample SB83B should be evaluated for site management decisions. Subsurface soils collected from four feet and deeper were not impacted from paint chip disposal activities. However, contamination could be limited to the first foot.

For both sample locations, the lowest concentration for each of the COPCs were normally detected at boring sample locations of 4 to 6 feet in depth. Only lead and chromium concentrations detected in Sample SB83B at depths of 4 to 6 feet and 9 to 11 feet, southeast of Building 949, slightly exceed background and groundwater protection screening level values.

The other five COPCs (antimony, barium, beryllium, cadmium, and iron) were mostly detected in the surface soils. Beryllium and cadmium concentrations were detected in one boring sample each. Note that antimony and barium were detected below screening criteria levels in the

CH2M HILL study, the most recent study; iron was only detected in the CH2M HILL study and within the background value range.

3.3 Potential Migration Pathways

The potential migration pathways for this site are surface runoff of the surface soil elevated metals and leaching to the groundwater. There is not a consistently increasing trend in metal concentration between upper and lower soil samples, and lead concentrations are close to background levels. Therefore, it is not evident that metals have significantly migrated through the soil column and ultimately towards groundwater. There are no significant surface water features within or in the immediate vicinity of the site, thus surface runoff is not a major issue for this site. The following paragraphs provide a general discussion of potential migration pathways for COPCs found at Screening Site 83.

Mobility of barium in soil depends on cation exchange capacity and calcium carbonate, sulfate, and chloride content. Carbonate and sulfate precipitate barium, while chloride forms of barium increase solubility and mobility. Barium is strongly adsorbed by clay materials. Barium can form salts with chloride, acetate, nitrate, and hydroxide ions in soil, resulting in an increased water solubility and mobility. The water solubility of barium compounds generally increases with decreasing pH. In aqueous solutions, barium tends to precipitate as an insoluble salt or adsorb to suspended particulates. Sulfate and carbonate increase this tendency.

Chromium has been reported from surface and subsurface soils at Screening Site 83 in concentrations greater than the screening levels. Chromium occurs in two oxidation states: +3 and +6. The trivalent form readily combines with aqueous hydroxide to form insoluble chromium hydroxide and is of little risk. The hexavalent form is soluble and tends to stay in solution, unless some activated carbon material is present for it to sorb onto. Dissolved chromium is readily adsorbed onto sediments but may be bioaccumulated through aquatic organisms.

Lead is present at concentrations greater than background, or above screening criteria, in surface and subsurface soils at Screening Site 83. Lead is moderately soluble and can be leached from any of these forms of occurrence, reaching concentrations in aqueous solution in both groundwater and surface water which, would be of concern to both human and ecological receptors. Additionally, lead in surface soils potentially may move as suspended particulate matter in surface waters and impact aquatic organisms.

3.4 Additional Data Needs

The extent of paint chip distribution within the surface soils has not been well defined. Additional samples are needed to define the extent of metals contamination for site management decisions.

4.0 Interpretation of Screening Criteria Comparisons

4.1 Methodology

The Preliminary Risk Evaluation (PRE) was performed in accordance with the *Guidance on Preliminary Risk Evaluations for the Purpose of Reaching a Finding of Suitability to Lease (FOSL)* (EPA Region IV, 1994). A discussion of the PRE methodology is provided as Appendix A to this document.

4.2 Screening Site 83 Risk

Carcinogenic risks and noncarcinogenic ratios for Screening Site 83 are presented in Table 4-53 of the draft PRE (USAESC, 1998). Detailed chemical-specific PRE estimates are presented in Appendix A of the PRE.

The carcinogenic PRE risk ratio is above one-in-a-million level for both industrial and residential scenarios, from the presence of polycyclic aromatic hydrocarbons (PAHs) and low-level chlorinated pesticides in the soil samples.

The non-carcinogenic PRE ratios were above a value of 1.0 for both industrial and residential scenarios, primarily due to metals lead, iron, chromium, and zinc. The past paint operations may have impacted the regional soil, which indicate presence of high levels of metals in the soils and should be further evaluated.

5.0 Summary and Recommendations

5.1 Summary

The site has been impacted by paint chip disposal, and metals are high indicating potential human health impacts if exposures were to occur. According to Table 5-2, the PRE results indicate that the carcinogenic PRE risk ratio is above 10^{-6} for both industrial and residential scenarios, due to the presence of PAHs and other chlorinated pesticides. Noncarcinogenic ratios were above one due to metals.

5.2 Recommendations

Further site management decisions should be made for the risks at the site. The extent of metals distribution should be further defined prior to corrective actions.

Table 83-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 83
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
CH2M HILL	ALUMINUM	SS83B	16700	=	24000	24000	Bkgd	MG/KG
CH2M HILL	ANTIMONY	SS83B	4.3	J	7	7	Bckg	MG/KG
CH2M HILL	ARSENIC	SB83A	8.9	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SB83A	9.9	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SB83B	8.7	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SS83A	8.9	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SS83B	2.6	J	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SS83C	7.7	=	20	20	Bckg	MG/KG
CH2M HILL	BERYLLIUM	SS83B	1.6	=	1.1	1.1	Bckg	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB83A	22	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB83A	71.5	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB83B	1750	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS83A	131	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS83B	1310	J	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS83C	610	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	IRON	SS83B	54500	=	37000	37000	Bckg	MG/KG
CH2M HILL	LEAD	SB83A	14.7	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SB83A	73	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SB83B	2430	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SS83A	67.5	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SS83B	1720	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SS83C	2800	=	30	400	CERCLA	MG/KG
CH2M HILL	MANGANESE	SS83B	282	=	1300	1300	Bckg	MG/KG
CH2M HILL	ZINC	SB83A	25.4	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SB83A	129	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SB83B	3030	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SS83A	193	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SS83B	2630	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SS83C	1000	=	130	23000	Residential RBC	MG/KG
LAW	2-METHYLNAPHTHALENE	SS20	2.6	=	NA	310	Residential RBC	MG/KG
LAW	ANTIMONY	SS20	27	=	7	7	Bckg	MG/KG

Table 83-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 83
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
LAW	ARSENIC	SS20	15	=	20	20	Bckg	MG/KG
LAW	BENZO(b)FLUORANTHENE	SS20	0.35	J	.78	0.88	Residential RBC	MG/KG
LAW	CHROMIUM, TOTAL	SS20	16200	=	24.8	39	Residential RBC	MG/KG
LAW	CHRYSENE	SS20	0.36	J	.94	88	Residential RBC	MG/KG
LAW	LEAD	SS20	7680	=	30	400	CERCLA	MG/KG
LAW	PYRENE	SS20	0.66	J	1.5	230	Residential RBC	MG/KG
LAW	ZINC	SS20	28200	=	130	23000	Residential RBC	MG/KG

Notes:

1. Detected values are obtained from the *Draft Parcel 30 Report-Screening Sites Sampling Program for Defense Depot* Memphis, TN, CH2M HILL, 1997, and the *Remedial Investigation at DDMT Final Report*, Law Environmental, August 1990.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. Based on values selected by the BRAC Cleanup Team in the August 1997 BCT meeting minutes, Memphis, Tennessee.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
J - indicates estimated value above the detection limit but below the reporting limit.
= - indicates unqualified detection.
BCT - BRAC Cleanup Team

Table 83-B
Summary of Detected Compounds in Surface Soils
Compared to Non-BCT Screening Levels for Site 83
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	Risk-Based Concentrations Soil Ingestion[4]		Units
						Residential	Industrial	
CH2M HILL	ACETONE	SB83A	0.007	J	NA	780	20000	MG/KG
CH2M HILL	ACETONE	SB83A	0.009	J	NA	780	20000	MG/KG
CH2M HILL	ACETONE	SB83B	0.03	=	NA	780	20000	MG/KG
CH2M HILL	BARIUM	SS83B	366	=	234	550	14000	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB83A	0.062	J	NA	46	410	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB83A	0.079	J	NA	46	410	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB83B	0.16	J	NA	46	410	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SS83A	0.094	J	NA	46	410	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SS83C	0.038	J	NA	46	410	MG/KG
CH2M HILL	CADMIUM	SB83B	4	=	1.4	3.9	100	MG/KG
CH2M HILL	CADMIUM	SS83B	2	=	1.4	3.9	100	MG/KG
CH2M HILL	CALCIUM	SS83B	19400	=	5840	NA	NA	MG/KG
CH2M HILL	COBALT	SS83B	16.2	=	18.3	470	12000	MG/KG
CH2M HILL	COPPER	SB83A	10.2	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SB83A	18.3	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SB83B	51	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SS83A	15.4	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SS83B	39.4	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SS83C	17.8	=	33	310	8200	MG/KG
CH2M HILL	DI-n-BUTYL PHTHALATE	SB83A	0.048	J	NA	780	20000	MG/KG
CH2M HILL	MAGNESIUM	SS83B	1540	=	4600	NA	NA	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SB83B	0.003	J	NA	85	760	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SS83A	0.002	J	NA	85	760	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SS83C	0.004	J	NA	85	760	MG/KG
CH2M HILL	NICKEL	SB83A	7.6	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SB83A	15	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SB83B	41	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SS83A	30.2	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SS83B	28.3	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SS83C	15.2	=	30	160	4100	MG/KG

Table 83-B
Summary of Detected Compounds in Surface Soils
Compared to Non-BCT Screening Levels for Site 83
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	Risk-Based Concentrations Soil Ingestion[4]		Units
						Residential	Industrial	
CH2M HILL	p,p'-DDE	SS83B	0.44	=	.16	1.9	17	MG/KG
CH2M HILL	p,p'-DDT	SS83B	1.7	=	.074	1.9	17	MG/KG
CH2M HILL	POTASSIUM	SS83B	2370	=	1820	NA	NA	MG/KG
CH2M HILL	SODIUM	SS83B	1080	J	NA	NA	NA	MG/KG
CH2M HILL	VANADIUM	SS83B	29.2	J	48.4	55	1400	MG/KG
LAW	ACETONE	SS20	0.008	J	NA	780	20000	MG/KG
LAW	BARIUM	SS20	6540	=	234	550	14000	MG/KG
LAW	bis(2-ETHYLHEXYL) PHTHALATE	SS20	2.3	=	NA	46	410	MG/KG
LAW	CADMIUM	SS20	5.4	=	1.4	3.9	100	MG/KG
LAW	COPPER	SS20	41	=	33	310	8200	MG/KG
LAW	DDE	SS20	0.49	=	.16	1.9	17	MG/KG
LAW	DDT	SS20	1.8	=	.074	1.9	17	MG/KG
LAW	MERCURY	SS20	0.18	=	.43	2.3	61	MG/KG
LAW	METHYLENE CHLORIDE	SS20	0.018	=	NA	85	760	MG/KG
LAW	NICKEL	SS20	24	=	30	160	4100	MG/KG
LAW	SELENIUM	SS20	12	=	.81	39	1000	MG/KG
LAW	SILVER	SS20	1.3	=	2	39	1000	MG/KG
LAW	TOLUENE	SS20	0.017	=	.012	1600	41000	MG/KG
LAW	Total Polynuclear Aromatic Hydrocarbons	SS20	0.776	=	NA	NA	NA	MG/KG
LAW	Total Xylenes	SS20	0.001	J	.009	NA	NA	MG/KG

Notes:
1. Detected values are obtained from the *Draft Parcel 30 Report-Screening Sites Sampling Program for Defense Depot Memphis, TN*, CH2M HILL, 1997, and the *Remedial Investigation at DDMT Final Report*, Law Environmental, August 1990.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. Risk-Based Concentrations are obtained from the *EPA Region III Risk-based Concentrations Table*, R.L. Smith, April, 1997.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
= - indicates unqualified detection.
J - indicates estimated value above the detection limit but below the reporting limit.

Table 83-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 83
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	ACETONE	SB83A	9 to 11	0.006	J	NA	16	MG/KG
CH2M HILL	ACETONE	SB83B	4 to 6.5	0.007	J	NA	16	MG/KG
CH2M HILL	ACETONE	SB83B	9 to 11	0.026	=	NA	16	MG/KG
CH2M HILL	ARSENIC	SB83A	4 to 6	6	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB83A	9 to 11	19.1	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB83B	4 to 6.5	20.2	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB83B	9 to 11	25.7	=	17	29	MG/KG
CH2M HILL	BERYLLIUM	SB83A	4 to 6	0.34	J	1.2	63	MG/KG
CH2M HILL	BERYLLIUM	SB83B	9 to 11	1	=	1.2	63	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB83B	9 to 11	0.12	J	NA	3600	MG/KG
CH2M HILL	CADMIUM	SB83A	4 to 6	0.47	J	1.4	8	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB83A	4 to 6	11.2	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB83A	9 to 11	22.9	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB83B	4 to 6.5	45.6	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB83B	9 to 11	26.8	=	26	38	MG/KG
CH2M HILL	COPPER	SB83A	4 to 6	16.3	J	33	NA	MG/KG
CH2M HILL	COPPER	SB83A	9 to 11	36.1	=	33	NA	MG/KG
CH2M HILL	COPPER	SB83B	4 to 6.5	34.6	=	33	NA	MG/KG
CH2M HILL	COPPER	SB83B	9 to 11	43.1	=	33	NA	MG/KG
CH2M HILL	LEAD	SB83A	4 to 6	8.8	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB83A	9 to 11	22.2	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB83B	4 to 6.5	36.3	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB83B	9 to 11	26.2	=	24	1.5	MG/KG
CH2M HILL	NICKEL	SB83A	4 to 6	15.7	J	37	130	MG/KG
CH2M HILL	NICKEL	SB83A	9 to 11	36.1	=	37	130	MG/KG
CH2M HILL	NICKEL	SB83B	4 to 6.5	33.5	=	37	130	MG/KG
CH2M HILL	NICKEL	SB83B	9 to 11	40.1	=	37	130	MG/KG
CH2M HILL	TOLUENE	SB83A	4 to 6	0.002	J	NA	12	MG/KG
CH2M HILL	Total Xylenes	SB83A	4 to 6	0.002	J	.002	190	MG/KG
CH2M HILL	ZINC	SB83A	4 to 6	43.5	J	110	12000	MG/KG
CH2M HILL	ZINC	SB83A	9 to 11	108	=	110	12000	MG/KG

Table 83-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 83
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	ZINC	SB83B	4 to 6.5	148	=	110	12000	MG/KG
CH2M HILL	ZINC	SB83B	9 to 11	124	=	110	12000	MG/KG

Notes:
1. Detected values are obtained from the *Draft Parcel 30 Report-Screening Sites Sampling Program for Defense Depot Memphis, TN*, CH2M HILL, 1997.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum* , CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. RBC-GWP values are obtained from the *EPA Region III Risk-based Concentrations Table* , R. L. Smith, April, 1997.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
= - indicates unqualified detection
J - indicates estimated value above the detection limit but below the reporting limit.
RBC-GWP - Risk-Based Concentrations - Groundwater Protection

TAB

Parcel 32

Parcel 32

Screening Sites Sampling Program

for

Defense Distribution Depot Memphis, Tennessee

March 1998

Prepared for

U.S. Army Engineering and Support Center, Huntsville

Prepared by

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Parcel 32
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Parcel 32 is a 3,148-square-foot (ft^2) parcel in the northwestern portion of the Main Installation in Operable Unit (OU)-4 (shown in Figure 1). Parcel 32 is made up of Buildings 835 and 865; open storage areas X02, X13, and X15; and the adjacent railroad tracks.

The screening sites in this document have been identified by the Defense Distribution Depot Memphis, Tennessee (DDMT) through a review of existing documents, interviews with facility personnel, and knowledge of the facility's operations. Screening sites are locations at the DDMT where there is a potential for materials to have been released to the environment from past operations. The following screening site is in Parcel 32:

- Screening Site 28 – the Recoup Area Building, Building 865

Sites where there is a confirmed presence of contaminants from past operations are addressed in the Remedial Investigation Sampling Program. Other facilities have been addressed in the Base Realignment and Closure (BRAC) Sampling Program. Results of these programs are addressed in separate reports.

The purpose of the Screening Sites Sampling Program is to identify whether past activities at each site have resulted in releases from the site that would require further investigation. The intent is not to fully delineate the nature and extent of soil or groundwater contamination attributable to past operations, but to conduct technically based screening analyses sufficient to identify the likelihood of contamination.

The purpose of this letter report is to evaluate the results of the Screening Sites Sampling Program and sampling from previous investigations and to recommend No Further Action or further investigation at screening sites in this parcel. The following sections present the results of past investigations; Screening Sites Sampling Program strategy, procedures, and results; and recommendations for each site.

Surface soils, subsurface soils, surface water, and sediments were investigated as part of the Screening Sites Sampling Program. Surface soil samples (any sample whose lowest depth is two feet or less) were taken both as independent samples and as the upper interval of a soil boring profile. Thus, surface soil samples taken as part of a soil boring may have an "SB" designation and are initially discussed under Subsurface Soil Sampling Procedure (Section 2.2.2.2). However, the results from that upper interval are presented in the surface soils tables and discussions in Section 3.

Screening Site 28—the Recoup Area Building, Building 865

1.0 Introduction

The chart below presents the location and status information for this screening site.

Parcel	Building Number	RI/FS[1] OU	Site Number	CERCLA[2] Status
32	865	4	28	Screening

[1]RI/FS = Remedial Investigation/Feasibility Study
[2]CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act

Screening Site 28 is a hazardous materials and waste handling area (see Figure 1). The area, which is used to transfer materials from damaged or leaking containers into undamaged containers, began operating in 1986. The area north of Building 865 historically has been used as an open storage area.

Screening Site 28 is situated 75 feet north of G Street and south of Building 835. Building 865 is constructed of concrete block with a poured concrete floor that has a chemical-resistant coating. The materials are placed in separate bays for segregation; bays are bermed to contain spills during repackaging or from leaking containers.

2.0 Study Area Investigation

2.1 Previous Investigations

No previous investigations have been performed for this site.

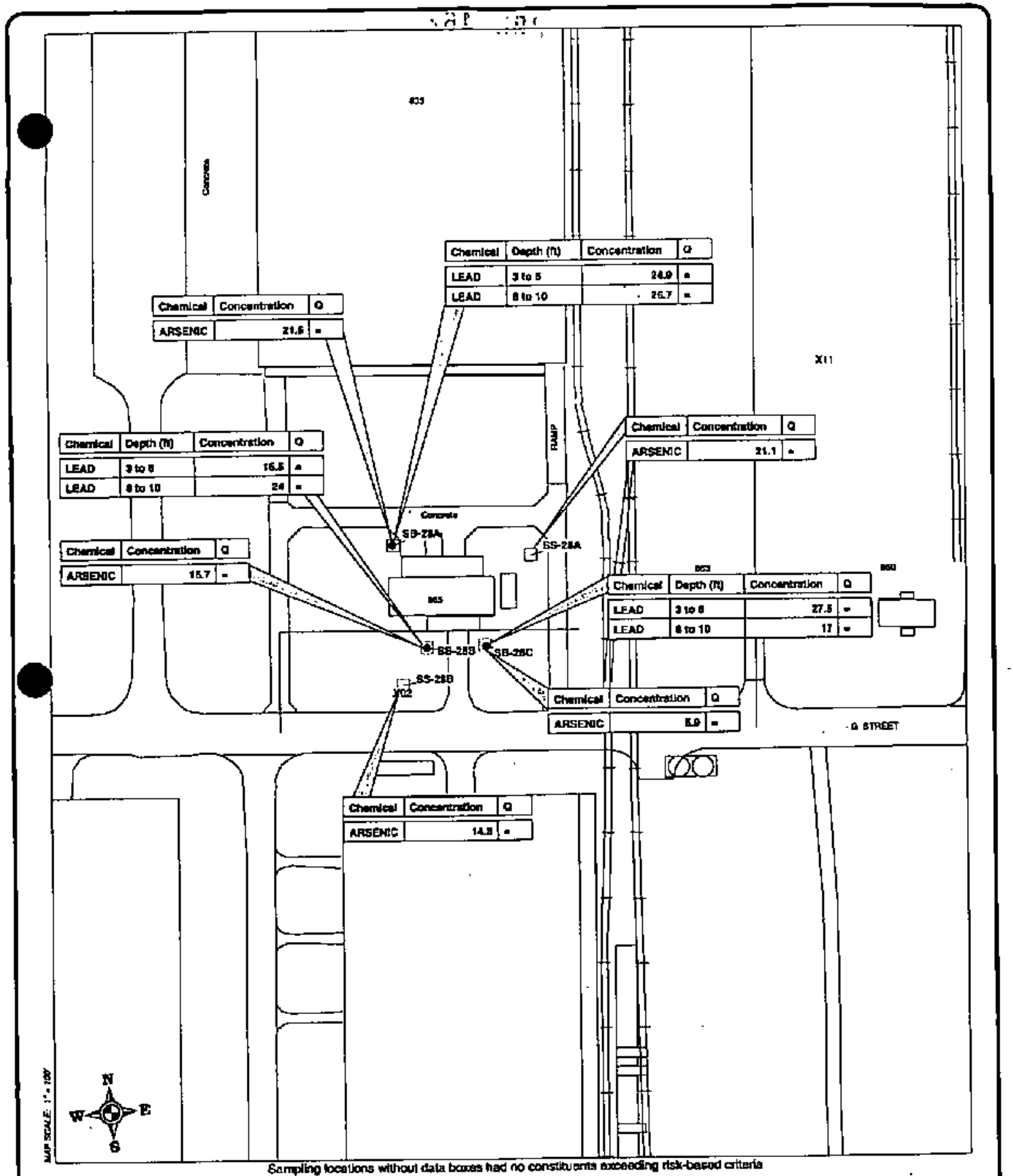
2.2 Screening Site Sampling Program

2.2.1 Sampling Strategy

The sampling strategy was developed to evaluate whether releases have occurred to surface soils and subsurface soils. Samples were analyzed for semivolatile organic compounds (SVOCs), volatile organic compounds (VOCs), pesticides, and metals. At least one sample from each media for each site was analyzed for target compounds list/target analyte list (TCL/TAL) constituents in accordance with the Screening *Sites Field Sampling Plan* (CH2M HILL, 1995).

2.2.2 Sampling Procedures

Sections 2.2.2.1 and 2.2.2.2 describe the sampling procedures and laboratory analyses performed for surface and subsurface soil.



Sampling locations without data boxes had no constituents exceeding risk-based criteria

LEGEND

- ☐ Surface Soil Sampling Location (mg/kg)
- ● Soil Boring Sampling Location (mg/kg)

(Q) Qualifier Definitions
= - Indicates unqualified detection
J - Indicates estimated value above detection limit, but below reporting limit.

Figure 1
Site 28, Building 865
Constituents Exceeding Risk-Based Criteria
Defense Distribution Depot Memphis, TN

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2.2.2.1 Surface Soil Sampling Procedures

With the approval of the Tennessee Department of Environment and Conservation (TDEC) and the U.S. Environmental Protection Agency (EPA), surface soil samples were collected from five locations (SS28A, SS28B, SB28A, SB28B, and SB28C) at this site (shown in Figure 1). The following describes the location of the samples:

- Sample SS28A was taken one foot east of the northeastern corner of Building 865, just 2 inches north of the drainage pipe running from the open storage area.
- Sample SS28B was taken 28 feet south of the southernmost corner of Building 865 and 17 feet west of the concrete drive extending from the south of Building 865, just northeast of a storm drain.

Locations of surface soil samples associated with soil borings are discussed under Section 2.2.2.2.

The soil was removed from the ground using a standard stainless-steel hand auger. VOC samples were immediately collected from the top six inches of soil before mixing the soil. Part of the VOC sample was placed into a sealable plastic bag and allowed to equilibrate. The head space in the plastic bag was measured for VOCs using a hand-held photoionization detector (PID), and the results were used to determine which sample location was selected for Level 3 selected list of chemicals or TCL/TAL analyses. The soil was transferred into a stainless-steel bowl using stainless-steel trowels, mixed, and then placed into the appropriate sample jars.

All sampling tools were decontaminated before being used at each sample location according to the procedures specified in the *Generic Quality Assurance Project Plan* (CH2M HILL, 1995) for the RI/FS currently being conducted at the DDMT.

2.2.2.2 Subsurface Soil Sampling Procedures

With the approval of the TDEC and EPA, subsurface soil samples were collected from three locations (SB28A, SB28B, and SB28C) at this site. At each location, samples were collected at three depths: zero to 1 foot, 3 to 5 feet, and 8 to 10 feet. The following describes the location of the samples:

- Sample SB28A was taken six feet north of Building 865 between two concrete drives. The sample was taken one foot east of the west concrete drive and 8 feet west of the east concrete drive.
- Sample SB28B was taken four feet south of the south side of Building 865 and three feet west of the concrete drive extending from the south of Building 865.
- Sample SB28C was taken four feet south of the south side of Building 865 and three feet east of the concrete drive.

Samples were collected using a 2-inch-diameter, stainless-steel push sampler. VOC soil samples were collected directly from the continuous sampler using stainless-steel spoons. Part of the VOC sample was placed into a sealable plastic bag and allowed to equilibrate. The head space in the plastic bag was measured for VOCs using a hand-held PID, and the results were used to determine which interval within each boring was selected for Level 3 selected list of chemicals

or TCL/TAL analyses. The remaining soil was placed into a stainless-steel bowl, mixed, and then transferred into the appropriate sample jars.

All sampling tools were decontaminated before being used at each sample location according to the procedures specified in the *Generic Quality Assurance Project Plan* (CH2M HILL, 1995).

2.2.3 Analytical Procedures

Two surface soil samples and nine samples from the borings were sent to CH2M HILL's Analytical Services in Montgomery, Alabama for VOC, SVOC, pesticide, metal, and TCL/TAL analyses. Samples received at the laboratory were analyzed in accordance with the procedures outlined in the *Generic Quality Assurance Project Plan* (CH2M HILL, 1995).

TDEC collected a split sample from the 8- to 10-foot interval of Sample SB28A. This subsurface soil sample was sent to TDEC's laboratory for analysis of VOCs, SVOCs, pesticides, and metals.

A data quality evaluation (DQE) was performed to assess the effect of the overall analytical process on the usability of the data CH2M HILL collected in 1997. The DQE established that the detection of acetone and bis(2-ethylhexyl)phthalate can be attributed to field sampling and laboratory contamination rather than to environmental conditions at the site. Also, low concentrations of dioxins and furans can be attributed to background or instrument noise and are not indicative of environmental conditions. With the exception of the qualifications listed above, the DQE concluded that data can be used in the project decision-making process.

3.0 Interpretation of Sampling Results

3.1 Presentation of Results

Sections 3.1.1 through 3.1.4 present the results of the Screening Sites Sampling Program for Screening Site 28. Data are presented by media for surface soil and subsurface soil and are compared with appropriate screening criteria in three summary tables: Tables 28-A, 28-B, and 28-C. Data from the 1997 CH2M HILL investigation are presented along with historical data from the *Remedial Investigations at DDMT, Final Report* (Law Environmental, 1990). If a value from a sampling location exceeds one of the comparison criteria, that value and the comparison criterion are shown in **bold** on the summary table.

COPCs are those parameters that exceed both background values and the screening criteria. Where concentrations exceed the selected background value, a comparison is made with the observed range of background values as reviewed and established by the BRAC Cleanup Team (BCT). The COPCs for Screening Site 28 include arsenic in the surface soils and lead in the subsurface soils.

3.1.1 Surface Soil

Results of the surface soil analyses with values above detection limits are shown in Tables 28-A and 28-B.

3.1.1.1 BCT Screening Criteria

Table 28-A summarizes constituents for which the BCT has selected a screening criteria. Arsenic was detected in five surface soil samples but exceeded screening criteria in only two of those samples. Sample SB28A (21.5 milligrams per kilogram [mg/kg]) and Sample SS28A (21.1 mg/kg) both only slightly exceeded the background criteria of 20 mg/kg. All other detected constituents were at concentrations below the BCT criteria.

Benzo(a)pyrene was found in Sample SB28C at 0.19 mg/kg (estimated), which exceeds the BCT screening criteria of 0.088 mg/kg. The BCT selected the risk-based concentration (RBC) for residential soil ingestion as the screening criteria. The background concentration of 0.96 mg/kg was based on benzo(a)pyrene detected in 9 of 22 background samples at concentrations ranging from 0.044 to 0.96 mg/kg. Although benzo(a)pyrene exceeds the residential RBC, it is within the range of concentrations found in the background samples. The detected benzo(a)pyrene concentrations are similar to those found elsewhere at the site.

3.1.1.2 Other Screening Criteria

Table 28-B compares the remaining constituents with the soil ingestion screening criteria for both residential and industrial exposure scenarios. None of the detected values shown in this table exceeded any of the screening criteria.

3.1.2 Subsurface Soils

Table 28-C summarizes the subsurface soil sampling data. Except for lead, all detected values of all other parameters were below the RBC groundwater protection criteria screening levels. Lead exceeded the groundwater protection criteria and background in three samples (Sample SB28A from 3 to 5 feet and 8 to 10 feet, and Sample SB28C from 3 to 5 feet) and was at or above background only in three other samples (Sample SB28B from 3 to 5 feet and 8 to 10 feet and Sample SB28C from 8 to 10 feet). Detected values of lead above screening levels were 24.9 mg/kg (Sample SB28A from 3 to 5 feet), 26.7 mg/kg (Sample SB28A from 8 to 10 feet), and 27.5 mg/kg (Sample SB28C from 3 to 5 feet). However, these concentrations are very similar to the background concentrations.

3.2 Vertical and Lateral Extent

Five soil samples were collected from Screening Site 28 around the Building 865. Constituents detected at this site are low levels of PAHs and metals. All these chemicals are similar in concentration to those found elsewhere at DDMT.

Arsenic was detected in all five of the surface soil samples associated with this site; however, only two of these samples had levels of arsenic that slightly exceeded the BCT criteria. The three surface soil sample locations south of Building 865 all had detections below the BCT criteria, while the two locations north and northeast of Building 865 had arsenic detections of 21.1 and 21.5 mg/kg, which slightly exceeded the BCT criteria of 20 mg/kg.

Arsenic was detected in all three borings at this site, at every depth that was sampled. However, none of the values detected exceeded the groundwater protection value of 29 mg/kg. Sample SB28A was the only sample in which all depths exceeded the background value of 17 mg/kg but did not exceed the groundwater protection value. Arsenic values in Sample SB28A also

slightly increased with depth. Except for the 3- to 5-foot interval in Sample SB28C, the borings to the south of Building 865 had detections that were below both background and groundwater protection values.

Lead was detected in all five surface soil locations at this site with values ranging from 28.2 to 45.8 mg/kg. None of these detected values exceeded the BCT criteria of 400 mg/kg, but four of the five values exceeded the background values of 30 mg/kg. The lateral distribution of these values appeared to be fairly uniform across the site.

Lead was detected in all three borings at all depths sampled. The highest value in each boring was at the surface, and lead concentrations varied with depth. All subsurface lead concentrations in all three borings exceeded the groundwater protection value of 1.5 mg/kg, but only three concentrations slightly exceeded the background value of 24 mg/kg. The highest overall concentrations of lead were found in Sample SB28A.

The low levels of metals and PAHs detected are not unique to this site. There are no other site-specific contaminants at this site.

3.3 Potential Migration Pathways

The following paragraphs provide a general discussion of potential migration pathways for the COPCs found at Screening Site 28. There are no significant contaminant off-site migration concerns at this site based on the low levels of metals and PAHs detected at this site.

Lead exists at concentrations slightly greater than background, or above screening criteria, in surface and subsurface soils, and in sediment at DDMT. Lead is moderately soluble and potentially can be leached from any of these forms of occurrence, reaching concentrations in aqueous solution in both groundwater.

Arsenic exists at several sites on DDMT in surface soils at concentrations above screening levels. Arsenic's mobility and toxicity are tied to its complex geochemistry and its ability to readily form soluble complexes. Arsenic may also readily be adsorbed onto clays, oxides, or humic organic material and migrate as suspended soil in surface water as a sediment. Arsenic can exist in four common oxication states, and these control its solubility.

3.4 Additional Data Needs

Potential risks associated with metals found at low concentrations, including arsenic and lead, require further comparison of the background population with the data collected. Available data is sufficient to perform this analysis, and additional data collection should not be required.

4.0 Interpretation of Screening Criteria Comparisons

4.1 Methodology

The Preliminary Risk Evaluation (PRE) was performed in accordance with the *Guidance on Preliminary Risk Evaluations for the Purpose of Reaching a Finding of Suitability to Lease (FOSL)* (EPA

Region IV, November 22, 1994). A discussion of the PRE methodology is provided as Appendix A to this document.

4.2 Screening Site 28 Risk

Carcinogenic risks and noncarcinogenic ratios for Screening Site 28 are presented in Table 4-55 of the draft PRE (USAESC, 1998). Detailed chemical-specific PRE estimates are presented in Appendix A of the PRE.

The PRE risk ratios for carcinogenic chemicals were above risk levels of one in a million due to arsenic in the soils at a level of 21.1 and 21.5 mg/kg, compared to a background level of 20 mg/kg.

The noncarcinogenic PRE ratio was less than 1.0 for an industrial worker scenario but was slightly exceeded for a residential scenario due to several inorganic chemicals present at low levels.

Due to the lack of site-related chemical contamination and concentrations of arsenic very close to the background levels, no further evaluation is suggested for this site

5.0 Summary and Recommendations

5.1 Summary

Arsenic and lead were found in every sample at every depth at this site at concentrations similar or slightly exceeding background. The highest concentrations were found to the north and northeast of Building 865. Arsenic concentrations exceeded BCT criteria at two surface soil locations north and northeast of Building 865, but none of the subsurface soil detections exceeded the groundwater protection values.

Lead concentrations in surface soil samples did not exceed BCT criteria. Lead concentrations in subsurface samples exceeded the groundwater protection values but were similar to background values.

Benzo(a)pyrene was found in Sample SB28C at 0.19 mg/kg (estimated), which exceeds the BCT screening criteria of 0.088 mg/kg. Benzo(a)pyrene, is found sitewide at the DDMT because of railroad operations, will be addressed in an upcoming risk evaluation.

5.2 Recommendations

The PRE risk ratios for both industrial and residential scenarios are above 10^{-6} because of arsenic levels slightly above background levels. Additional evaluation for arsenic is necessary due to elevated arsenic concentrations relative to background criteria; however, no further action or additional data are anticipated for this site.

Table 28-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 28
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
CH2M HILL	ACENAPHTHENE	SB28C	0.041	J	NA	470	Residential RBC	MG/KG
CH2M HILL	ANTHRACENE	SB28C	0.094	J	.096	2300	Residential RBC	MG/KG
CH2M HILL	ARSENIC	SB28A	21.5	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SB28B	15.7	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SB28C	5.9	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SS28A	21.1	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SS28B	14.3	=	20	20	Bckg	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	SB28C	0.2	J	.71	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	SS28B	0.05	J	.71	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(a)PYRENE	SB28C	0.19	J	.96	0.088	Residential RBC	MG/KG
CH2M HILL	BENZO(a)PYRENE	SS28B	0.059	J	.96	0.088	Residential RBC	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	SB28C	0.21	J	.78	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	SS28A	0.054	J	.78	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	SS28B	0.076	J	.78	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(g,h,i)PERYLENE	SB28C	0.14	J	.82	230	Residential RBC	MG/KG
CH2M HILL	BENZO(g,h,i)PERYLENE	SS28B	0.049	J	.82	230	Residential RBC	MG/KG
CH2M HILL	BENZO(k)FLUORANTHENE	SB28C	0.18	J	.78	8.8	Residential RBC	MG/KG
CH2M HILL	BENZO(k)FLUORANTHENE	SS28B	0.073	J	.78	8.8	Residential RBC	MG/KG
CH2M HILL	CARBAZOLE	SB28C	0.076	J	.067	32	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB28A	29	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB28B	25.3	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB28C	30.6	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS28A	30.8	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS28B	29.5	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHRYSENE	SB28C	0.24	J	.94	88	Residential RBC	MG/KG
CH2M HILL	CHRYSENE	SS28B	0.073	J	.94	88	Residential RBC	MG/KG
CH2M HILL	DIBENZ(a,h)ANTHRACENE	SB28C	0.061	J	.26	0.088	Residential RBC	MG/KG
CH2M HILL	FLUORANTHENE	SB28C	0.56	=	1.6	310	Residential RBC	MG/KG
CH2M HILL	FLUORANTHENE	SS28B	0.098	J	1.6	310	Residential RBC	MG/KG
CH2M HILL	FLUORENE	SB28C	0.04	J	NA	310	Residential RBC	MG/KG
CH2M HILL	INDENO(1,2,3-c,d)PYRENE	SB28C	0.13	J	.7	0.88	Residential RBC	MG/KG

Table 28-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 28
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
CH2M HILL	INDENO(1,2,3-c,d)PYRENE	SS28B	0.043	J	.7	0.88	Residential RBC	MG/KG
CH2M HILL	LEAD	SB28A	43.5	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SB28B	39.1	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SB28C	28.2	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SS28A	45.8	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SS28B	43.4	=	30	400	CERCLA	MG/KG
CH2M HILL	PHENANTHRENE	SB28C	0.4	=	.61	2300	Residential RBC	MG/KG
CH2M HILL	PHENANTHRENE	SS28B	0.038	J	.61	2300	Residential RBC	MG/KG
CH2M HILL	PYRENE	SB28C	0.32	J	1.5	230	Residential RBC	MG/KG
CH2M HILL	PYRENE	SS28B	0.097	J	1.5	230	Residential RBC	MG/KG
CH2M HILL	ZINC	SB28A	114	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SB28B	114	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SB28C	45.1	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SS28A	1530	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SS28B	80.9	=	130	23000	Residential RBC	MG/KG

Notes:

1. Detected values are obtained from the *Draft Parcel 32 Report-Screening Sites Sampling Program for Defense Depot* Memphis, TN, CH2M HILL, 1997, or the *Remedial Investigation at DDMT Final Report*, Law Environmental, August 1990.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. Based on values selected by the BRAC Cleanup Team in the August 1997 BCT meeting minutes, Memphis, Tennessee.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
J - indicates estimated value above the detection limit but below the reporting limit.
= - indicates unqualified detection
BCT - BRAC Cleanup Team

Table 28-B
Summary of Detected Compounds in Surface Soils
Compared to Non-BCT Screening Levels for Site 28
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	Risk-Based Concentrations Soil Ingestion[4]		Units
						Residential	Industrial	
CH2M HILL	ACETONE	SB28A	0.011	J	NA	780	20000	MG/KG
CH2M HILL	ACETONE	SB28B	0.078	=	NA	780	20000	MG/KG
CH2M HILL	ACETONE	SS28A	0.003	J	NA	780	20000	MG/KG
CH2M HILL	ACETONE	SS28B	0.004	J	NA	780	20000	MG/KG
CH2M HILL	ALPHA-CHLORDANE	SB28C	0.0017	J	.029	.49	4.4	MG/KG
CH2M HILL	ALPHA-CHLORDANE	SS28A	0.072	=	.029	.49	4.4	MG/KG
CH2M HILL	ALPHA-CHLORDANE	SS28B	0.0086	=	.029	.49	4.4	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB28A	0.053	J	NA	46	410	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB28C	0.04	J	NA	46	410	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SS28A	0.27	J	NA	46	410	MG/KG
CH2M HILL	CADMIUM	SS28A	1.8	=	1.4	3.9	100	MG/KG
CH2M HILL	COPPER	SB28A	36.4	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SB28B	30.7	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SB28C	8.9	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SS28A	38.4	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SS28B	16.9	=	33	310	8200	MG/KG
CH2M HILL	DI-n-BUTYL PHTHALATE	SB28A	0.041	J	NA	780	20000	MG/KG
CH2M HILL	DIELDRIN	SB28B	0.0067	J	.086	.04	.36	MG/KG
CH2M HILL	DIELDRIN	SB28C	0.006	J	.086	.04	.36	MG/KG
CH2M HILL	DIELDRIN	SS28B	0.02	=	.086	.04	.36	MG/KG
CH2M HILL	GAMMA-CHLORDANE	SB28C	0.0047	=	.026	.49	4.4	MG/KG
CH2M HILL	GAMMA-CHLORDANE	SS28A	0.11	=	.026	.49	4.4	MG/KG
CH2M HILL	GAMMA-CHLORDANE	SS28B	0.012	=	.026	.49	4.4	MG/KG
CH2M HILL	METHYL ETHYL KETONE (2-BUTANONE)	SB28B	0.01	J	.002	4700	100000	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SB28A	0.002	J	NA	85	760	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SB28B	0.003	J	NA	85	760	MG/KG
CH2M HILL	NICKEL	SB28A	30.9	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SB28B	29.8	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SB28C	12.7	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SS28A	34.3	=	30	160	4100	MG/KG

Table 28-B
Summary of Detected Compounds in Surface Soils
Compared to Non-BCT Screening Levels for Site 28
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	Risk-Based Concentrations Soil Ingestion[4]		Units
						Residential	Industrial	
CH2M HILL	NICKEL	SS28B	17.2	=	30	160	4100	MG/KG
CH2M HILL	p,p'-DDE	SS28B	0.011	=	.16	1.9	17	MG/KG
CH2M HILL	p,p'-DDT	SB28C	0.006	J	.074	1.9	17	MG/KG
CH2M HILL	p,p'-DDT	SS28B	0.028	=	.074	1.9	17	MG/KG

Notes:
1. Detected values are obtained from the *Draft Parcel 32 Report-Screening Sites Sampling Program for Defense Depot Memphis, TN*, CH2M HILL, 1997, and the *Remedial Investigation at DDMT Final Report*, Law Environmental, August 1990.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. Risk-Based Concentrations are obtained from the *EPA Region III Risk-based Concentrations Table*, R.L. Smith, April, 1997.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
J - indicates estimated value above the detection limit but below the reporting limit.
= - indicates unqualified detection

Table 28-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 28
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	ACETONE	SB28A	3 to 5	0.16	=	NA	16	MG/KG
CH2M HILL	ACETONE	SB28B	8 to 10	0.11	=	NA	16	MG/KG
CH2M HILL	ANTHRACENE	SB28A	8 to 10	0.2	J	NA	12000	MG/KG
CH2M HILL	ARSENIC	SB28A	3 to 5	21.6	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB28A	8 to 10	24.8	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB28B	3 to 5	12.4	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB28B	8 to 10	12.2	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB28C	3 to 5	20.9	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB28C	8 to 10	13.2	=	17	29	MG/KG
CH2M HILL	BERYLLIUM	SB28B	3 to 5	0.38	J	1.2	63	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB28A	3 to 5	0.099	J	NA	3600	MG/KG
CH2M HILL	CADMIUM	SB28B	3 to 5	0.45	J	1.4	8	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB28A	3 to 5	22.8	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB28A	8 to 10	32.2	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB28B	3 to 5	15.2	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB28B	8 to 10	24.7	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB28C	3 to 5	28.3	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB28C	8 to 10	22.5	=	26	38	MG/KG
CH2M HILL	COPPER	SB28A	3 to 5	39.8	=	33	NA	MG/KG
CH2M HILL	COPPER	SB28A	8 to 10	38.3	=	33	NA	MG/KG
CH2M HILL	COPPER	SB28B	3 to 5	16.4	J	33	NA	MG/KG
CH2M HILL	COPPER	SB28B	8 to 10	35.2	=	33	NA	MG/KG
CH2M HILL	COPPER	SB28C	3 to 5	32.4	=	33	NA	MG/KG
CH2M HILL	COPPER	SB28C	8 to 10	29.5	=	33	NA	MG/KG
CH2M HILL	DIELDRIN	SB28B	8 to 10	0.0019	J	.37	.004	MG/KG
CH2M HILL	DIELDRIN	SB28C	8 to 10	0.0017	J	.37	.004	MG/KG
CH2M HILL	LEAD	SB28A	3 to 5	24.9	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB28A	8 to 10	26.7	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB28B	3 to 5	15.5	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB28B	8 to 10	24	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB28C	3 to 5	27.5	=	24	1.5	MG/KG

Table 28-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 28
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	LEAD	SB28C	8 to 10	17	=	24	**1.5**	MG/KG
CH2M HILL	METHYL ETHYL KETONE (2-BUTANONE)	SB28B	8 to 10	0.021	=	NA	NA	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SB28A	3 to 5	0.002	J	NA	.02	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SB28A	8 to 10	0.002	J	NA	.02	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SB28B	8 to 10	0.002	J	NA	.02	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SB28C	8 to 10	0.003	J	NA	.02	MG/KG
CH2M HILL	NICKEL	SB28A	3 to 5	37.6	=	37	130	MG/KG
CH2M HILL	NICKEL	SB28A	8 to 10	30.9	=	37	130	MG/KG
CH2M HILL	NICKEL	SB28B	3 to 5	17.7	J	37	130	MG/KG
CH2M HILL	NICKEL	SB28B	8 to 10	34.2	=	37	130	MG/KG
CH2M HILL	NICKEL	SB28C	3 to 5	35.7	=	37	130	MG/KG
CH2M HILL	NICKEL	SB28C	8 to 10	31.8	=	37	130	MG/KG
CH2M HILL	SELENIUM	SB28B	3 to 5	0.57	J	.64	5	MG/KG
CH2M HILL	ZINC	SB28A	3 to 5	131	=	110	12000	MG/KG
CH2M HILL	ZINC	SB28A	8 to 10	154	=	110	12000	MG/KG
CH2M HILL	ZINC	SB28B	3 to 5	58.2	J	110	12000	MG/KG
CH2M HILL	ZINC	SB28B	8 to 10	119	=	110	12000	MG/KG
CH2M HILL	ZINC	SB28C	3 to 5	120	=	110	12000	MG/KG
CH2M HILL	ZINC	SB28C	8 to 10	96.3	=	110	12000	MG/KG

Notes:
1. Detected values are obtained from the *Draft Parcel 32 Report-Screening Sites Sampling Program for Defense Depot Memphis, TN, CH2M HILL, 1997*
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. RBC-GWP values are obtained from the *EPA Region III Risk-based Concentrations Table*, R. L. Smith, April, 1997.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
= - indicates unqualified detection
J - indicates estimated value above the detection limit but below the reporting limit.
RBC-GWP - Risk-Based Concentrations - Groundwater Protection

TAB

Parcel 33

Parcel 33

Screening Sites Sampling Program

for

Defense Distribution Depot Memphis, Tennessee

March 1998

Prepared for

U.S. Army Engineering and Support Center, Huntsville

Prepared by

CH2M HILL

2567 Fairlane Drive

Montgomery, Alabama 36116

137449.RR.ZZ

Parcel 33
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Parcel 33 is a 12,034-square-foot (ft^2) parcel in the northwestern portion of the Main Installation in Operable Unit OU-4 (shown in Figure 1). Parcel 33 is made up of Buildings 720, 737, 753, 754, 755, 756, 765, 860, and 863; open storage areas X05, X06, X07, X08, X10, X11, and X12; and the adjacent railroad tracks.

The screening sites in this document have been identified by the Defense Distribution Depot Memphis, Tennessee (DDMT) through a review of existing documents, interviews with facility personnel, and knowledge of the facility's operations. Screening sites are locations at DDMT where there is a potential for materials to have been released to the environment from past operations. Screening sites in Parcel 33 include the following:

- Screening Site 42 – Former Pentachlorophenol (PCP) Dip Vat Area
- Screening Site 43 – Former Underground PCP Tank Area
- Screening Site 46 – Pallet Drying Area
- Screening Site 80 – Fuel and Cleaners Dispensing, Building 720
- Screening Site 81 – Fuel Oil Building 765

Sites where there is a confirmed presence of contaminants from past operations are addressed in the Remedial Investigation Sampling Program. Other facilities have been addressed in the Base Realignment and Closure (BRAC) Sampling Program. Results of these programs are addressed in separate reports.

The purpose of the Screening Sites Sampling Program is to identify whether past activities at each site have resulted in releases from the site that would require further investigation. The intent is not to fully delineate the nature and extent of soil or groundwater contamination attributable to past operations, but to conduct technically based screening analyses activities sufficient to identify the likelihood of contamination.

The purpose of this letter report is to evaluate the results of the Screening Sites Sampling Program and sampling from previous investigations and to recommend No Further Action or further investigation at screening sites in this parcel. The remainder of this report presents the results of past investigations; Screening Sites Sampling Program strategy, procedures, and results; and recommendations for each site.

Surface soils, subsurface soils, surface water, and sediments were investigated as part of the Screening Sites Sampling Program. Surface soil samples (any sample whose lowest depth is two feet or less) were taken both as independent samples and as the upper interval of a soil boring profile. Thus, surface soil samples taken as part of a soil boring may have an "SB" designation and are initially discussed under Subsurface Soil Sampling Procedure (Section 2.2.2.2). However, the results from that upper interval are presented in the surface soils tables and discussions in Section 3.0.

Screening Site 42—Former PCP Dip Vat Area

1.0 Introduction

The chart below presents the location and status information for this screening site.

Parcel	Building Number	RI/FS[1] OU	Screening Site Number	CERCLA[2] Status
33	Dip Vat Area	4	42	Screening

[1]RI/FS: Remedial Investigation/Feasibility Study
[2]CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act

The vat at Screening Site 42 was used to hold pentachlorophenol (PCP) for treating wood pallets. The site is located near Building 737 (Figure 1) and is 275 feet west of 6th Street. PCP inherently contains small amounts of dioxins as a by-product of manufacturing.

2.0 Study Area Investigation

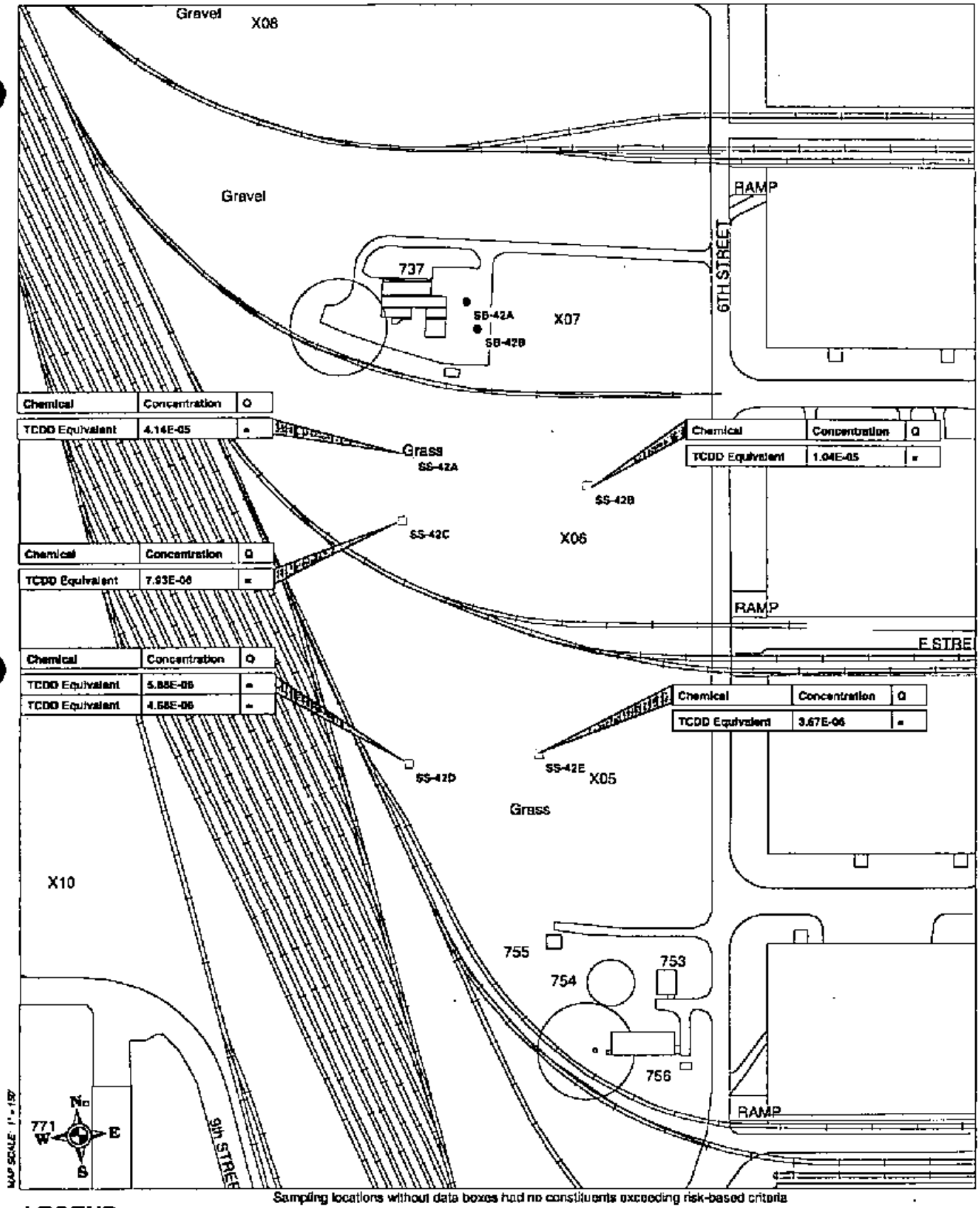
2.1 Previous Investigations

During 1985, O. H. Materials (OHM) removed the PCP dip vat, associated PCP underground tank (Screening Site 43), and 39 roll-off containers of PCP-contaminated soil. The tank was removed, and soils were removed until the excavation pit was approximately 15 feet deep, 20 feet wide, and 22 feet long.

OHM also conducted soil sampling around the vat (OHM, 1986). A longitudinal sampling grid was constructed across the dip vat area, and samples were taken at 5-foot intervals up to a depth of 35 feet. Additionally, soil borings were installed around the Building 737 area.

Correspondence with facility personnel by OHM and United States Army Environmental Hygiene Agency (USAHEA) representatives revealed that PCP liquid had been mixed with waste oil in past years and sprayed on the grounds for dust control. Figure 3 of the *Summary Report On-Site Remedial Activities at the Defense Depot Memphis, Tennessee* (OHM, 1986) shows six areas suspected of receiving this mixture. The areas are located in the area between the cluster of railroad track trunkline and 6th Street extending 450 feet to the southeast and 1000 feet to the northwest. The soil samples from each individual area were composited and analyzed, and all six areas showed PCP and dioxin contamination. None of the soil was removed; however, gravel was used to cover some of the areas with higher dioxin concentration (see OHM, 1986, Figure 18). Only the PCP underground storage tank (UST) and dip vat area were removed.

Soil associated with the dip vat and PCP UST was removed until the concentration of total dioxins and furans was below 200 parts per billion (ppb) (OHM, 1986) Within the area of the PCP UST and dip vat, these depths ranged from 5 to 14 feet. The top 3 inches of soil was removed from an area extending about 75 feet east of Building 737. This area as well as the surface of the former dip vat and PCP UST are currently covered by concrete. Table B-10 and Figure 4-26 in the *Screening Sites Field Sampling Plan* (CH2M HILL, 1995) present the historical data for the site. Pesticides have also been used extensively in this area. The sampling locations were selected based on the location of the dip vat and on previous sampling results.



Sampling locations without data boxes had no constituents exceeding risk-based criteria

LEGEND

- Surface Soil Sampling Location (mg/kg)
- Soil Boring Sampling Location (mg/kg)

(Q) Qualifier Definitions
= - indicates unqualified detection
J - indicates estimated value above detection limit, but below reporting limit

Figure 1
Site 42, Former PCP Dip Vat Area
Constituents Exceeding Risk Based Criteria
Defense Distribution Depot Memphis, TN

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2.2 Screening Site Sampling Program

2.2.1 Sampling Strategy

Additional samples were collected to ensure that soil remaining in place was within health protective levels. Five surface soils and two biased soil borings were used to evaluate whether potential contaminants exist at the site beneath the previous dip vat location. Samples were collected at depths of 10 feet, 20 feet, 30 feet, and 40 feet. Five additional surface soil samples were collected based on field observations. A boring depth of 40 feet was selected because there is evidence of dioxins and furans above 200 ppb at the 10-foot excavation depth. Three surface soil samples (SS42A, SS42B, and SS42C) were taken in Area 6, identified by OHM (1986, Figure 3) as an area were PCP-contaminated oils were land applied. Two surface soil samples (SS42D and SS42E) were taken form the open area south of Area 6.

2.2.2 Sampling Procedures

Sections 2.2.2.1 and 2.2.2.2 describe the sampling procedures and laboratory analyses performed for surface and subsurface soils.

2.2.2.1 Surface Soil Sampling Procedures

With the approval of the Tennessee Department of Environment and Conservation (TDEC) and the U.S. Environmental Protection Agency (EPA), surface soil samples were collected from five locations (SS42A, SS42B, SS42C, SS42D, and SS42E) at this site (shown in Figure 1). The following details the sample locations:

- Sample SS42 A was taken between a railroad track fork just south of Building 737 and west of 6th Street. The sample was taken in a gravel area east of a pine and cedar wood storage area, 29 feet north of the southern-most track in the fork and 17 feet south of a nearby drain.
- Sample SS42B was taken 42 feet north of the southern-most track in the fork and 47 feet west of 6th Street.
- Sample SS42C was taken southwest of Sample SS42B just 33 feet directly south of another split in the railroad tracks.
- Sample SS42D was taken southwest of Sample SS42C just 56 feet east of a third split in the railroad tracks.
- Sample SS42E was taken south of Sample SS42B, 52 feet south of the railroad track north of Sample SS52C, 40 feet west of 6th Street and 42 feet north of the flagpole.

The soil was removed from the ground using a standard stainless-steel hand auger. Volatile organic compound (VOC) samples were immediately collected from the top six inches of soil before being mixed. Part of the VOC sample was placed into a sealable plastic bag and allowed to equilibrate. The head space in the plastic bag was measured for VOCs using a hand-held photoionization detector (PID), and the results were used to determine which sample location was selected for Level 3 contaminant of potential concern (COPC) or target compound list/target analyte list (TCL/TAL) analyses. The soils was transferred into a stainless-steel bowl using stainless-steel trowels, mixed, and then placed into the appropriate sample jars.

All sampling tools were decontaminated before being used at each sample location according to the procedures specified in the *Generic Quality Assurance Project Plan* (CH2M HILL, 1995) for the RI/FS currently being conducted at the DDMT.

2.2.2.2 Subsurface Soil Sampling Procedures

With the approval of the TDEC and EPA, subsurface soil samples were collected from two locations (SB42A and SB42B) at this site. Sample SB42A was taken 15 feet east of the northeastern corner of Building 737 and 6 feet south from this point. Sample SB42B was taken 28 feet east of the southeastern corner of Building 737 and 3 feet north of this point.

A Geoprobe® push sampler was used to penetrate the concrete pad to collect these samples. At both locations, samples were collected at depths of 8 to 10 feet using a 2-inch-diameter, stainless-steel push sampler and at depths of 18 to 20 feet, 28 to 30 feet, and 38 to 40 feet using a 1-inch-diameter, stainless-steel push sampler.

VOC soil samples were collected directly from the continuous sampler using stainless-steel spoons. Part of the VOC sample was placed into a sealable plastic bag and allowed to equilibrate. The head space in the plastic bag was measured for VOCs using a hand-held PID, and the results were used to determine which interval within each boring was selected for Level 3 COPC or TCL/TAL analyses. The remaining soil was placed into a stainless-steel bowl, mixed, and then transferred into the appropriate sample jars.

All sampling tools were decontaminated before being used at each sample location according to the procedures listed in the Generic Quality Assurance Project Plan (CH2M HILL, 1995).

2.2.3 Analytical Procedures

Five surface and eight subsurface soil samples were sent to CH2M HILL's Analytical Services in Montgomery, Alabama for PCP, dioxin, and TCL/TAL analyses. Samples received at the laboratory were analyzed in accordance with the procedures outlined in the *Generic Quality Assurance Project Plan* (CH2M HILL, 1995).

A United States Army Corps of Engineers (COE) split sample was collected at Sample SS42B. This one surface soil sample was sent to COE's laboratory in Atlanta, Georgia for analysis of dioxins.

A data quality evaluation (DQE) was performed to assess the effect of the overall analytical process on the usability of the data. The DQE established that the detection of acetone and bis(2-ethylhexyl)phthalate can be attributed to field sampling and laboratory contamination rather than environmental conditions at the site. Also, low concentrations of dioxins and furans can be attributed to background or instrument noise and are not indicative of environmental conditions. With exception to the qualifications listed above, the DQE concluded that data can be used in the project decision-making process.

3.0 Interpretation of Sampling Results

3.1 Presentation of Results

Sections 3.1.1 through 3.1.4 present results of the Screening Sites Sampling Program for Screening Site 42. Data are presented by media for surface soil and subsurface soil and compared with appropriate screening criteria in three summary tables: Tables 42-A, 42-B, and 42-C. Data from the 1997 CH2M HILL investigation are presented along with historical data from the *Remedial Investigations at DDMT, Final Report* (Law Environmental, 1990). If a value from a sampling location exceeds one of the comparison criteria, that value and the comparison criterion are shown in bold on the summary table.

COPCs are those parameters that exceed both background values and the screening criteria. Where concentrations exceed the selected background value, a comparison is made with the observed range of background values as reviewed and established by the BRAC Cleanup Team (BCT).

3.1.1 Surface Soil

Results of the surface soil analyses with values above detection limits are shown in Tables 42-A and 42-B.

3.1.1.1 BCT Screening Criteria

Table 42-A summarizes constituents for which the BCT has selected a screening criteria. Dioxins are generally detected in all urban environments at levels above health-based risk-based concentrations (RBCs). Thus BCT criteria are the background levels. Dioxin results exceeded the BCT criteria of 0.00001 milligrams per kilogram (mg/kg) in two of the five surface soil samples. Sample SS42A had a tetrachlorodibenzo-p-dioxin (TCDD) equivalent concentration of 0.000041 mg/kg, and Sample SS42B had a TCDD equivalent concentration of 0.0000104 mg/kg, which slightly exceeds the criteria of 0.00001 mg/kg (background value). The other three samples had TCDD equivalent concentrations that were slightly below the criteria. These values are above risk-based criteria of 0.0000043 mg/kg. However, the less toxic common dioxin and furans isomers were detected in these samples at the site.

3.1.1.2 Other Screening Criteria

Table 42-B compares the remaining constituents with the soil ingestion screening criteria for both residential and industrial exposure scenarios. None of the constituent concentrations exceeded the background or screening criteria. The individual constituents of the dioxin and furan mixtures were listed in these tables to show that commonly occurring dioxins and furans are the less toxic compounds. These individual constituents were not compared with RBC values because they were already compared with the total equivalency factor concentration (TCDD equivalent) in Table 42-A. The observed dioxin concentrations are similar to those found in the background.

3.1.2 Subsurface Soils

Table 42-C summarizes subsurface soil sampling data. PCP and dioxins were found in samples from Sample SB42A. Samples from SB42A at the 8- to 10-foot depth had a PCP concentration of

470 mg/kg (estimated), which exceeds the groundwater protection standard, and a TCDD equivalent of 0.0056 mg/kg, which exceeds the background value. Subsurface soils, however, at these depths are not an exposure concern. The dioxin is also not elevated in the underlying sample. Dioxins are not very mobile in the environment. Thus, migration to groundwater is not likely, particularly since the highest residual soils have been removed from the site.

3.2 Vertical and Lateral Extent

Remedial actions at the site has been effective in removing the surface contamination, as the detected surface soil concentrations are similar to the background levels. One location within the known source area has PCP and dioxins/furans in deep subsurface soils. However, concentrations of PCP and dioxins found at the 8- to 10-foot depth in Sample SB42A decreased with depth. Concentrations at the 40-foot depth were below detection limits for PCP and below the background value for TCDD equivalent. Thus migration to groundwater, exceeding 60 feet at this location, has not been observed. Results for samples from Sample SB42B were below the screening criteria.

3.3 Potential Migration Pathways

The following paragraphs provide a general discussion of potential migration pathways for several constituents found at Screening Site 42.Dioxins are widespread in environmental media originating primarily from atmospheric depositions that result from waste incineration/burning activities. In general, dioxins in such emission are dominated by octa-CCD. Furthermore, if a source-related contribution exists, a series of dioxins, such as 2,3,7,8-TCDD and other lower chlorinated congeners, are expected in the samples. Most of the background detections were octa- and hepta-isomers indicating the observed concentrations could be from atmospheric deposition rather than from a localized source contribution. There were no detects of 2,3,7,8-TCDD in any of the 76 background samples tested (22 sediment, 14 surface water, 20 deep soil, and 20 shallow soil samples).

For Screening Site 42, most of the dioxin detections were the hepta- and octa-isomers although there were a few hexa-, penta- , and tetra detections. Concentrations exceed background values indicating that these constituents may be source related.

Dioxins strongly sorb to soils and do not readily leach to groundwater. The soil organic carbon/water partition coefficient (Koc) of 4,570,000 liters per kilogram (L/kg) for 2,3,7,8-TCDD results in an estimated migration rate approximately 45,000 times slower than the water migration rate. (This is an estimated retardation based on the assumptions for soil characteristics used in the *EPA Soil Screening Guidance* [1996]). The retardation of PCP is dependent on the soil or water pH. The Koc for neutral PCP is 53,000 L/kg, which would result in a retardation factor of approximately 500. Based on the depth to groundwater and the slow migration potential, these constituents are not likely to pose a problem for cross-media contamination.

3.4 Additional Data Needs

There are no additional data needs for Screening Site 42.

4.0 Interpretation of Screening Criteria Comparisons

4.1 Methodology

The Preliminary Risk Evaluation (PRE) was performed in accordance with the *Guidance on Preliminary Risk Evaluations for the Purpose of Reaching a Finding of Suitability to Lease (FOSL)* (EPA Region IV, 1994). A discussion of the PRE methodology is provided as Appendix A to this document.

4.2 Screening Site 42 Risk

Carcinogenic and noncarcinogenic risks for Screening Site 42 are presented in Table 4-57 of the draft PRE (USAESC, 1998). Detailed chemical-specific estimates are presented in Appendix A of the PRE.

The carcinogenic PRE risk ratio was above a risk level of one in a million for both industrial and residential scenarios, primarily from dieldrin in soil. However, the dieldrin concentrations are below the background-based criteria.

No noncarcinogenic chemicals were detected in the surface soil samples.

5.0 Summary and Recommendations

5.1 Summary

PCP and dioxins were found in subsurface samples from Samples SB42A and SB42B. Concentrations exceeded screening criteria at the 8- to 10-foot depth and concentrations decreased with depth. Concentrations at the 38- to 40-foot depth were below screening criteria.

Human health risk at this site is primarily due to dieldrin in surface soil at concentrations below background levels. Dieldrin will be addressed as part of an upcoming sitewide risk evaluation.

5.2 Recommendations

No further evaluation is proposed for Screening Site 42.

Screening Site 43—Former Underground PCP Tank Area

1.0 Introduction

The chart below presents the location and status information for this screening site.

Parcel	Building Number	RI/FS[1] OU	Screening Site Number	CERCLA[2] Status
33	PCP UST Area	4	43	Screening

[1]RI/FS: Remedial Investigation/Feasibility Study
[2]CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act

Screening Site 43 is located near the center of the Main Installation south of Building 737 (shown in Figure 2). Screening Site 43 contained a UST that stored PCP. PCP, formerly used for treating pallets at the facility, was mixed with waste oil and applied to the ground surface for dust control purposes.

2.0 Study Area Investigation

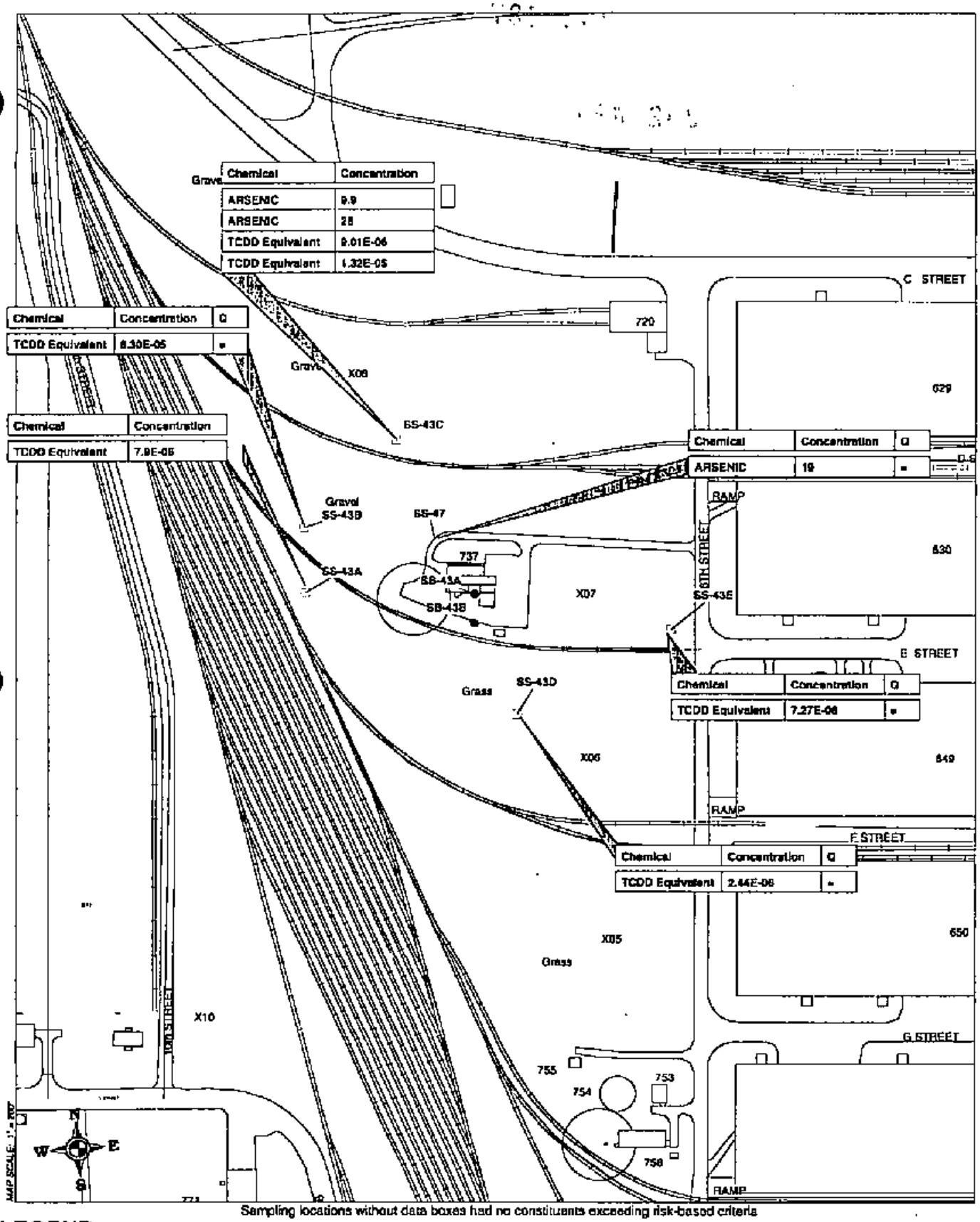
2.1 Previous Investigations

During 1985, OHM conducted the tank removal and soil sampling around the excavated tank; these activities are detailed in *Summary Report, Onsite Remedial Activities at the Defense Depot Memphis* (OHM, 1986). The structural integrity of the tank was determined to be sound. However, leaking was discovered at six joints between the pump house and tank, and between the pump house and dipping vat. The tank was removed, and soils were removed until the excavation pit was approximately 15 feet deep, 20 feet wide, and 22 feet long.

Thus subsurface soils with total dioxin and furan concentrations exceeding 200 ppb associated with the tank have been replaced with clean soils (OHM, 1986). Samples that contained more than 200 ppb total dioxins and furans were packed in roll-off containment vessels; thirty-nine roll-off vessels were stored in the vicinity of former Building 737 and covered with tarps for weather protection. The roll-offs were subsequently removed from the facility. The excavation was then filled with 650 cubic feet of native soil and 489 tons of crushed stone (see Table B-10 and Figure 4-27 in the *Screening Sites Field Sampling Plan*, CH2M HILL, 1995). Pesticides have been used extensively in this area.

Correspondence with facility personnel by OHM and USAHEA representatives revealed that PCP liquid had been mixed with waste oil in past years and sprayed on the grounds for dust control. Figure 3 of the *Summary Report On-Site Remedial Activities at the Defense Depot Memphis, Tennessee* (OHM, 1986) shows six areas suspected of receiving this mixture. The areas are located in the area between the cluster of railroad track trunkline and 6th Street extending 450 feet to the southeast and 1,000 feet to the northwest.

The samples collected subsequent to the remedial action represent current site conditions. A biased sampling approach was selected for the site. Sampling locations were selected based on the former tank location and areas where dioxin and furan contamination was detected as described above.



Sampling locations without data boxes had no constituents exceeding risk-based criteria

LEGEND

- Surface Soil Sampling Location (mg/kg)
- Soil Boring Sampling Location (mg/kg)

(Q) Qualifer Definitions
= - indicates unqualified detection
J - indicates estimated value above detection limit, but below reporting limit

Figure 2
Site 43, Former Underground PCP Tank Area
Constituents Exceeding Risk Based Criteria
Defense Distribution Depot Memphis, TN

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2.2 Screening Site Sampling Program

2.2.1 Sampling Strategy

Five surface soil samples were collected from Screening Site 43 within the areas that OHM (1986) determined were subject to land application of fluids containing PCPs. Two biased soil borings were used to evaluate whether potential contaminants exist at the site beneath the previous dip vat location. Samples were collected at depths of 10 feet, 20 feet, 30 feet, and 40 feet. A boring depth of 40 feet was selected because there is evidence of dioxins and furans above 200 ppb at the 10-foot excavation depth.

2.2.2 Sampling Procedures

Sections 2.2.2.1 and 2.2.2.2 describe the sampling procedures and laboratory analyses performed for surface and subsurface soils.

2.2.2.1 Surface Soil Sampling Procedures

With the approval of the TDEC and EPA, surface soil samples were collected from five locations (SS43A, SS43B, SS43C, SS43D, and SS43E) at this site (shown in Figure 2). The following details the sample locations:

- Sample SS43A was taken between the railroad tracks fork directly west of Building 630, 45 feet northwest of the northwestern end of a box car located within the fork, 30 feet southwest from the top of the fork and 21 feet northeast from the bottom of the fork.
- Sample SS43B was taken 267 feet west of the northwest corner of Building 737 and 27 feet northeast from the railroad tracks directly west of Building 630. The sample was taken 45 feet northwest of the northwestern end of a box car located within the fork, 30 feet southwest from the top of the fork and 21 feet northeast from the bottom of the fork.
- Surface soil sample SS43C was taken 18 feet west of the southwest corner of Building 736 and 15 feet north of the railroad tracks located south of Building 736.
- Sample SS43D was taken southeast of Building 737 in a gravel area between two east-west aligned railroad tracks. The sample was taken 69 feet south from the top railroad track and 150 feet north from the bottom railroad track.
- Sample SS43E was taken in a gravel area 60 feet west of 6th Street, west of the southwest side of Building 630, and 24 feet north of the railroad track located southwest of Building 630 and southeast of Building 737.

The soil was removed from the ground using a standard stainless-steel hand auger. VOC samples were immediately collected from the top six inches of soil before being mixed. Part of the VOC sample was placed into a sealable plastic bag and allowed to equilibrate. The head space in the plastic bag was measured for VOCs using a hand-held PID, and the results were used to determine which sample location was selected for Level 3 COPC or TCL/TAL analyses. Stainless-steel trowels were used to transfer the soil into a stainless-steel bowl for mixing. The soil was then placed into the appropriate sample jars. All sampling tools were decontaminated before being used at each sample location according to the procedures in the *Generic Quality Assurance Project Plan* (CH2M HILL, 1995) for the RI/FS currently being conducted at DDMT.

2.2.2.2 Subsurface Soil Sampling Procedures

With the approval of the TDEC and EPA, subsurface soil samples were collected from two locations (SB43A and SB43B) at this site. Sample SB43A was taken 10 feet south and 3 feet east of the southeastern corner of the extended southwest part of Building 737. Sample SB43B was taken 30 feet south of the extended southwest part of Building 737.

The Geoprobe® was used to penetrate the concrete to collect these samples. Samples were collected at depths of 8 to 10 feet using a 2-inch-diameter, stainless-steel push sampler; samples were also collected at an interval of 18 to 20 feet, 28 to 30 feet, and 38 to 40 feet using a 1-inch-diameter, stainless-steel push sampler. VOC soil samples were collected directly from the continuous sampler using stainless-steel spoons. Part of the VOC sample was placed into a sealable plastic bag and allowed to equilibrate. The head space in the plastic bag was measured for VOCs using a hand-held PID, and the results were used to determine which interval within each boring was selected for Level 3 COPC or TCL/TAL analyses. The remaining soil was placed into a stainless-steel bowl, mixed, and then transferred into the appropriate sample jars. All sampling tools were decontaminated before being used at each sample location according to the procedures specified in the *Generic Quality Assurance Project Plan* (CH2M HILL, 1995).

2.2.3 Analytical Procedures

Five surface and eight subsurface soil samples were sent to CH2M HILL's Analytical Services in Montgomery, Alabama for PCP, dioxin, and TCL/TAL analyses. Samples received at the laboratory were analyzed in accordance with the procedures outlined in the *Generic Quality Assurance Project Plan* (CH2M HILL, 1995).

COE split samples were collected from Sample SS43C and from the 8- to 10-foot interval of Sample SB43A. One surface soil and one subsurface soil sample were sent to COE's laboratory in Atlanta, Georgia for analysis of PCP, dioxin, and TCL/TAL parameters.

A data quality evaluation (DQE) was performed to assess the effect of the overall analytical process on the usability of the data. The DQE established that the detection of acetone and bis(2-ethylhexyl)phthalate can be attributed to field sampling and laboratory contamination rather than environmental conditions at the site. Also, low concentrations of dioxins and furans can be attributed to background or instrument noise and are not indicative of environmental conditions. With exception to the qualifications listed above, the DQE concluded that data can be used in the project decision-making process.

3.0 Interpretation of Sampling Results

3.1 Presentation of Results

Sections 3.1.1 through 3.1.4 present results of the Screening Sites Sampling Program for Screening Site 43. Data are presented by media for surface soil and subsurface soil and compared with appropriate screening criteria in three summary tables: Tables 43-A, 43-B, and 43-C. Data from the 1997 CH2M HILL investigation are presented along with historical data from the *Remedial Investigations at DDMT, Final Report* (Law Environmental, 1990). If a value from a sampling location exceeds one of the comparison criteria, that value and the comparison criterion are shown in **bold** on the summary table.

COPCs are those parameters that exceed both background values and the screening criteria. Where concentrations exceed the selected background value, a comparison is made with the observed range of background values as reviewed and established by the BCT.

3.1.1 Surface Soil

Results of the surface soil analyses with values above detection limits are shown in Tables 43-A and 43-B.

3.1.1.1 BCT Screening Criteria

Table 43-A summarizes constituents for which the BCT has selected a screening criteria. Arsenic and dioxins (TCDD equivalent) were detected at concentrations exceeding the BCT criteria.

Arsenic was found in Sample SS43C at 28 mg/kg, which exceeds the BCT value of 20 based on background results. Arsenic was found in all 22 background samples, ranging in concentration from 4.2 to 27.7 mg/kg. These results indicate that arsenic concentrations at Sample SS43C are similar to the upper limit of the background range of values.

Dioxins (TCDD equivalent) were found in Sample SS43B at 0.000083 mg/kg and in Sample SS43C at 0.000009 mg/kg and 0.000013 mg/kg (duplicate analysis). Only the duplicate analysis concentrations exceeds the BCT value of 0.00001 mg/kg. This illustrates the variability in dioxin concentration results.

3.1.1.2 Other Screening Criteria

Table 43-B compares the remaining constituents with the soil ingestion screening criteria for both residential and industrial exposure scenarios. Dioxin results exceed the background value for 1,2,3,4,6,7,8-heptachlorodibenzo-p-dioxin for four of five samples. The highest result for the five surface samples was 0.020 mg/kg in Sample SS43B; the background value is 0.00039mg/kg. Similar results were found for octachlorodibenzo-p-furan. These isomers were included in the TCDD equivalent concentrations in Table 42A, which indicated only a slight exceedence of background at this sampling location.

3.1.2 Subsurface Soils

Table 43-C summarizes subsurface soil sampling data. TCDD exceeded background in Sample SB43B (the 38- to 40-foot depth) at 0.000019323 mg/kg; however, this detection is anomalous since background concentrations were not exceeded in the overlying samples from the same borehole.

3.2 Vertical and Lateral Extent

The post remedial sampling conducted indicated that two surface soil samples (SS43B and SS43C) had TCDD equivalent levels slightly above background levels. One of the samples had a duplicate analysis above background (BCT Criteria) level only in the duplicate sample, but not in the original analysis. The subsurface soils at this site do not have dioxins or any other constituents above background levels. Based on the data collected so far, it appears that dioxins and furans are present at concentrations slightly exceeding background in surface soil.

However, concentrations sporadically exceed background in subsurface soils, although there is not a consistent vertical distribution consistent with leaching from an overlying source.

3.3 Potential Migration Pathways

The following paragraphs provide a general discussion of potential migration pathways for several constituents found at Screening Site 43.

Dioxins are widespread in environmental media originating primarily from atmospheric depositions that result from waste incineration/burning activities. In general, dioxins in such emission are dominated by octa-CCD. Furthermore, if a source-related contribution exists, a series of dioxins, such as 2,3,7,8-TCDD and other lower chlorinated congeners, are expected in the samples. Most of the background detections were octa- and hepta-isomers indicating the observed concentrations could be from atmospheric deposition rather than from a localized source contribution. There were no detects of 2,3,7,8-TCDD in any of the 76 background samples tested (22 sediment, 14 surface water, 20 deep soil, and 20 shallow soil samples).

For Screening Site 43, most of the dioxin detections were the hepta- and octa-isomers although there were a few hexa-, penta- , and tetra- detections. Concentrations exceed background values indicating that these constituents may be source related.

Dioxins strongly sorb to soils and do not readily leach to groundwater. The soil organic carbon/water partition coefficient (Koc) of 4,570,000 L/kg for 2,3,7,8-TCDD results in an estimated migration rate approximately 45,000 times slower than the water migration rate. (This is an estimated retardation based on the assumptions for soil characteristics used in the EPA *Soil Screening Guidance* [1996]). The retardation of PCP is dependent on the soil or water pH. The Koc for neutral PCP is 53,000 L/kg, which would result in a retardation factor of approximately 500. Based on the depth to groundwater and the slow migration potential, these constituents are not likely to pose a problem for cross-media contamination. Dioxins were not detected above background concentrations in the subsurface samples at Screening Site 43.

3.4 Additional Data Needs

There are no additional data needs for this site.

4.0 Interpretation of Screening Criteria Comparisons

4.1 Methodology

The Preliminary Risk Evaluation (PRE) was performed in accordance with the *Guidance on Preliminary Risk Evaluations for the Purpose of Reaching a Finding of Suitability to Lease (FOSL)* (EPA Region IV, 1994). A discussion of the PRE methodology is provided as Appendix A to this document.

4.2 Screening Site 43 Risk

Carcinogenic and noncarcinogenic risks for Screening Site 43 are presented in Table 4-58 of the draft PRE (USAESC, 1998), and detailed chemical-specific estimates are presented in Appendix A of the PRE.

The carcinogenic PRE risk ratio was well below a risk level of one in a million for both industrial and residential receptors at this site. The noncarcinogenic ratio was below a value of 1.0 for both industrial and residential receptors at this site.

5.0 Summary and Recommendations

5.1 Summary

Dioxins were found in surface soil samples for Screening Site 43 at concentrations exceeding background values. Dioxin concentrations exceeded background in isolated subsurface soil samples, but did not present a consistent vertical distribution indicative of downward transport from a surface source.

Human health risks were well below a risk level of one in a million for both industrial and residential receptors at this site. The noncarcinogenic ratio was below a value of 1.0 for both industrial and residential receptors at this site.

5.2 Recommendations

No further evaluation is proposed for Screening Site 43.

Screening Site 46—Pallet Drying Area

1.0 Introduction

The chart below presents the location and status information for this screening site.

Parcel	Building Number	RI/FS[1] OU	Screening Site Number	CERCLA[2] Status
33	Pallet Drying Area	4	46	Screening

[1]RI/FS: Remedial Investigation/Feasibility Study
[2]CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act

Screening Site 46 is located near the center of the Main Installation, 115 feet south of Building 720 and 125 feet west of 6th Street (Figure 3). This site was used to dry pallets after the PCP-treating operation that occurred at Screening Sites 42 and 43.

2.0 Study Area Investigation

2.1 Previous Investigations

Results of a soil boring (STB4), located 75 feet west of Screening Site 46, revealed that soils at this screening site are contaminated with 2-butanone. Table B-11 and Figure 4-26 in the *Screening Sites Field Sampling Plan* (CH2M HILL, 1995) present the historical data for the site.

The soil sampling locations were selected based on the knowledge of the pallet drying area and the previous soil boring sampling results. The samples were collected from within the pallet drying area.

2.2 Screening Site Sampling Program

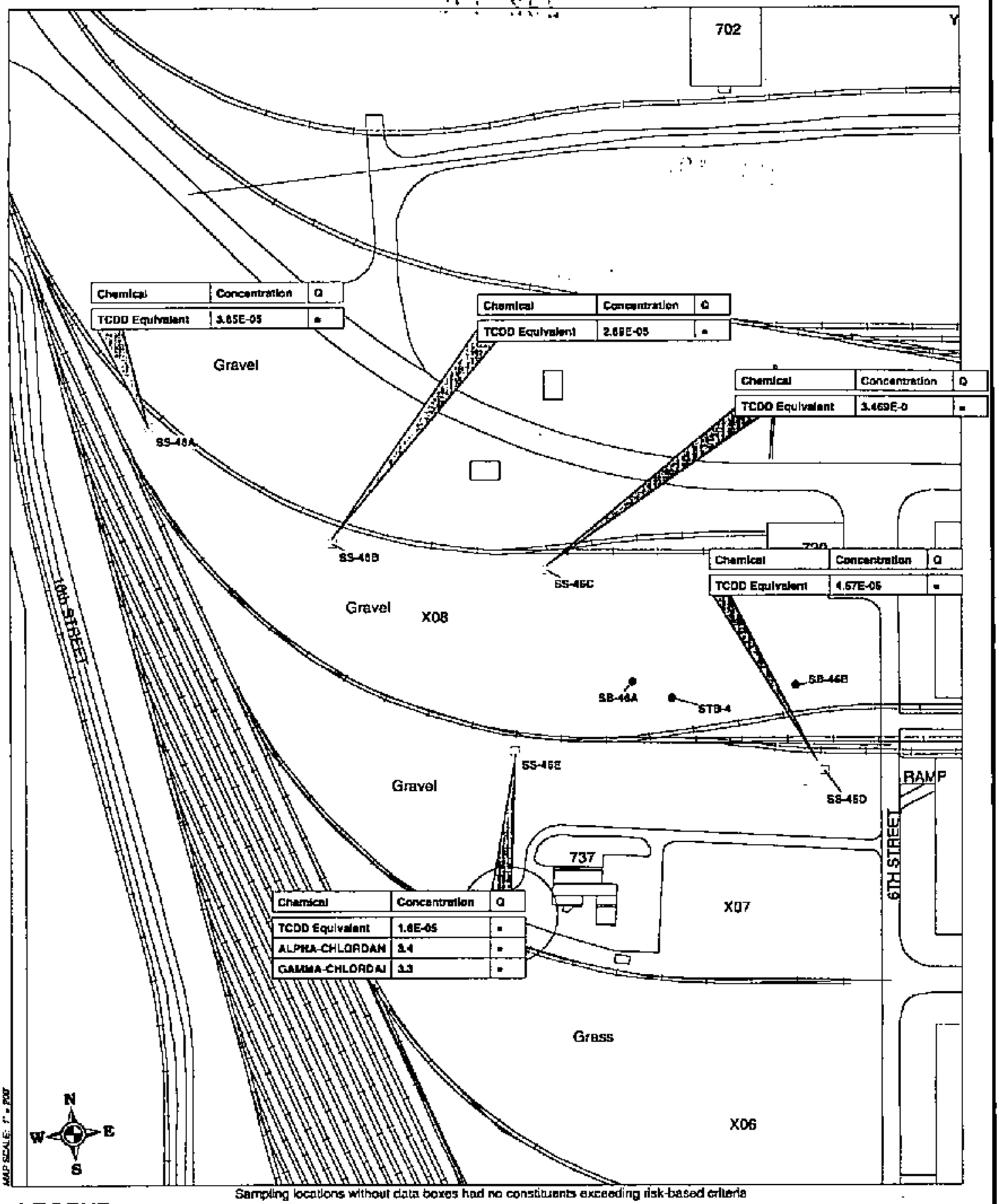
2.2.1 Sampling Strategy

Five surface soil samples were collected from the area soils. Two biased soil borings were used to evaluate whether potential contaminants exist at the site. Samples were collected at five depths (approximate): zero to 12 inches, 10 feet, 20 feet, 30 feet, and 40 feet. Five additional surface soil samples were also collected. A boring depth of 40 feet was selected because there is knowledge of contamination at 15 feet around the PCP area.

2.2.2 Sampling Procedures

2.2.2.1 Surface Soil Sampling Procedures

With the approval of the TDEC and EPA, surface soil samples were collected from five locations (SS46A, SS46B, SS46C, SS46D, and SS46E) at this site (shown in Figure 3). Parts of this area were visibly stained on the surface. The following details the sample locations:



Sampling locations without data boxes had no constituents exceeding risk-based criteria

LEGEND

- Surface Soil Sampling Location (mg/kg)
- Soil Boring Sampling Location (mg/kg)

(Q) Qualifer Definitions
= - indicates unqualified detection
J - Indicates estimated value above detection limit, but below reporting limit

Figure 3
Site 46, Pallet Drying Area
Constituents Exceeding Risk Based Criteria
Defense Distribution Depot Memphis, TN

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- Sample SS46A was taken between the railroad fork northwest of Building 720 and 629. The sample was taken 21 feet southwest from the top of the railroad and 21 feet northeast from the bottom of the railroad.
- Sample SS46B was taken between the railroad fork directly west of the mid west corner of Building 629. The sample was taken at the point of the railroad fork that measured 111 feet, 5 feet south from the top and 96 feet north from the bottom.
- Sample SS46C was taken east of Sample SS46B, which was 87 feet southwest from the southwestern end of the guard house and 33 feet southeast from the railroad track switch in that area.
- Sample SS46D was taken 132 feet west of 6th Street, west of the northwestern side of Building 630, and 30 feet south of the railroad tracks located northwest of Building 630.
- Sample SS46E was taken 460 feet west of 6th Street, and 10 feet south of the railroad tracks located northwest of Building 630.

The soil was removed from the ground using a standard stainless-steel hand auger. VOC samples were immediately collected from the top six inches of soil before being mixed. Part of the VOC sample was placed into a scalable plastic bag and allowed to equilibrate. The head space in the plastic bag was measured for VOCs using a hand-held PID, and the results were used to determine which sample location was selected for Level 3 COPC or TCL/TAL analyses. The soil was transferred into a stainless-steel bowl using stainless-steel trowels, mixed, and then placed into the appropriate sample jars.

2.2.2.2 Subsurface Soil Sampling Procedures

With the approval of the TDEC and EPA, subsurface soil samples were collected from two locations (SB46A and SB46B) at this site. Sample SB46A was taken 110 feet east of the southwest corner of an unnumbered building southwest of Building 720 and 75 feet north of the railroad tracks just south of this point. Sample SB46B was taken 5 feet east of the southwest corner of the same unnumbered building and 55 feet north of the railroad tracks just south of this point.

Samples were collected at a depth of 8 to 10 feet using a 2-inch-diameter, stainless-steel push sampler, and samples were collected at intervals of 18 to 20 feet, 28 to 30 feet, and 38 to 40 feet using a 1-inch-diameter, stainless-steel push sampler. VOC soil samples were collected directly from the continuous sampler using stainless-steel spoons. Part of the VOC sample was placed into a scalable plastic bag and allowed to equilibrate. The head space in the plastic bag was measured for VOCs using a hand-held PID, and the results were used to determine which interval within each boring was selected for Level 3 COPC or TCL/TAL analyses. The remaining soil was placed into a stainless-steel bowl, mixed, and then transferred into the appropriate sample jars.

All sampling tools were decontaminated before being used at each sample location according to the procedures specified in the *Generic Quality Assurance Project Plan* (CH2M HILL, 1995) for the RI/FS currently being conducted at DDMT.

2.2.3 Analytical Procedures

Five surface and eight subsurface soil samples were sent to CH2M HILL's Analytical Services in Montgomery, Alabama for VOC, PCP, dioxin, and TCL/TAL analyses. Samples received at

the laboratory were analyzed in accordance with procedures outlined in the *Generic Quality Assurance Project Plan* (CH2M HILL, 1995).

A data quality evaluation (DQE) was performed to assess the effect of the overall analytical process on the usability of the data. The DQE established that the detection of acetone and bis(2-ethylhexyl)phthalate can be attributed to field sampling and laboratory contamination rather than environmental conditions at the site. Also, low concentrations of dioxins and furans can be attributed to background or instrument noise and are not indicative of environmental conditions. With exception to the qualifications listed above, the DQE concluded that data can be used in the project decision-making process.

3.0 Interpretation of Sampling Results

3.1 Presentation of Results

Sections 3.1.1 through 3.1.4 present results of the Screening Sites Sampling Program for Screening Site 46. Data are presented by media for surface soil and subsurface soil and compared with appropriate screening criteria in three summary tables: Tables 46-A, 46-B, and 46-C. Data from the 1997 CH2M HILL investigation are presented along with historical data from the *Remedial Investigations at DDMT, Final Report* (Law Environmental, 1990). If a value from a sampling location exceeds one of the comparison criteria, that value and the comparison criterion are shown in **bold** on the summary table.

COPCs are those parameters that exceed both background values and the screening criteria. Where concentrations exceed the selected background value, a comparison is made with the observed range of background values as reviewed and established by the BCT.

3.1.1 Surface Soil

Results of the surface soil analyses with values above detection limits are shown in Tables 46-A and 46-B.

3.1.1.1 BCT Screening Criteria

Table 46-A summarizes constituents for which the BCT has selected screening criteria. Dioxins (TCDD equivalent) were found in the five surface soil samples at concentrations from 0.000016 to 0.000046 mg/kg, which slightly exceeds the BCT selected screening criteria of 0.000011 mg/kg (background value).

Arsenic was found in Sample SS46E at 25 mg/kg, which slightly exceeds the BCT selected background value of 20 mg/kg. Arsenic was found in all 22 background samples ranging in concentration from 4.2 to 27.7 mg/kg. These results indicate that the arsenic concentrations found in SS46E is within the background range.

3.1.1.2 Other Screening Criteria

Table 46-B compares remaining constituents with background values and with the soil ingestion screening criteria for both residential and industrial exposure scenarios. Dioxins were found at concentrations exceeding background values. Note that there are no residential RBCs for soil ingestion for dioxin in surface soil.

Alpha-chlordane and gamma-chlordane were found in Sample SS46E at 3.4 mg/kg and 3.3 mg/kg, respectively, which exceeds the residential RBC for soil ingestion of 0.49 mg/kg. Also, dichlorodiphenyltrichloroethane (DDT) was found in Sample SS46E at 3.1 mg/kg, which exceeds the residential RBC for soil ingestion of 1.9 mg/kg.

3.1.2 Subsurface Soils

Table 46-C summarizes subsurface soil sampling data. Dioxins were found at concentrations mostly below background. Dioxin (TCDD equivalent) was found in Sample SB46A (at 38 to 40 feet) at 0.000020 mg/kg and in Sample SB46A (at 8 to 10 feet) at 0.0000062 mg/kg, which slightly exceed the background value of 0.000006 mg/kg. Dioxins are very immobile, and these measured values are similar to the background. Due to the low detection capabilities, all the analyses indicate detections because chlorinated compounds such as dioxins tend to adsorb to most surfaces. Thus, the detected concentrations could be analytical artifacts.

3.2 Vertical and Lateral Extent

Low level dioxins were detected in most of the samples analyzed. However concentrations are similar to those detected in background samples. Other than dioxins, no other site-related (e.g. PCPs) constituents were detected in the subsurface soils.3.3 Potential Migration Pathways

The following paragraphs provide a general discussion of potential migration pathways for several constituents found at Screening Site 46.

Alpha- and gamma-chlordane was detected in surface soils at the DDMT. This pesticide has a high affinity for soils and is only marginally soluble in water. Sorption to soil particles and transport via surface water or wind is its primary potential migration mode. Alpha- and gamma-chlordane potentially would be available to aquatic organisms if it existed as suspended sediment in turbid surface water or as a sediment in an area with bottom feeders. The pesticide would also bioaccumulate in that environment. However, since alpha- and gamma-chlordane were not detected in either of these media during sampling activities at the DDMT, this is not believed to be an ongoing contaminant release mechanism at the site.

Arsenic exists at several sites at the DDMT in surface soils at concentrations above screening levels. Arsenic's mobility and toxicity are tied to its complex geochemistry and its ability to readily form soluble complexes. Arsenic may also readily be adsorbed onto clays, oxides, or humic organic material and migrate as suspended soil in surface water or as a sediment. Arsenic can exist in four common oxidation states, and these control its solubility. It readily transports through aquatic environments as a dissolved salt or as a complex with an organic compound.

3.4 Additional Data Needs

There are no additional data needs for this site.

4.0 Interpretation of Screening Criteria Comparisons

4.1 Methodology

The Preliminary Risk Evaluation (PRE) was performed in accordance with the *Guidance on Preliminary Risk Evaluations for the Purpose of Reaching a Finding of Suitability to Lease (FOSL)* (EPA Region IV, 1994). A discussion of the PRE methodology is provided as Appendix A to this document.

4.2 Screening Site 46 Risk

Carcinogenic and noncarcinogenic risks for Screening Site 46 are presented in Table 4-59 of the draft PRE (USAESC, 1998), and detailed chemical-specific estimates are presented in Appendix A of the PRE.

The carcinogenic PRE risk ratios were above a risk level of one in a million for industrial and residential receptor scenarios from arsenic, chlordane, and dichlorodiphenyldichloroethene (DDE)/DDT in surface soil.

The noncarcinogenic PRE ratio values were well below a value of 1.0 for both industrial worker and residential receptor pathways.

The detected chlorinated pesticides, which are present at low levels, are not related to site operations, but could be from historical site applications.

5.0 Summary and Recommendations

5.1 Summary

Dioxins exist in surface soils across this area and in subsurface soils at depths up to 40 feet at concentrations exceeding background levels. However, the main risks to human health from this site is from pesticides and arsenic in surface soil. These constituents are not due to site operations; rather, they are due to sitewide operations at DDMT and will be addressed in an upcoming risk evaluation.

5.2 Recommendations

Further risk evaluation is recommended for constituents at this to evaluate risks from pesticides and arsenic. It is anticipated that other than the sitewide risk evaluation, no further action will be necessary for this site.

Screening Site 80—Fuel and Cleaner Dispensing, Building 72

1.0 Introduction

The chart below presents the location and status information for this screening site.

Parcel	Building Number	RI/FS[1] OU	Screening Site Number	CERCLA[2] Status
33	720	4	80	Screening

[1]RI/FS: Remedial Investigation/Feasibility Study
[2]CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act

Screening Site 80 is located approximately 2,000 feet east of the western boundary and 700 feet south of the northern boundary of the Main Installation (Figure 4). Building 720 contains one 12,000-gallon aboveground diesel fuel storage tank; this tank is scheduled for replacement. Cleaners also are stored and dispensed in Building 720.

2.0 Study Area Investigation

2.1 Previous Investigations

According to the *Remedial Investigations at DDMT, Final Report* (Law Environmental, 1990), one surface soil sample (SS29) taken adjacent to Building 720 indicated the presence of VOCs, polycyclic aromatic hydrocarbons (PAHs), DDT, and metals. Table B-12 and Figure 4-26 in the *Screening Sites Field Sampling Plan* (CH2M HILL, 1995) present the historical data for the site.

Sample locations were selected based on the location of the storage tank and the loading and unloading area around the railroad tracks that enter the building on the south side. Because the tank is above ground and surface spills are probable, boring depths of 20 feet were selected.

2.2 Screening Site Sampling Program

2.2.1 Sampling Strategy

Three surface soil and two soil boring locations were used to evaluate whether potential contaminants exist at the site. Samples were collected at the surface (zero to 12 inches) and at 5-foot, 10-foot, and 20-foot depths (approximate). Because the tank is above ground and surface spills are probable, boring depths of 20 feet were selected. Three additional surface soil samples were collected.

2.2.2 Sampling Procedures

Sections 2.2.2.1 and 2.2.2.2 describe the sampling procedures and laboratory analyses performed for surface and subsurface soils.

2.2.2.1 Surface Soil Sampling Procedures

With the approval of the TDEC and EPA, surface soil samples were collected from three

locations (SS80A, SS80B, and SS80C) at this site (shown in Figure 4). The following details the sample locations:

- Sample SS80A was taken 4 feet west and 1 feet south from the northwest corner of Building 720.
- Sample SS80B was taken 6 feet south and 5 feet west from the southwest corner of Building 720.
- Sample SS80C was taken 8 feet east and 9 feet north from the northwest corner of Building 720.

The soil was removed from the ground using a standard stainless-steel hand auger. VOC samples were immediately collected from the top six inches before being mixed. Part of the VOC sample was placed into a sealable plastic bag and allowed to equilibrate. The head space in the plastic bag was measured for VOCs using a hand-held PID, and the results were used to determine which interval within each boring might be selected for Level 3 analyses. The soil was transferred to a stainless-steel bowl using stainless-steel trowels, mixed, and then placed into the appropriate sample jar.

All sampling tools were decontaminated before use at each sample location according to the procedures specified in the *Generic Quality Assurance Project Plan* (CH2M HILL, 1995).

2.2.2.2 Subsurface Soil Sampling Procedures

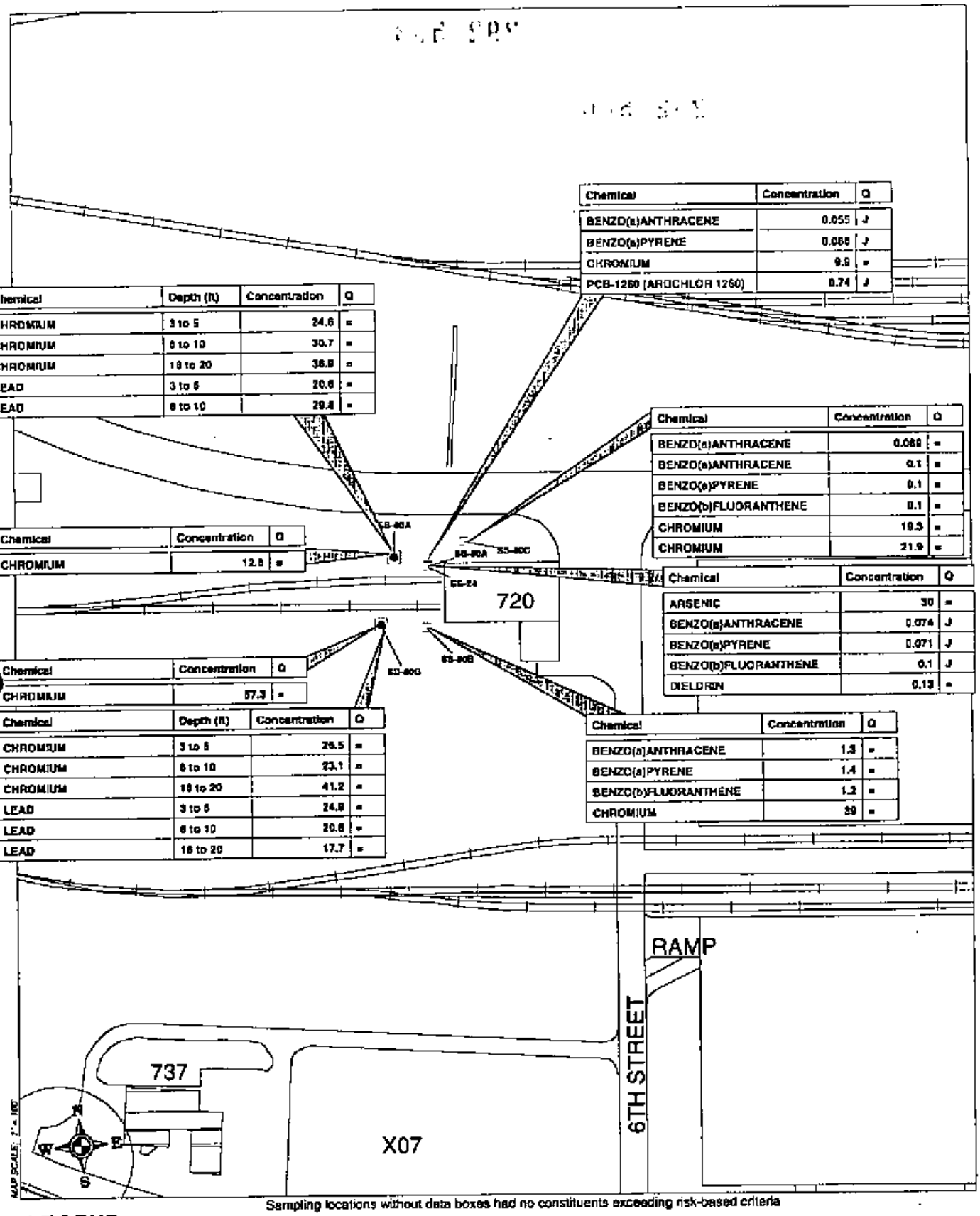
With the approval of the TDEC and EPA, subsurface soil samples were collected from two locations (SB80A and SB80B) at this site. Sample SB80A was taken 5 feet west of the northwest corner of Building 720 and 2 feet north of the nearby railroad tracks. Sample SB80B was taken 15 feet west of the southwest corner of Building 720 and 5 feet south of the nearby railroad tracks.

At both locations, samples were collected at three depths: zero to 1 foot, 3 to 5 feet, and 8 to 10 feet. Samples were collected using a 2-inch-diameter, stainless-steel push sampler. Samples were also collected at an interval of 18 to 20 feet using a 1-inch-diameter, stainless-steel push sampler. VOC soil samples were collected directly from the continuous sampler using stainless-steel spoons. Part of the VOC sample was placed into a sealable plastic bag and allowed to equilibrate. The head space in the plastic bag was measured for VOCs using a hand-held PID, and the results were used to determine which interval within each boring might be selected for Level 3 analyses. The remaining soil was placed into a stainless-steel bowl, mixed, and then transferred into the appropriate sample jar.

All sampling tools are decontaminated before use according to the *Generic Quality Assurance Project Plan* (CH2M HILL, 1995).

2.2.3 Analytical Procedures

All samples were sent to CH2M HILL's Analytical Services in Montgomery, Alabama for analyses. Three surface and eight subsurface soil samples were analyzed for PAHs, VOCs, metals, and TCL/TAL. Samples received at the laboratory were analyzed in accordance with the procedures outlined in the *Generic Quality Assurance Project Plan* (CH2M HILL, 1995).



Sampling locations without data boxes had no constituents exceeding risk-based criteria

LEGEND

Surface Soil Sampling Location (mg/kg)

Soil Boring Sampling Location (mg/kg)

(Q) Qualifier Definitions
= - indicates unqualified detection
J - indicates estimated value above detection limit, but below reporting limit

Figure 4
Site 80, Fuel & Cleaner Dispensing, Bldg 720
Constituents Exceeding Risk Based Criteria
Defense Distribution Depot Memphis, TN

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A COE split sample was collected from the 18- to 20-foot interval of Sample SB80B. This subsurface soil sample was sent to COE's Atlanta, Georgia laboratory for analysis of PAHs, VOCs, and metals.

A data quality evaluation (DQE) was performed to assess the effect of the overall analytical process on the usability of the data. The DQE established that the detection of acetone and bis(2-ethylhexyl)phthalate can be attributed to field sampling and laboratory contamination rather than environmental conditions at the site. Also, low concentrations of dioxins and furans can be attributed to background or instrument noise and are not indicative of environmental conditions. With exception to the qualifications listed above, the DQE concluded that data can be used in the project decision-making process.

3.0 Interpretation of Sampling Results

3.1 Presentation of Results

Sections 3.1.1 through 3.1.4 present results of the Screening Sites Sampling Program for Screening Site 80. Data are presented by media for surface soil and subsurface soil and compared with appropriate screening criteria in three summary tables: Tables 80-A, 80-B, and 80-C. Data from the 1997 CH2M HILL investigation are presented along with historical data from the *Remedial Investigations at DDMT, Final Report* (Law Environmental, 1990). If a value from a sampling location exceeds one of the comparison criteria, that value and the comparison criterion are shown in **bold** on the summary table.

COPCs are those parameters that exceed both background values and the screening criteria. Where concentrations exceed the selected background value, a comparison is made with the observed range of background values as reviewed and established by the BCT.

3.1.1 Surface Soil

Results of the surface soil analyses with values above detection limits are shown in Tables 80-A and 80-B.

3.1.1.1 BCT Screening Criteria

Table 80-A summarizes constituents for which the BCT has selected a screening criteria. PAH compounds—including benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluroanthene—were found at concentrations exceeding the screening criteria. PAH compounds are found sitewide at DDMT due to railroad operations and will be addressed in an upcoming risk evaluation.

Chromium was found in Sample SB80B at 57.3 mg/kg, which exceeds the BCT criteria of 39 mg/kg based on the residential exposure RBC.

PCB-1260 (Arochlor 1260) was found in Sample SS80A at 0.74 mg/kg (estimated), which exceeds the BCT criteria of 0.083 mg/kg based on the residential exposure RBC.

3.1.1.2 Other Screening Criteria

Table 80-B compares the remaining constituents with background values and with the soil ingestion screening criteria for both residential and industrial exposure scenarios. Only dieldrin at Sample SS24 exceeds background and the residential exposure RBC.

3.1.2 Subsurface Soils

Table 80-C summarizes subsurface soil sampling data. Chromium was found in Sample SB80A and Sample SB80B at the 18- to 20-foot depth at concentrations of 39.8 and 41.2 mg/kg, respectively. These concentrations slightly exceed the groundwater protection standard of 38 mg/kg. However, chromium in subsurface soil is considered to be due to natural variability of chromium with changing soil type. Chromium is also not elevated above criteria in the overlying borehole samples thus the vertical distribution does not indicate a reduction in chromium concentration with depth indicative of leaching from a surface soil source.

Lead was found in Sample SB80A (at the 8- to 10-foot depth) at 29.8 mg/kg and in Sample SB80B (at the 3- to 5-foot) at 24.9 mg/kg, which slightly exceeds the background value of 24 mg/kg. Lead concentrations in underlying borehole interval samples are below background criteria.

3.2 Vertical and Lateral Extent

Based on the data collected from the site, it appears that there are no COPCs that persist uniformly across several media that are attributed to Screening Site 80. Many constituents that were found are at concentrations similar to background levels.

PAH concentrations found in surface soil at Screening Site 80 are found sitewide at DDMT and are attributed to railroad operations. PAH compounds did not exceed the groundwater protection criteria in the subsurface soil samples.

3.3 Potential Migration Pathways

The following paragraphs provide a general discussion of potential migration pathways for several constituents found at Screening Site 80.

Benzo(a)anthracene, benzo(a)pyrene, benzo(k)fluoranthene, benzo(b)fluoranthene, and indeno(1,2,3-c,d)pyrene make up a group of related, long-chain PAHs that have similar chemical and physical characteristics and tend to migrate and behave in the environment in a similar manner. Generally, these compounds have low vapor pressures, are only marginally soluble in water, and have a high affinity for soils. These compounds have been detected at concentrations above screening values for surface soils at DDMT. They would be expected to migrate as adsorbed components of the soils and would potentially be available to aquatic organisms in turbid surface water or to bottom feeders in areas with contaminated sediments. That none of these compounds were detected in sediments indicates this is not a major source of contaminant migration for these compounds at this site. These compounds do not bioaccumulate significantly due to their rapid metabolism and excretion by most aquatic organisms.

PCBs, as a group, are relatively insoluble in water; therefore, they tend to migrate primarily through physical transport such as erosion via surface water. At the DDMT, PCB-1260 has been

detected at concentrations of concern in surface soils. This material is subject to migration either via wind action or surface water transport and the PCB would be present as an adsorded chemical on the clay platelets comprising the soil. This material could potentially be ingested either by breathing contaminated dust or by aqueous organisms exposed to turbid water or bottom feeding of contaminated sediment.

3.4 Additional Data Needs

Additional surface soil sampling is recommended to further evaluate the extent of PAH and PCBs and to support a human health risk evaluation for the site. The vertical distribution of chemicals in the soil column does indicate vertical transport to groundwater depths, so additional vertical sampling is not warranted.

4.0 Interpretation of Screening Criteria Comparisons

4.1 Methodology

The Preliminary Risk Evaluation (PRE) was performed in accordance with the *Guidance on Preliminary Risk Evaluations for the Purpose of Reaching a Finding of Suitability to Lease (FOSL)* (EPA Region IV, November 22, 1994). A discussion of the PRE methodology is provided as Appendix A to this document.

4.2 Screening Site 80 Risk

Carcinogenic and noncarcinogenic risks for Screening Site 80 are presented in Table 4-60 of the draft PRE (USAESC, 1998), and detailed chemical-specific estimates are presented in Appendix A of the PRE.

The PRE risk ratios for carcinogens were slightly above a risk level of one in a million for both industrial and residential scenarios, due to the presence of PAHs and PCBs.

The noncarcinogenic PRE ratios were below a value of 1.0 for a worker, but were exceeded for the residential scenario from the presence of PAHs and metals.

The presence of PAHs and PCBs should be further investigated for human health evaluation.

5.0 Summary and Recommendations

5.1 Summary

PAH concentrations found in surface soil at Screening Site 80 are found sitewide at DDMT and are attributed to railroad operations. PAH compounds did not exceed the groundwater protection criteria in the subsurface soil samples.

PCB-1260 (Arochlor 1260) was found in Sample SS80A at 0.74 mg/kg (estimated), which exceeds the BCT criteria of 0.083 mg/kg based on the residential RBC.

5.2 Recommendations

Additional sampling is recommended at this site to evaluate the extent of PAH and PCB constituents in surface soil and to support a human health risk evaluation for the site.

Screening Site 81—Fuel Oil Building 765

1.0 Introduction

The chart below presents the location and status information for this screening site.

Parcel	Building Number	RI/FS[1] OU	Screening Site Number	CERCLA[2] Status
33	765	4	81	Screening

[1]RI/FS: Remedial Investigation/Feasibility Study
[2]CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act

Screening Site 81 is approximately 2,200 feet east of the western boundary and 1,350 feet south of the northern boundary of the installation (shown in Figure 5). Building 765 contains an aboveground fuel oil storage tank. This tank is scheduled for removal under a separate action by DDMT.

2.0 Study Area Investigation

2.1 Previous Investigations

No sampling data exist for this site. Sampling locations were selected based on the location of the tank.

2.2 Screening Site Sampling Program

2.2.1 Sampling Strategy

Three surface soil borings and one biased soil borings were used to evaluate whether potential contaminants exist at the site. Samples were collected at the surface (zero to 12 inches) and at approximately three additional depths: 5 feet, 10 feet, and 20 feet. Three additional surface soil samples were collected. A boring depth of 20 feet was selected because shallow soil contamination is probable due to possible surface spills during loading and unloading operations.

2.2.2 Sampling Procedures

Section 2.2.2.1 and 2.2.2.2 describe the sample procedures and laboratory analyses performed for surface and subsurface soils.

2.2.2.1 Surface Soil Sampling Procedures

With the approval of the TDEC and EPA, three surface soil samples were collected from three locations (SS81A, SS81B, and SS81C) at this site (shown in Figure 5). Samples SS81A, SS81B, and SS81C were taken east of Building 770 and 9th Street in the open gravel area between two railroad tracks extending northwest. The following details the sample locations:

- Sample SS81A was taken 23 feet west of the right railroad track, 50 feet east of the left

railroad track, and 66 feet northwest of a storm drain also located between the railroad tracks.

- Sample SS81B was taken 33 feet west of the right railroad track, 48 feet northeast of the left railroad track, and 33 feet northeast of Sample SS81A.
- Sample SS81C was taken 7 feet west of the east railroad track and 33 feet northwest of Sample SS81B.

The soil was removed from the ground using a standard stainless-steel hand auger. VOC samples were immediately collected from the top six inches before being mixed. Part of the VOC samples was placed into a sealable plastic bag and allowed to equilibrate. The head space in the plastic bag was measured for VOCs using a hand-held PID, and the results were used to determine which interval within each boring might be selected for Level 3 analyses. The soil was transferred into a stainless-steel bowl using stainless-steel trowels, mixed, and then placed into the appropriate sample jar.

All sampling tools were decontaminated before use at each sample location according to the procedures specified in the *Generic Quality Assurance Project Plan* (CH2M HILL, 1995) for the RI/FS currently being conducted at DDMT.

2.2.2.2 Subsurface Soil Sampling Procedures

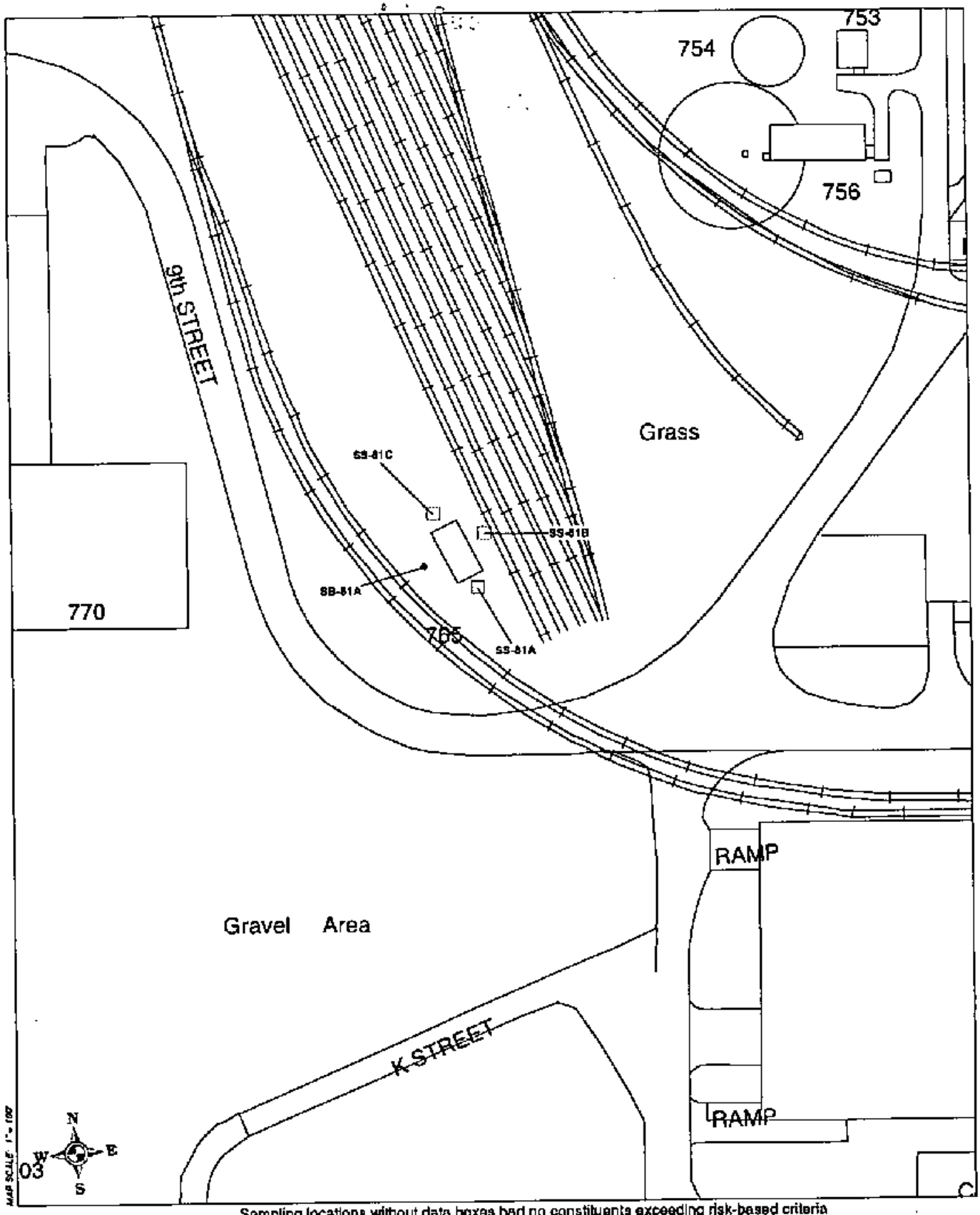
With the approval of the TDEC and EPA, subsurface soil samples were collected from one location (SB81A) at this site. Sample SB81A was taken east of Building 770 and 9th Street in the open gravel area between two railroad tracks extending northwest. The sample was taken 36 feet east of the west railroad track, 39 feet west of the east railroad track, and 114 feet south of a gravel pile located between the two tracks. At the location, samples were at three depths: zero to 1 foot, 4 to 6 feet, and 9 to 11 feet.

Samples were collected using a 2-inch-diameter, stainless-steel push sampler. VOC soil samples were collected directly from the continuous sampler using stainless-steel spoons. Part of the VOC sample was placed into a sealable plastic bag and allowed to equilibrate. The head space in the plastic bag was measured for VOCs using a hand-held PID, and the results were used to determine which interval within each boring might be selected for Level 3 analyses. The remaining soil was placed into a stainless-steel bowl, mixed, and then transferred into the appropriate sample jar.

2.2.3 Analytical Procedures

All samples were sent to CH2M HILL's Analytical Services in Montgomery, Alabama for analyses. Three surface and four subsurface soil samples were analyzed for PAHs and semivolatile organic compounds (SVOCs). Sample SS81B was analyzed for TCL/TAL analyses including total metals, pesticides/PCBs, SVOCs, and VOCs. Samples received at the laboratory were analyzed in accordance with the procedures outlined in the *Generic Quality Assurance Project Plan* (CH2M HILL, 1995) for the RI/FS currently being conducted at DDMT.

A data quality evaluation (DQE) was performed to assess the effect of the overall analytical process on the usability of the data. The DQE established that the detection of acetone and bis(2-ethylhexyl)phthalate can be attributed to field sampling and laboratory contamination rather than environmental conditions at the site. Also, low concentrations of dioxins and furans can be attributed to background or instrument noise and are not indicative of environmental



Sampling locations without data boxes had no constituents exceeding risk-based criteria

LEGEND

Surface Soil Sampling Location (mg/kg)

Soil Boring Sampling Location (mg/kg)

Figure 5
Site 81, Fuel Oil Building 765
Sampling Locations
Defense Distribution Depot Memphis, TN

CH2MHILL

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conditions. With exception to the qualifications listed above, the DQE concluded that data can be used in the project decision-making process.

3.0 Interpretation of Sampling Results

3.1 Presentation of Results

Sections 3.1.1 through 3.1.4 present results of the Screening Sites Sampling Program for Screening Site 81. Data are presented by media for surface and subsurface soil and compared with appropriate screening criteria in three summary tables: Tables 81-A, 81-B, and 81-C. Data from the 1997 CH2M HILL investigation are presented along with historical data from the *Remedial Investigations at DDMT, Final Report* (Law Environmental, 1990). If a value from a sampling location exceeds one of the comparison criteria, that value and the comparison criterion are shown in bold on the summary table.

COPCs are parameters that exceed both background values and the screening criteria. Where concentrations exceed the selected background value, the concentration is compared with the observed range of background values as reviewed and established by the BCT.

3.1.1 Surface Soil

Results of the surface soil analyses with values above detection limits are shown in Tables 81-A and 81-B.

3.1.1.1 BCT Screening Criteria

Table 81-A summarizes constituents for which the BCT has selected a screening criteria. The PAH benzo(a)pyrene was found at a concentration exceeding the screening criteria at Sample SS81A. PAH compounds are found sitewide at DDMT due to railroad operations and will be addressed in an upcoming risk evaluation.

3.1.1.2 Other Screening Criteria

Table 81-B compares remaining constituents with the soil ingestion screening criteria for both residential and industrial exposure scenarios. There were no remaining constituents that exceeded screening criteria for the site.

3.1.2 Subsurface Soils

Table 81-C shows a summary of subsurface soil sampling data. There were no results that exceeded the background value or the groundwater protection criteria for this site.

3.2 Vertical and Lateral Extent

Based on the data collected so far, it appears that there are no COPCs that persist uniformly across several media that are attributed to Screening Site 81. Most constituents that were found are at concentrations similar to background levels.

PAH concentrations found in surface soil at Screening Site 81 are found sitewide at DDMT and are attributed to railroad operations.

3.3 Potential Migration Pathways

The following paragraphs provide a general discussion of potential migration pathways for several constituents found at Screening Site 81.

Benzo(a)anthracene, benzo(a)pyrene, benzo(k)fluoranthene, benzo(b)fluoranthene, and indeno(1,2,3-c,d)pyrene make up a group of related, long-chain PAHs that have similar chemical and physical characteristics and tend to migrate and behave in the environment in a similar manner. Generally, these compounds have low vapor pressures, are only marginally soluble in water, and have a high affinity for soils. All of these compounds have been detected at concentrations above screening values for surface soils at the DDMT. They would be expected to migrate as adsorbed components of the soils and would potentially be available to aquatic organisms in turbid surface water or to bottom feeders in areas with contaminated sediments. That none of these compounds was detected in sediments indicates this is not a major source of contaminant migration for these compounds at this site. These compounds do not bioaccumulate significantly due to their rapid metabolism and excretion by most aquatic organisms.

3.4 Additional Data Needs

There are no additional data needs for the site. PAH detections will be evaluated in an upcoming sitewide PAH assessment.

4.0 Interpretation of Screening Criteria Comparisons

4.1 Methodology

The Preliminary Risk Evaluation (PRE) was performed in accordance with the *Guidance on Preliminary Risk Evaluations for the Purpose of Reaching a Finding of Suitability to Lease (FOSL)* EPA Region IV, November 22, 1994. A discussion of the PRE methodology is provided as Appendix A to this report.

4.2 Screening Site 81 Risk

Carcinogenic and noncarcinogenic risks for Screening Site 81 are presented in Table 4-61 of the draft PRE (UASESC, 1998), and detailed chemical-specific estimates are presented in Appendix A of the PRE.

The PRE risk ratios were well below a risk level of one in a million for both industrial and residential scenarios at the site as none of the chemicals exceeded the background. Noncarcinogenic ratios were also not significant, as all of the chemicals are below background levels.

Thus, due to the absence of contamination, the site has no significant human health concerns.

5.0 Summary and Recommendations

5.1 Summary

Based on the limited data collected so far, it appears that there are no COPCs that persist uniformly across several media that are attributed to Screening Site 81. Many of the constituents that were found are at concentrations similar to background levels.

PAH concentrations found in surface soil at Screening Site 81 are found sitewide at DDMT and are attributed to railroad operations.

5.2 Recommendations

No further evaluation is needed at Screening Site 81.

Table 42-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 42
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
CH2M HILL	ALUMINUM	SS42D	16200	=	24000	24000	Bkgd	MG/KG
CH2M HILL	ALUMINUM	SS42D	20500	=	24000	24000	Bkgd	MG/KG
CH2M HILL	ANTIMONY	SS42D	4.2	J	7	7	Bckg	MG/KG
CH2M HILL	ARSENIC	SS42D	12.5	J	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SS42D	15.6	J	20	20	Bckg	MG/KG
CH2M HILL	BERYLLIUM	SS42D	0.43	J	1.1	1.1	Bckg	MG/KG
CH2M HILL	BERYLLIUM	SS42D	0.54	J	1.1	1.1	Bckg	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS42D	15.2	J	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS42D	19.3	J	24.8	39	Residential RBC	MG/KG
CH2M HILL	IRON	SS42D	23200	=	37000	37000	Bckg	MG/KG
CH2M HILL	IRON	SS42D	28200	=	37000	37000	Bckg	MG/KG
CH2M HILL	LEAD	SS42D	14.9	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SS42D	18.1	=	30	400	CERCLA	MG/KG
CH2M HILL	MANGANESE	SS42D	621	=	1300	1300	Bckg	MG/KG
CH2M HILL	MANGANESE	SS42D	831	=	1300	1300	Bckg	MG/KG
CH2M HILL	PYRENE	SS42D	0.05	J	1.5	230	Residential RBC	MG/KG
CH2M HILL	TCDD Equivalent	SS42A	**4.1359E-05**	=	.000011	**0.00001**	Bckg	MG/KG
CH2M HILL	TCDD Equivalent	SS42B	**1.0411E-05**	=	.000011	**0.00001**	Bckg	MG/KG
CH2M HILL	TCDD Equivalent	SS42C	7.933E-06	=	.000011	0.00001	Bckg	MG/KG
CH2M HILL	TCDD Equivalent	SS42D	5.883E-06	=	.000011	0.00001	Bckg	MG/KG
CH2M HILL	TCDD Equivalent	SS42D	4.675E-06	=	.000011	0.00001	Bckg	MG/KG
CH2M HILL	TCDD Equivalent	SS42E	3.674E-06	=	.000011	0.00001	Bckg	MG/KG
CH2M HILL	ZINC	SS42D	64.9	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SS42D	81.2	=	130	23000	Residential RBC	MG/KG

Notes:
1. Detected values are obtained from the *Draft Parcel 33 Report-Screening Sites Sampling Program for Defense Depot* Memphis, TN, CH2M HILL, 1997.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. Based on values selected by the BRAC Cleanup Team in the August 1997 BCT meeting minutes, Memphis, Tennessee.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
J - indicates estimated value above the detection limit but below the reporting limit.
= - indicates unqualified detection
BCT - BRAC Cleanup Team

Table 42-B
Summary of Detected Compounds in Surface Soils
Compared to Non-BCT Screening Levels for Site 42
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	Risk-Based Concentrations Soil Ingestion[4]		Units
						Residential	Industrial	
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZO-p-DIOXIN	SS42A	0.006944	=	.00039	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZO-p-DIOXIN	SS42B	0.001569	J	.00039	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZO-p-DIOXIN	SS42C	0.000482	J	.00039	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZO-p-DIOXIN	SS42D	0.000039	J	.00039	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZO-p-DIOXIN	SS42D	0.000075	J	.00039	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZO-p-DIOXIN	SS42E	0.000194	J	.00039	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZOFURAN	SS42A	0.002565	=	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZOFURAN	SS42B	0.000403	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZOFURAN	SS42C	0.000078	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZOFURAN	SS42D	0.000021	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZOFURAN	SS42D	0.00001	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZOFURAN	SS42E	0.000046	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,7,8,9-HEPTACHLORODIBENZOFURAN	SS42A	0.000043	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,7,8-HEXACHLORODIBENZO-p-DIOXIN	SS42A	0.000035	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,7,8-HEXACHLORODIBENZOFURAN	SS42A	0.00004	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,7,8-HEXACHLORODIBENZOFURAN	SS42B	0.000012	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,6,7,8-HEXACHLORODIBENZO-P-DIOXIN	SS42A	0.000115	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,6,7,8-HEXACHLORODIBENZO-P-DIOXIN	SS42B	0.000035	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,6,7,8-HEXACHLORODIBENZOFURAN	SS42A	0.000039	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,6,7,8-HEXACHLORODIBENZOFURAN	SS42B	0.000006	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,7,8,9-HEXACHLORODIBENZO-P-DIOXIN	SS42A	0.000069	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,7,8,9-HEXACHLORODIBENZO-P-DIOXIN	SS42B	0.000018	J	NA	NA	NA	MG/KG
CH2M HILL	2,3,4,6,7,8-HEXACHLORODIBENZOFURAN	SS42A	0.000038	J	NA	NA	NA	MG/KG
CH2M HILL	BARIUM	SS42D	119	=	234	550	14000	MG/KG
CH2M HILL	BARIUM	SS42D	169	=	234	550	14000	MG/KG
CH2M HILL	CALCIUM	SS42D	1420	=	5840	NA	NA	MG/KG
CH2M HILL	CALCIUM	SS42D	1690	=	5840	NA	NA	MG/KG
CH2M HILL	COBALT	SS42D	9.3	=	18.3	470	12000	MG/KG
CH2M HILL	COBALT	SS42D	13.2	=	18.3	470	12000	MG/KG
CH2M HILL	COPPER	SS42D	18.5	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SS42D	22.2	=	33	310	8200	MG/KG
CH2M HILL	DIELDRIN	SS42D	0.026	=	.086	.04	.36	MG/KG

Table 42-B
Summary of Detected Compounds in Surface Soils
Compared to Non-BCT Screening Levels for Site 42
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	Risk-Based Concentrations Soil Ingestion[4]		Units
						Residential	Industrial	
CH2M HILL	DIELDRIN	SS42D	0.033	=	.086	.04	.36	MG/KG
CH2M HILL	MAGNESIUM	SS42D	2830	=	4600	NA	NA	MG/KG
CH2M HILL	MAGNESIUM	SS42D	3510	=	4600	NA	NA	MG/KG
CH2M HILL	NICKEL	SS42D	20.3	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SS42D	24.6	=	30	160	4100	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SS42A	0.035622	=	.01	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SS42B	0.009298	=	.01	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SS42C	0.007685	=	.01	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SS42D	0.003734	J	.01	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SS42D	0.004658	J	.01	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SS42E	0.003596	J	.01	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	SS42A	0.005737	=	.00039	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	SS42B	0.001113	J	.00039	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	SS42C	0.000248	J	.00039	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	SS42D	0.002149	J	.00039	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	SS42D	0.000017	J	.00039	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	SS42E	0.000078	J	.00039	NA	NA	MG/KG
CH2M HILL	POTASSIUM	SS42D	1270	=	1820	NA	NA	MG/KG
CH2M HILL	POTASSIUM	SS42D	1630	=	1820	NA	NA	MG/KG
CH2M HILL	VANADIUM	SS42D	32.1	J	48.4	55	1400	MG/KG
CH2M HILL	VANADIUM	SS42D	40.3	J	48.4	55	1400	MG/KG

Notes:
1. Detected values are obtained from the *Draft Parcel 33 Report-Screening Sites Sampling Program for Defense Depot Memphis, TN*, CH2M HILL, 1997, and the *Remedial Investigation at DDMT Final Report*, Law Environmental, August 1990.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. Risk-Based Concentrations are obtained from the *EPA Region III Risk-based Concentrations Table*, R.L. Smith, April, 1997.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
= - indicates unqualified detection.
J - indicates estimated value above the detection limit but below the reporting limit.

Table 42-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 42
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[1]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZO-p-	SB42A	18 to 20	0.000102	J	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZO-p-	SB42A	28 to 30	0.024966	=	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZO-p-	SB42A	38 to 40	0.000094	J	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZO-p-	SB42A	8 to 10	0.487586	J	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZO-p-	SB42B	28 to 30	0.000042	J	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZO-p-	SB42B	38 to 40	0.000011	J	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZO-p-	SB42B	8 to 10	0.000151	J	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-	SB42A	18 to 20	0.000023	J	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-	SB42A	28 to 30	0.007715	=	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-	SB42A	38 to 40	0.000068	J	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-	SB42A	8 to 10	0.104727	J	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-	SB42B	28 to 30	0.000022	J	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-	SB42B	38 to 40	0.000005	J	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-	SB42B	8 to 10	0.000128	J	NA	NA	MG/KG
CH2M HILL	1,2,3,4,7,8,9-	SB42A	28 to 30	0.000302	J	NA	NA	MG/KG
CH2M HILL	1,2,3,4,7,8,9-	SB42A	8 to 10	0.006637	=	NA	NA	MG/KG
CH2M HILL	1,2,3,4,7,8-HEXACHLORODIBENZOFURAN	SB42A	28 to 30	0.000262	J	NA	NA	MG/KG
CH2M HILL	1,2,3,4,7,8-HEXACHLORODIBENZOFURAN	SB42A	8 to 10	0.001696	J	NA	NA	MG/KG
CH2M HILL	1,2,3,6,7,8-HEXACHLORODIBENZO-P-	SB42A	18 to 20	0.000004	J	NA	NA	MG/KG
CH2M HILL	1,2,3,6,7,8-HEXACHLORODIBENZO-P-	SB42A	28 to 30	0.000478	J	NA	NA	MG/KG
CH2M HILL	1,2,3,6,7,8-HEXACHLORODIBENZO-P-	SB42A	8 to 10	0.006611	=	NA	NA	MG/KG
CH2M HILL	1,2,3,6,7,8-HEXACHLORODIBENZOFURAN	SB42A	18 to 20	0.000002	J	NA	NA	MG/KG
CH2M HILL	1,2,3,6,7,8-HEXACHLORODIBENZOFURAN	SB42A	28 to 30	0.000186	J	NA	NA	MG/KG
CH2M HILL	1,2,3,6,7,8-HEXACHLORODIBENZOFURAN	SB42A	8 to 10	0.000504	J	NA	NA	MG/KG
CH2M HILL	1,2,3,7,8,9-HEXACHLORODIBENZO-P-	SB42A	18 to 20	0.000005	J	NA	NA	MG/KG
CH2M HILL	1,2,3,7,8,9-HEXACHLORODIBENZO-P-	SB42A	28 to 30	0.000243	J	NA	NA	MG/KG
CH2M HILL	1,2,3,7,8,9-HEXACHLORODIBENZO-P-	SB42A	8 to 10	0.000496	J	NA	NA	MG/KG
CH2M HILL	1,2,3,7,8,9-HEXACHLORODIBENZOFURAN	SB42A	28 to 30	0.000133	J	NA	NA	MG/KG
CH2M HILL	1,2,3,7,8,9-HEXACHLORODIBENZOFURAN	SB42A	8 to 10	0.000012	J	NA	NA	MG/KG
CH2M HILL	1,2,3,7,8-PENTACHLORODIBENZO-p-	SB42A	8 to 10	0.000007	J	NA	NA	MG/KG
CH2M HILL	1,2,3,7,8-PENTACHLORODIBENZOFURAN	SB42A	8 to 10	0.000009	J	NA	NA	MG/KG

Table 42-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 42
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	2,3,4,6,7,8-HEXACHLORODIBENZOFURAN	SB42A	18 to 20	0.000002	J	NA	NA	MG/KG
CH2M HILL	2,3,4,6,7,8-HEXACHLORODIBENZOFURAN	SB42A	28 to 30	0.000243	J	NA	NA	MG/KG
CH2M HILL	2,3,4,6,7,8-HEXACHLORODIBENZOFURAN	SB42A	38 to 40	0.000003	J	NA	NA	MG/KG
CH2M HILL	2,3,4,6,7,8-HEXACHLORODIBENZOFURAN	SB42A	8 to 10	0.000344	J	NA	NA	MG/KG
CH2M HILL	2,3,4,6,7,8-HEXACHLORODIBENZOFURAN	SB42B	18 to 20	0.000004	J	NA	NA	MG/KG
CH2M HILL	2,3,4,7,8-PENTACHLORODIBENZOFURAN	SB42A	8 to 10	0.000006	J	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SB42A	18 to 20	0.007776	=	.009	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SB42A	28 to 30	0.061771	=	.009	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SB42A	38 to 40	0.001286	J	.009	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SB42A	8 to 10	3.246274	J	.009	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SB42B	18 to 20	0.000098	J	.009	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SB42B	28 to 30	0.002987	J	.009	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SB42B	38 to 40	0.001258	J	.009	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SB42B	8 to 10	0.00159	J	.009	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	SB42A	18 to 20	0.000027	J	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	SB42A	28 to 30	0.030694	=	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	SB42A	38 to 40	0.000208	J	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	SB42A	8 to 10	2.31122	J	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	SB42B	18 to 20	0.000006	J	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	SB42B	28 to 30	0.000066	J	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	SB42B	38 to 40	0.00001	J	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	SB42B	8 to 10	0.000333	J	NA	NA	MG/KG
CH2M HILL	PENTACHLOROPHENOL	SB42A	8 to 10	470	J	NA	.03	MG/KG
CH2M HILL	TCDD Equivalent	SB42A	18 to 20	7.803E-06	=	.000006	NA	MG/KG
CH2M HILL	TCDD Equivalent	SB42A	28 to 30	8.1724E-05	=	.000006	NA	MG/KG
CH2M HILL	TCDD Equivalent	SB42A	38 to 40	1.494E-06	=	.000006	NA	MG/KG
CH2M HILL	TCDD Equivalent	SB42A	8 to 10	0.00555749	=	.000006	NA	MG/KG
CH2M HILL	TCDD Equivalent	SB42B	18 to 20	1.04E-07	=	.000006	NA	MG/KG
CH2M HILL	TCDD Equivalent	SB42B	28 to 30	3.053E-06	=	.000006	NA	MG/KG
CH2M HILL	TCDD Equivalent	SB42B	38 to 40	1.268E-06	=	.000006	NA	MG/KG

Table 42-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 42
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	TCDD Equivalent	SB42B	8 to 10	1.923E-06	=	.000006	NA	MG/KG

Notes:
1. Detected values are obtained from the *Draft Parcel 33 Report-Screening Sites Sampling Program for Defense Depot Memphis, TN,* CH2M HILL, 1997.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. RBC-GWP values are obtained from the *EPA Region III Risk-based Concentrations Table*, R. L. Smith, April, 1997.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
= - indicates unqualified detection
J - indicates estimated value above the detection limit but below the reporting limit.
RBC-GWP - Risk-Based Concentrations - Groundwater Protection

Table 43-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 43
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
CH2M HILL	2-METHYLNAPHTHALENE	SS43C	0.13	J	NA	310	Residential RBC	MG/KG
CH2M HILL	ALUMINUM	SS43C	8190	=	24000	24000	Bkgd	MG/KG
CH2M HILL	ALUMINUM	SS43C	5970	=	24000	24000	Bkgd	MG/KG
CH2M HILL	ANTHRACENE	SS43C	0.053	J	.096	2300	Residential RBC	MG/KG
CH2M HILL	ARSENIC	SS43C	9.9	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SS43C	28	=	20	20	Bckg	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	SS43C	0.076	J	.71	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	SS43C	0.42	=	.71	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(a)PYRENE	SS43C	0.09	J	.96	0.088	Residential RBC	MG/KG
CH2M HILL	BENZO(a)PYRENE	SS43C	0.5	=	.96	0.088	Residential RBC	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	SS43C	0.098	J	.78	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	SS43C	0.46	=	.78	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(g,h,i)PERYLENE	SS43C	0.059	J	.82	230	Residential RBC	MG/KG
CH2M HILL	BENZO(g,h,i)PERYLENE	SS43C	0.43	=	.82	230	Residential RBC	MG/KG
CH2M HILL	BENZO(k)FLUORANTHENE	SS43C	0.083	J	.78	8.8	Residential RBC	MG/KG
CH2M HILL	BENZO(k)FLUORANTHENE	SS43C	0.49	=	.78	8.8	Residential RBC	MG/KG
CH2M HILL	BERYLLIUM	SS43C	0.69	=	1.1	1.1	Bckg	MG/KG
CH2M HILL	BERYLLIUM	SS43C	0.32	J	1.1	1.1	Bckg	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS43C	11.7	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS43C	10.3	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHRYSENE	SS43C	0.11	J	.94	88	Residential RBC	MG/KG
CH2M HILL	CHRYSENE	SS43C	0.54	=	.94	88	Residential RBC	MG/KG
CH2M HILL	DIBENZOFURAN	SS43C	0.05	J	.647	31	Residential RBC	MG/KG
CH2M HILL	FLUORANTHENE	SS43C	0.13	J	1.6	310	Residential RBC	MG/KG
CH2M HILL	FLUORANTHENE	SS43C	1	=	1.6	310	Residential RBC	MG/KG
CH2M HILL	INDENO(1,2,3-c,d)PYRENE	SS43C	0.042	J	.7	0.88	Residential RBC	MG/KG
CH2M HILL	INDENO(1,2,3-c,d)PYRENE	SS43C	0.37	J	.7	0.88	Residential RBC	MG/KG
CH2M HILL	IRON	SS43C	19400	J	37000	37000	Bckg	MG/KG
CH2M HILL	IRON	SS43C	9850	J	37000	37000	Bckg	MG/KG

Table 43-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 43
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
CH2M HILL	LEAD	SS43C	33.1	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SS43C	34.5	=	30	400	CERCLA	MG/KG
CH2M HILL	MANGANESE	SS43C	303	=	1300	1300	Bckg	MG/KG
CH2M HILL	MANGANESE	SS43C	234	=	1300	1300	Bckg	MG/KG
CH2M HILL	PHENANTHRENE	SS43C	0.22	J	.61	2300	Residential RBC	MG/KG
CH2M HILL	PHENANTHRENE	SS43C	0.37	J	.61	2300	Residential RBC	MG/KG
CH2M HILL	PYRENE	SS43C	0.19	J	1.5	230	Residential RBC	MG/KG
CH2M HILL	PYRENE	SS43C	0.78	=	1.5	230	Residential RBC	MG/KG
CH2M HILL	TCDD Equivalent	SS43A	0.0000079	=	.000011	0.00001	Bckg	MG/KG
CH2M HILL	TCDD Equivalent	SS43B	8.3017E-05	=	.000011	0.00001	Bckg	MG/KG
CH2M HILL	TCDD Equivalent	SS43C	0.00000901	=	.000011	0.00001	Bckg	MG/KG
CH2M HILL	TCDD Equivalent	SS43C	1.3213E-05	=	.000011	0.00001	Bckg	MG/KG
CH2M HILL	TCDD Equivalent	SS43D	2.439E-06	=	.000011	0.00001	Bckg	MG/KG
CH2M HILL	TCDD Equivalent	SS43E	7.271E-06	=	.000011	0.00001	Bckg	MG/KG
CH2M HILL	ZINC	SS43C	67.7	J	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SS43C	47.7	J	130	23000	Residential RBC	MG/KG
LAW	ARSENIC	SS47	19	=	20	20	Bckg	MG/KG
LAW	BENZO(a)ANTHRACENE	SS47	0.057	J	.71	0.88	Residential RBC	MG/KG
LAW	BENZO(a)PYRENE	SS47	0.046	J	.96	0.088	Residential RBC	MG/KG
LAW	BENZO(b)FLUORANTHENE	SS47	0.09	J	.78	0.88	Residential RBC	MG/KG
LAW	CHROMIUM, TOTAL	SS47	9	=	24.8	39	Residential RBC	MG/KG
LAW	CHRYSENE	SS47	0.078	J	.94	88	Residential RBC	MG/KG
LAW	FLUORANTHENE	SS47	0.13	J	1.6	310	Residential RBC	MG/KG
LAW	INDENO(1,2,3-c,d)PYRENE	SS47	0.084	J	.7	0.88	Residential RBC	MG/KG
LAW	LEAD	SS47	4	=	30	400	CERCLA	MG/KG
LAW	PHENANTHRENE	SS47	0.072	J	.61	2300	Residential RBC	MG/KG

Table 43-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 43
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
LAW	PYRENE	SS47	0.13	J	1.5	230	Residential RBC	MG/KG
LAW	ZINC	SS47	67	=	130	23000	Residential RBC	MG/KG

Notes:

1. Detected values are obtained from the *Draft Parcel 33 Report-Screening Sites Sampling Program for Defense Depot* Memphis, TN, CH2M HILL, 1997, and the *Remedial Investigation at DDMT Final Report* , Law Environmental, August 1990.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum* , CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. Based on values selected by the BRAC Cleanup Team in the August 1997 BCT meeting minutes, Memphis, Tennessee.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
J - indicates estimated value above the detection limit but below the reporting limit.
= - indicates unqualified detection
BCT - BRAC Cleanup Team

Table 43-B
Summary of Detected Compounds in Surface Soils
Compared to Non-BCT Screening Levels for Site 43
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	Risk-Based Concentrations Soil Ingestion[4]		Units
						Residential	Industrial	
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZO-p-DIOXIN	SS43A	0.000807	J	.00039	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZO-p-DIOXIN	SS43B	0.019812	=	.00039	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZO-p-DIOXIN	SS43C	0.00063	J	.00039	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZO-p-DIOXIN	SS43C	0.001118	J	.00039	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZO-p-DIOXIN	SS43D	0.000281	J	.00039	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZO-p-DIOXIN	SS43E	0.000617	J	.00039	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZOFURAN	SS43A	0.00025	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZOFURAN	SS43B	0.001976	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZOFURAN	SS43C	0.000212	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZOFURAN	SS43C	0.000296	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZOFURAN	SS43D	0.000032	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZOFURAN	SS43E	0.000362	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,7,8,9-HEPTACHLORODIBENZOFURAN	SS43C	0.000009	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,7,8-HEXACHLORODIBENZOFURAN	SS43A	0.000009	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,7,8-HEXACHLORODIBENZOFURAN	SS43C	0.00001	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,7,8-HEXACHLORODIBENZOFURAN	SS43C	0.000022	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,7,8-HEXACHLORODIBENZOFURAN	SS43E	0.00001	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,6,7,8-HEXACHLORODIBENZO-P-DIOXIN	SS43A	0.000022	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,6,7,8-HEXACHLORODIBENZO-P-DIOXIN	SS43B	0.00033	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,6,7,8-HEXACHLORODIBENZO-P-DIOXIN	SS43C	0.000015	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,6,7,8-HEXACHLORODIBENZO-P-DIOXIN	SS43C	0.000015	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,6,7,8-HEXACHLORODIBENZO-P-DIOXIN	SS43E	0.000012	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,6,7,8-HEXACHLORODIBENZOFURAN	SS43E	0.000005	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,7,8,9-HEXACHLORODIBENZO-P-DIOXIN	SS43C	0.000006	J	NA	NA	NA	MG/KG
CH2M HILL	ACENAPHTHYLENE	SS43C	0.074	J	.19	NA	NA	MG/KG
CH2M HILL	BARIUM	SS43C	84.4	=	234	550	14000	MG/KG
CH2M HILL	BARIUM	SS43C	56.4	=	234	550	14000	MG/KG
CH2M HILL	CALCIUM	SS43C	3640	=	5840	NA	NA	MG/KG
CH2M HILL	CALCIUM	SS43C	6160	=	5840	NA	NA	MG/KG
CH2M HILL	COBALT	SS43C	6.7	=	18.3	470	12000	MG/KG

Table 43-B
Summary of Detected Compounds in Surface Soils
Compared to Non-BCT Screening Levels for Site 43
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	Risk-Based Concentrations Soil Ingestion[4]		Units
						Residential	Industrial	
CH2M HILL	COBALT	SS43C	4.4	J	18.3	470	12000	MG/KG
CH2M HILL	COPPER	SS43C	38.5	J	33	310	8200	MG/KG
CH2M HILL	COPPER	SS43C	21.5	J	33	310	8200	MG/KG
CH2M HILL	MAGNESIUM	SS43C	1180	=	4600	NA	NA	MG/KG
CH2M HILL	MAGNESIUM	SS43C	1320	=	4600	NA	NA	MG/KG
CH2M HILL	NAPHTHALENE	SS43C	0.045	J	NA	310	8200	MG/KG
CH2M HILL	NICKEL	SS43C	14.1	J	30	160	4100	MG/KG
CH2M HILL	NICKEL	SS43C	8.5	J	30	160	4100	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SS43A	0.007129	=	.01	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SS43B	0.072102	=	.01	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SS43C	0.008666	=	.01	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SS43C	0.012749	=	.01	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SS43D	0.001916	J	.01	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SS43E	0.006838	=	.01	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	SS43A	0.000771	J	.00039	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	SS43B	0.026781	=	.00039	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	SS43C	0.000344	J	.00039	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	SS43C	0.000464	J	.00039	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	SS43D	0.000523	J	.00039	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	SS43E	0.000433	J	.00039	NA	NA	MG/KG
CH2M HILL	p,p'-DDD	SS43C	0.033	J	.0067	2.7	24	MG/KG
CH2M HILL	p,p'-DDE	SS43C	0.15	=	.16	1.9	17	MG/KG
CH2M HILL	p,p'-DDE	SS43C	0.52	=	.16	1.9	17	MG/KG
CH2M HILL	p,p'-DDT	SS43C	0.33	=	.074	1.9	17	MG/KG
CH2M HILL	p,p'-DDT	SS43C	1.4	=	.074	1.9	17	MG/KG
CH2M HILL	POTASSIUM	SS43C	771	=	1820	NA	NA	MG/KG
CH2M HILL	POTASSIUM	SS43C	648	=	1820	NA	NA	MG/KG
CH2M HILL	SELENIUM	SS43C	0.66	=	.81	39	1000	MG/KG
CH2M HILL	SODIUM	SS43C	277	J	NA	NA	NA	MG/KG
CH2M HILL	VANADIUM	SS43C	23.1	=	48.4	55	1400	MG/KG

Table 43-B
Summary of Detected Compounds in Surface Soils
Compared to Non-BCT Screening Levels for Site 43
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	Risk-Based Concentrations Soil Ingestion[4]		Units
						Residential	Industrial	
CH2M HILL	VANADIUM	SS43C	15.2	=	48.4	55	1400	MG/KG
LAW	ACETONE	SS47	0.074	=	NA	780	20000	MG/KG
LAW	ALPHA-CHLORDANE	SS47	0.033	J	.029	.49	4.4	MG/KG
LAW	BARIUM	SS47	30.6	=	234	550	14000	MG/KG
LAW	BETA BHC (BETA	SS47	0.033	=	NA	NA	NA	MG/KG
LAW	bis(2-ETHYLHEXYL) PHTHALATE	SS47	0.33	J	NA	46	410	MG/KG
LAW	COPPER	SS47	12	=	33	310	8200	MG/KG
LAW	DDE	SS47	0.014	J	.16	1.9	17	MG/KG
LAW	DDT	SS47	0.079	J	.074	1.9	17	MG/KG
LAW	GAMMA-CHLORDANE	SS47	0.053	J	.026	.49	4.4	MG/KG
LAW	HEPTACHLOR EPOXIDE	SS47	0.0091	=	.0045	.07	.63	MG/KG
LAW	METHYLENE CHLORIDE	SS47	0.006	=	NA	85	760	MG/KG
LAW	NICKEL	SS47	3	=	30	160	4100	MG/KG
LAW	TOLUENE	SS47	0.005	J	.012	1600	41000	MG/KG
LAW	Total Polynuclear Aromatic Hydrocarbons	SS47	0.687	=	NA	NA	NA	MG/KG
LAW	TRICHLOROETHYLENE (TCE)	SS47	0.001	J	NA	58	520	MG/KG

Notes:
1. Detected values are obtained from the *Draft Parcel 33 Report-Screening Sites Sampling Program for Defense Depot Memphis, TN*, CH2M HILL, 1997, and the *Remedial Investigation at DDMT Final Report*, Law Environmental, August 1990.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. Risk-Based Concentrations are obtained from the *EPA Region III Risk-based Concentrations Table*, R.L. Smith, April, 1997.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
= - indicates unqualified detection.
J - indicates estimated value above the detection limit but below the reporting limit.

Table 43-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 43
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZO-p-DIOXIN	SB43A	18 to 20	0.000006	J	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZO-p-DIOXIN	SB43B	38 to 40	0.000009	J	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZO-p-DIOXIN	SB43B	8 to 10	0.000007	J	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZO-p-DIOXIN	SB43B	8 to 10	0.000052	J	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZOFURAN	SB43A	18 to 20	0.000003	J	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZOFURAN	SB43B	38 to 40	0.000027	J	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZOFURAN	SB43B	8 to 10	0.000003	J	NA	NA	MG/KG
CH2M HILL	1,2,3,4,7,8,9-HEPTACHLORODIBENZOFURAN	SB43B	38 to 40	0.000012	J	NA	NA	MG/KG
CH2M HILL	1,2,3,4,7,8-HEXACHLORODIBENZO-p-DIOXIN	SB43B	38 to 40	0.000006	J	NA	NA	MG/KG
CH2M HILL	1,2,3,4,7,8-HEXACHLORODIBENZOFURAN	SB43B	38 to 40	0.000012	J	NA	NA	MG/KG
CH2M HILL	1,2,3,6,7,8-HEXACHLORODIBENZO-P-DIOXIN	SB43B	38 to 40	0.000011	J	NA	NA	MG/KG
CH2M HILL	1,2,3,6,7,8-HEXACHLORODIBENZOFURAN	SB43B	38 to 40	0.000012	J	NA	NA	MG/KG
CH2M HILL	1,2,3,7,8,9-HEXACHLORODIBENZO-P-DIOXIN	SB43B	38 to 40	0.000024	J	NA	NA	MG/KG
CH2M HILL	1,2,3,7,8,9-HEXACHLORODIBENZOFURAN	SB43B	38 to 40	0.000013	J	NA	NA	MG/KG
CH2M HILL	2,3,4,6,7,8-HEXACHLORODIBENZOFURAN	SB43A	18 to 20	0.000003	J	NA	NA	MG/KG
CH2M HILL	2,3,4,6,7,8-HEXACHLORODIBENZOFURAN	SB43A	18 to 20	0.000004	J	NA	NA	MG/KG
CH2M HILL	2,3,4,6,7,8-HEXACHLORODIBENZOFURAN	SB43A	28 to 30	0.000003	J	NA	NA	MG/KG
CH2M HILL	2,3,4,6,7,8-HEXACHLORODIBENZOFURAN	SB43A	38 to 40	0.000003	J	NA	NA	MG/KG
CH2M HILL	2,3,4,6,7,8-HEXACHLORODIBENZOFURAN	SB43B	18 to 20	0.000008	J	NA	NA	MG/KG
CH2M HILL	2,3,4,6,7,8-HEXACHLORODIBENZOFURAN	SB43B	28 to 30	0.000006	J	NA	NA	MG/KG
CH2M HILL	2,3,4,6,7,8-HEXACHLORODIBENZOFURAN	SB43B	38 to 40	0.000015	J	NA	NA	MG/KG
CH2M HILL	2,3,4,6,7,8-HEXACHLORODIBENZOFURAN	SB43B	8 to 10	0.000011	J	NA	NA	MG/KG
CH2M HILL	2,3,4,6,7,8-HEXACHLORODIBENZOFURAN	SB43B	8 to 10	0.000004	J	NA	NA	MG/KG
CH2M HILL	2,3,4,7,8-PENTACHLORODIBENZOFURAN	SB43B	38 to 40	0.000038	J	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SB43A	18 to 20	0.000653	J	.009	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SB43A	18 to 20	0.000178	J	.009	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SB43A	28 to 30	0.000133	J	.009	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SB43A	38 to 40	0.000126	J	.009	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SB43B	18 to 20	0.000405	J	.009	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SB43B	28 to 30	0.00008	J	.009	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SB43B	38 to 40	0.000264	J	.009	NA	MG/KG

Table 43-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 43
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SB43B	8 to 10	0.001289	J	.009	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SB43B	8 to 10	0.000758	J	.009	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	SB43A	18 to 20	0.000016	J	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	SB43B	38 to 40	0.000059	J	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	SB43B	8 to 10	0.000002	J	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	SB43B	8 to 10	0.00001	J	NA	NA	MG/KG
CH2M HILL	TCDD Equivalent	SB43A	18 to 20	1.78E-07	=	.000006	NA	MG/KG
CH2M HILL	TCDD Equivalent	SB43A	18 to 20	6.69E-07	=	.000006	NA	MG/KG
CH2M HILL	TCDD Equivalent	SB43A	28 to 30	1.33E-07	=	.000006	NA	MG/KG
CH2M HILL	TCDD Equivalent	SB43A	38 to 40	1.26E-07	=	.000006	NA	MG/KG
CH2M HILL	TCDD Equivalent	SB43B	18 to 20	4.05E-07	=	.000006	NA	MG/KG
CH2M HILL	TCDD Equivalent	SB43B	28 to 30	0.00000008	=	.000006	NA	MG/KG
CH2M HILL	TCDD Equivalent	SB43B	38 to 40	**1.9323E-05**	=	**.000006**	NA	MG/KG
CH2M HILL	TCDD Equivalent	SB43B	8 to 10	7.68E-07	=	.000006	NA	MG/KG
CH2M HILL	TCDD Equivalent	SB43B	8 to 10	1.291E-06	=	.000006	NA	MG/KG

Notes:
1. Detected values are obtained from the *Draft Parcel 33 Report-Screening Sites Sampling Program for Defense Depot Memphis, TN*, CH2M HILL, 1997.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum* , CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. RBC-GWP values are obtained from the *EPA Region III Risk-based Concentrations Table* , R. L. Smith, April, 1997.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
= - indicates unqualified detection
J - indicates estimated value above the detection limit but below the reporting limit.
RBC-GWP - Risk-Based Concentrations - Groundwater Protection

Table 46-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 46
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
CH2M HILL	ALUMINUM	SS46E	4480	=	24000	24000	Bkgd	MG/KG
CH2M HILL	ARSENIC	SS46E	25	=	20	20	Bckg	MG/KG
CH2M HILL	BENZO(k)FLUORANTHENE	SS46E	0.43	=	.78	8.8	Residential RBC	MG/KG
CH2M HILL	BERYLLIUM	SS46E	0.34	J	1.1	1.1	Bckg	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS46E	9.2	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	IRON	SS46E	13900	J	37000	37000	Bckg	MG/KG
CH2M HILL	LEAD	SS46E	26	=	30	400	CERCLA	MG/KG
CH2M HILL	MANGANESE	SS46E	206	=	1300	1300	Bckg	MG/KG
CH2M HILL	PYRENE	SS46E	0.93	=	1.5	230	Residential RBC	MG/KG
CH2M HILL	TCDD Equivalent	SS46A	**3.8451E-05**	=	.000011	**0.00001**	Bckg	MG/KG
CH2M HILL	TCDD Equivalent	SS46B	**2.8913E-05**	=	.000011	**0.00001**	Bckg	MG/KG
CH2M HILL	TCDD Equivalent	SS46C	**3.4689E-05**	=	.000011	**0.00001**	Bckg	MG/KG
CH2M HILL	TCDD Equivalent	SS46D	**0.00004577**	=	.000011	**0.00001**	Bckg	MG/KG
CH2M HILL	TCDD Equivalent	SS46E	**1.6031E-05**	=	.000011	**0.00001**	Bckg	MG/KG
CH2M HILL	ZINC	SS46E	52.8	J	130	23000	Residential RBC	MG/KG

Notes:
1. Detected values are obtained from the *Draft Parcel 33 Report-Screening Sites Sampling Program for Defense Depot* Memphis, TN, CH2M HILL, 1997.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. Based on values selected by the BRAC Cleanup Team in the August 1997 BCT meeting minutes, Memphis, Tennessee.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
J - indicates estimated value above the detection limit but below the reporting limit.
= - indicates unqualified detection.
BCT - BRAC Cleanup Team

Table 46-B
Summary of Detected Compounds in Surface Soils
Compared to Non-BCT Screening Levels for Site 46
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	Risk-Based Concentrations Soil Ingestion[4]		Units
						Residential	Industrial	
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZO-p-DIOXIN	SS46A	0.004972	=	.00039	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZO-p-DIOXIN	SS46B	0.004306	=	.00039	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZO-p-DIOXIN	SS46C	0.005012	=	.00039	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZO-p-DIOXIN	SS46E	0.023402	=	.00039	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZOFURAN	SS46A	0.00186	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZOFURAN	SS46B	0.001668	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZOFURAN	SS46C	0.002448	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZOFURAN	SS46D	0.012004	=	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZOFURAN	SS46E	0.003901	=	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,7,8,9-HEPTACHLORODIBENZOFURAN	SS46A	0.000057	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,7,8,9-HEPTACHLORODIBENZOFURAN	SS46B	0.000032	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,7,8,9-HEPTACHLORODIBENZOFURAN	SS46C	0.000054	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,7,8,9-HEPTACHLORODIBENZOFURAN	SS46E	0.00018	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,7,8-HEXACHLORODIBENZO-p-DIOXIN	SS46A	0.000022	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,7,8-HEXACHLORODIBENZO-p-DIOXIN	SS46B	0.000022	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,7,8-HEXACHLORODIBENZO-p-DIOXIN	SS46C	0.000033	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,7,8-HEXACHLORODIBENZO-p-DIOXIN	SS46E	0.000131	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,7,8-HEXACHLORODIBENZOFURAN	SS46A	0.00009	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,7,8-HEXACHLORODIBENZOFURAN	SS46B	0.000111	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,7,8-HEXACHLORODIBENZOFURAN	SS46C	0.000172	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,7,8-HEXACHLORODIBENZOFURAN	SS46E	0.000401	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,6,7,8-HEXACHLORODIBENZO-P-DIOXIN	SS46A	0.000083	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,6,7,8-HEXACHLORODIBENZO-P-DIOXIN	SS46B	0.000079	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,6,7,8-HEXACHLORODIBENZO-P-DIOXIN	SS46C	0.000129	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,6,7,8-HEXACHLORODIBENZO-P-DIOXIN	SS46D	0.001318	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,6,7,8-HEXACHLORODIBENZO-P-DIOXIN	SS46E	0.000442	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,6,7,8-HEXACHLORODIBENZOFURAN	SS46A	0.00003	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,6,7,8-HEXACHLORODIBENZOFURAN	SS46B	0.000041	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,6,7,8-HEXACHLORODIBENZOFURAN	SS46C	0.000066	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,6,7,8-HEXACHLORODIBENZOFURAN	SS46E	0.000135	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,7,8,9-HEXACHLORODIBENZO-P-DIOXIN	SS46A	0.00004	J	NA	NA	NA	MG/KG

Table 46-B
Summary of Detected Compounds in Surface Soils
Compared to Non-BCT Screening Levels for Site 46
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	Risk-Based Concentrations Soil Ingestion[4]		Units
						Residential	Industrial	
CH2M HILL	1,2,3,7,8,9-HEXACHLORODIBENZO-P-DIOXIN	SS46B	0.000044	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,7,8,9-HEXACHLORODIBENZO-P-DIOXIN	SS46C	0.000086	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,7,8,9-HEXACHLORODIBENZO-P-DIOXIN	SS46E	0.000292	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,7,8-PENTACHLORODIBENZO-p-DIOXIN	SS46C	0.000012	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,7,8-PENTACHLORODIBENZO-p-DIOXIN	SS46E	0.000055	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,7,8-PENTACHLORODIBENZOFURAN	SS46E	0.000012	J	NA	NA	NA	MG/KG
CH2M HILL	2,3,4,6,7,8-HEXACHLORODIBENZOFURAN	SS46A	0.000028	J	NA	NA	NA	MG/KG
CH2M HILL	2,3,4,6,7,8-HEXACHLORODIBENZOFURAN	SS46B	0.000037	J	NA	NA	NA	MG/KG
CH2M HILL	2,3,4,6,7,8-HEXACHLORODIBENZOFURAN	SS46C	0.000063	J	NA	NA	NA	MG/KG
CH2M HILL	2,3,4,6,7,8-HEXACHLORODIBENZOFURAN	SS46E	0.000089	J	NA	NA	NA	MG/KG
CH2M HILL	2,3,4,7,8-PENTACHLORODIBENZOFURAN	SS46E	0.000014	J	NA	NA	NA	MG/KG
CH2M HILL	ACETONE	SS46B	0.005	J	NA	780	20000	MG/KG
CH2M HILL	ACETONE	SS46D	0.005	J	NA	780	20000	MG/KG
CH2M HILL	ALPHA-CHLORDANE	SS46E	3.4	=	.029	.49	4.4	MG/KG
CH2M HILL	BARIUM	SS46E	69	=	234	550	14000	MG/KG
CH2M HILL	CALCIUM	SS46E	24100	=	5840	NA	NA	MG/KG
CH2M HILL	COBALT	SS46E	5.5	J	18.3	470	12000	MG/KG
CH2M HILL	COPPER	SS46E	17.9	J	33	310	8200	MG/KG
CH2M HILL	GAMMA-CHLORDANE	SS46E	3.3	=	.026	.49	4.4	MG/KG
CH2M HILL	MAGNESIUM	SS46E	1860	=	4600	NA	NA	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SS46D	0.001	J	NA	85	760	MG/KG
CH2M HILL	NICKEL	SS46E	12.5	J	30	160	4100	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SS46A	0.035032	=	.01	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SS46B	0.02651	=	.01	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SS46C	0.031852	=	.01	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	SS46A	0.003419	J	.00039	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	SS46B	0.002403	J	.00039	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	SS46C	0.002837	J	.00039	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	SS46D	0.03227	=	.00039	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	SS46E	0.008431	=	.00039	NA	NA	MG/KG
CH2M HILL	p,p'-DDE	SS46E	1.6	=	.16	1.9	17	MG/KG

Table 46-B
Summary of Detected Compounds in Surface Soils
Compared to Non-BCT Screening Levels for Site 46
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	Risk-Based Concentrations Soil Ingestion[4]		Units
						Residential	Industrial	
CH2M HILL	p,p'-DDT	SS46E	3.1	=	.074	1.9	17	MG/KG
CH2M HILL	POTASSIUM	SS46E	484	J	1820	NA	NA	MG/KG
CH2M HILL	SELENIUM	SS46E	0.44	J	.81	39	1000	MG/KG
CH2M HILL	VANADIUM	SS46E	18.4	=	48.4	55	1400	MG/KG

Notes:
1. Detected values are obtained from the *Draft Parcel 33 Report-Screening Sites Sampling Program for Defense Depot Memphis, TN*, CH2M HILL, 1997.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. Risk-Based Concentrations are obtained from the *EPA Region III Risk-based Concentrations Table*, R.L. Smith, April, 1997.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
= - indicates unqualified detection
J - indicates estimated value above the detection limit but below the reporting limit.

Table 46-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 46
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZO-p-	SB46A	38 to 40	0.000123	J	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-	SB46A	18 to 20	0.000004	J	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-	SB46A	28 to 30	0.000002	J	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-	SB46A	38 to 40	0.000083	J	NA	NA	MG/KG
CH2M HILL	1,2,3,4,7,8,9-	SB46A	38 to 40	0.000043	J	NA	NA	MG/KG
CH2M HILL	1,2,3,4,7,8-HEXACHLORODIBENZO-p-	SB46A	38 to 40	0.000039	J	NA	NA	MG/KG
CH2M HILL	1,2,3,4,7,8-HEXACHLORODIBENZOFURAN	SB46A	38 to 40	0.00004	J	NA	NA	MG/KG
CH2M HILL	1,2,3,6,7,8-HEXACHLORODIBENZO-P-	SB46A	38 to 40	0.000048	J	NA	NA	MG/KG
CH2M HILL	1,2,3,6,7,8-HEXACHLORODIBENZOFURAN	SB46A	38 to 40	0.000033	J	NA	NA	MG/KG
CH2M HILL	1,2,3,7,8,9-HEXACHLORODIBENZO-P-	SB46A	38 to 40	0.000055	J	NA	NA	MG/KG
CH2M HILL	1,2,3,7,8,9-HEXACHLORODIBENZOFURAN	SB46A	38 to 40	0.000042	J	NA	NA	MG/KG
CH2M HILL	1,2,3,7,8-PENTACHLORODIBENZOFURAN	SB46A	38 to 40	0.000019	J	NA	NA	MG/KG
CH2M HILL	2,3,4,6,7,8-HEXACHLORODIBENZOFURAN	SB46A	28 to 30	0.000006	J	NA	NA	MG/KG
CH2M HILL	2,3,4,6,7,8-HEXACHLORODIBENZOFURAN	SB46A	38 to 40	0.000051	J	NA	NA	MG/KG
CH2M HILL	2,3,4,6,7,8-HEXACHLORODIBENZOFURAN	SB46B	28 to 30	0.000006	J	NA	NA	MG/KG
CH2M HILL	2,3,7,8-TETRACHLORODIBENZO-p-	SB46A	38 to 40	0.000017	J	NA	NA	MG/KG
CH2M HILL	2,3,7,8-TETRACHLORODIBENZOFURAN	SB46A	38 to 40	0.000008	J	NA	NA	MG/KG
CH2M HILL	ACETONE	SB46A	18 to 20	0.004	J	NA	16	MG/KG
CH2M HILL	ACETONE	SB46A	28 to 30	0.004	J	NA	16	MG/KG
CH2M HILL	ACETONE	SB46A	38 to 40	0.005	J	NA	16	MG/KG
CH2M HILL	ACETONE	SB46B	18 to 20	0.004	J	NA	16	MG/KG
CH2M HILL	ACETONE	SB46B	28 to 30	0.004	J	NA	16	MG/KG
CH2M HILL	ACETONE	SB46B	38 to 40	0.005	J	NA	16	MG/KG
CH2M HILL	ACETONE	SB46B	8 to 10	0.004	J	NA	16	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SB46B	8 to 10	0.002	J	NA	.02	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SB46A	18 to 20	0.000019	J	.009	NA	MG/KG

Table 46-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 46
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SB46A	28 to 30	0.002341	J	.009	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SB46A	38 to 40	0.001133	J	.009	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SB46A	8 to 10	0.006152	=	.009	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SB46B	18 to 20	0.000045	J	.009	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SB46B	28 to 30	0.000014	J	.009	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SB46B	38 to 40	0.00008	J	.009	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	SB46B	8 to 10	0.002157	J	.009	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	SB46A	18 to 20	0.000005	J	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	SB46A	38 to 40	0.000173	J	NA	NA	MG/KG
CH2M HILL	TCDD Equivalent	SB46A	18 to 20	2.4E-08	=	.000006	NA	MG/KG
CH2M HILL	TCDD Equivalent	SB46A	28 to 30	2.341E-06	=	.000006	NA	MG/KG
CH2M HILL	TCDD Equivalent	SB46A	38 to 40	2.0056E-05	=	.000006	NA	MG/KG
CH2M HILL	TCDD Equivalent	SB46A	8 to 10	6.152E-06	=	.000006	NA	MG/KG
CH2M HILL	TCDD Equivalent	SB46B	18 to 20	4.5E-08	=	.000006	NA	MG/KG
CH2M HILL	TCDD Equivalent	SB46B	28 to 30	1.4E-08	=	.000006	NA	MG/KG
CH2M HILL	TCDD Equivalent	SB46B	38 to 40	0.00000008	=	.000006	NA	MG/KG
CH2M HILL	TCDD Equivalent	SB46B	8 to 10	2.157E-06	=	.000006	NA	MG/KG
LAW	ACETONE	STB-4-1	19 to 24	0.031	=	NA	16	MG/KG
LAW	ACETONE	STB-4-2	26 to 31	0.008	J	NA	16	MG/KG
LAW	ACETONE	STB-4-3	102 to 107	0.017	=	NA	16	MG/KG
LAW	bis(2-ETHYLHEXYL) PHTHALATE	STB-4-1	19 to 24	0.61	=	NA	3600	MG/KG
LAW	bis(2-ETHYLHEXYL) PHTHALATE	STB-4-2	26 to 31	1.5	=	NA	3600	MG/KG
LAW	bis(2-ETHYLHEXYL) PHTHALATE	STB-4-3	102 to 107	0.56	J	NA	3600	MG/KG
LAW	METHYL ETHYL KETONE (2-BUTANONE)	STB-4-1	19 to 24	0.018	=	NA	NA	MG/KG
LAW	METHYLENE CHLORIDE	STB-4-1	19 to 24	0.002	J	NA	.02	MG/KG
LAW	METHYLENE CHLORIDE	STB-4-2	26 to 31	0.016	=	NA	.02	MG/KG
LAW	METHYLENE CHLORIDE	STB-4-3	102 to 107	0.019	=	NA	.02	MG/KG

Table 46-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 46
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
LAW	N-NITROSODIPHENYLAMINE	STB-4-2	26 to 31	0.044	J	NA	1	MG/KG
LAW	TOLUENE	STB-4-1	19 to 24	0.001	J	NA	12	MG/KG

Notes:

1. Detected values are obtained from the *Draft Parcel 33 Report-Screening Sites Sampling Program for Defense Depot Memphis, TN*, CH2M HILL, 1997, and the *Remedial Investigation at DDMT Final Report*, Law Environmental, August 1990.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum* , CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. RBC-GWP values are obtained from the *EPA Region III Risk-based Concentrations Table* , R. L. Smith, April, 1997.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
= - indicates unqualified detection
J - indicates estimated value above the detection limit but below the reporting limit.
RBC-GWP - Risk-Based Concentrations - Groundwater Protection

Table 80-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 80
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
CH2M HILL	2-METHYLNAPHTHALENE	SS80A	0.051	J	NA	310	Residential RBC	MG/KG
CH2M HILL	ALUMINUM	SS80A	3470	=	24000	24000	Bkgd	MG/KG
CH2M HILL	ANTIMONY	SB80A	2.4	J	7	7	Bckg	MG/KG
CH2M HILL	ARSENIC	SB80A	8.9	J	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SB80B	8.9	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SS80A	19.2	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SS80B	17.2	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SS80C	15.9	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SS80C	15.5	=	20	20	Bckg	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	SS80A	0.055	J	.71	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	SS80B	1.3	=	.71	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	SS80C	0.1	=	.71	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	SS80C	0.089	=	.71	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(a)PYRENE	SS80A	0.086	J	.96	0.088	Residential RBC	MG/KG
CH2M HILL	BENZO(a)PYRENE	SS80B	1.4	=	.96	0.088	Residential RBC	MG/KG
CH2M HILL	BENZO(a)PYRENE	SS80C	0.1	=	.96	0.088	Residential RBC	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	SS80B	1.2	=	.78	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	SS80C	0.1	=	.78	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(g,h,i)PERYLENE	SS80A	0.059	J	.82	230	Residential RBC	MG/KG
CH2M HILL	BENZO(k)FLUORANTHENE	SS80B	1.3	=	.78	8.8	Residential RBC	MG/KG
CH2M HILL	BENZO(k)FLUORANTHENE	SS80C	0.078	=	.78	8.8	Residential RBC	MG/KG
CH2M HILL	BERYLLIUM	SB80A	0.4	J	1.1	1.1	Bckg	MG/KG
CH2M HILL	BERYLLIUM	SB80B	0.98	=	1.1	1.1	Bckg	MG/KG
CH2M HILL	BERYLLIUM	SS80A	0.14	J	1.1	1.1	Bckg	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB80A	12.8	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB80B	57.3	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS80A	9.9	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS80B	39	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS80C	21.9	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS80C	19.3	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHRYSENE	SS80A	0.087	J	.94	88	Residential RBC	MG/KG

Table 80-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 80
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
CH2M HILL	CHRYSENE	SS80B	1.3	=	.94	88	Residential RBC	MG/KG
CH2M HILL	CHRYSENE	SS80C	0.1	=	.94	88	Residential RBC	MG/KG
CH2M HILL	CHRYSENE	SS80C	0.066	=	.94	88	Residential RBC	MG/KG
CH2M HILL	FLUORANTHENE	SS80A	0.11	J	1.6	310	Residential RBC	MG/KG
CH2M HILL	FLUORANTHENE	SS80B	2.3	=	1.6	310	Residential RBC	MG/KG
CH2M HILL	FLUORANTHENE	SS80C	0.15	=	1.6	310	Residential RBC	MG/KG
CH2M HILL	FLUORANTHENE	SS80C	0.16	=	1.6	310	Residential RBC	MG/KG
CH2M HILL	INDENO(1,2,3-c,d)PYRENE	SS80A	0.045	J	.7	0.88	Residential RBC	MG/KG
CH2M HILL	IRON	SS80A	7030	J	37000	37000	Bckg	MG/KG
CH2M HILL	LEAD	SB80A	10.5	J	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SB80B	115	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SS80A	23.2	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SS80B	237	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SS80C	34.6	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SS80C	34.1	=	30	400	CERCLA	MG/KG
CH2M HILL	MANGANESE	SS80A	154	=	1300	1300	Bckg	MG/KG
CH2M HILL	PCB-1260 (AROCHLOR 1260)	SS80A	0.74	J	.11	0.083	Residential RBC	MG/KG
CH2M HILL	PHENANTHRENE	SS80A	0.09	J	.61	2300	Residential RBC	MG/KG
CH2M HILL	PHENANTHRENE	SS80B	1.4	=	.61	2300	Residential RBC	MG/KG
CH2M HILL	PHENANTHRENE	SS80C	0.11	=	.61	2300	Residential RBC	MG/KG
CH2M HILL	PHENANTHRENE	SS80C	0.11	=	.61	2300	Residential RBC	MG/KG
CH2M HILL	PYRENE	SS80A	0.17	J	1.5	230	Residential RBC	MG/KG
CH2M HILL	PYRENE	SS80B	1.7	=	1.5	230	Residential RBC	MG/KG
CH2M HILL	PYRENE	SS80C	0.12	=	1.5	230	Residential RBC	MG/KG
CH2M HILL	PYRENE	SS80C	0.083	=	1.5	230	Residential RBC	MG/KG
CH2M HILL	ZINC	SB80A	56.4	J	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SB80B	230	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SS80A	87.4	J	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SS80B	308	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SS80C	78.6	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SS80C	70.3	=	130	23000	Residential RBC	MG/KG

Table 80-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 80
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
LAW	ARSENIC	SS24	30	=	20	20	Bckg	MG/KG
LAW	BENZO(a)ANTHRACENE	SS24	0.074	J	.71	0.88	Residential RBC	MG/KG
LAW	BENZO(a)PYRENE	SS24	0.071	J	.96	0.088	Residential RBC	MG/KG
LAW	BENZO(b)FLUORANTHENE	SS24	0.1	J	.78	0.88	Residential RBC	MG/KG
LAW	BENZO(k)FLUORANTHENE	SS24	0.08	J	.78	8.8	Residential RBC	MG/KG
LAW	CHROMIUM, TOTAL	SS24	28	=	24.8	39	Residential RBC	MG/KG
LAW	CHRYSENE	SS24	0.077	J	.94	88	Residential RBC	MG/KG
LAW	FLUORANTHENE	SS24	0.2	J	1.6	310	Residential RBC	MG/KG
LAW	LEAD	SS24	98	=	30	400	CERCLA	MG/KG
LAW	PHENANTHRENE	SS24	0.12	J	.61	2300	Residential RBC	MG/KG
LAW	PYRENE	SS24	0.14	J	1.5	230	Residential RBC	MG/KG
LAW	ZINC	SS24	48.6	=	130	23000	Residential RBC	MG/KG

Notes:
1. Detected values are obtained from the *Draft Parcel 33 Report-Screening Sites Sampling Program for Defense Depot* Memphis, TN, CH2M HILL, 1997, and the *Remedial Investigation at DDMT Final Report*, Law Environmental, August 1990.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. Based on values selected by the BRAC Cleanup Team in the August 1997 BCT meeting minutes, Memphis, Tennessee.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
J - indicates estimated value above the detection limit but below the reporting limit.
= - indicates unqualified detection
BCT - BRAC Cleanup Team

Table 80-B
Summary of Detected Compounds in Surface Soils
Compared to Non-BCT Screening Levels for Site 80
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	Risk-Based Concentrations Soil Ingestion[4]		Units
						Residential	Industrial	
CH2M HILL	ACETONE	SB80B	0.004	J	NA	780	20000	MG/KG
CH2M HILL	ACETONE	SS80B	0.011	=	NA	780	20000	MG/KG
CH2M HILL	ACETONE	SS80C	0.005	J	NA	780	20000	MG/KG
CH2M HILL	BARIUM	SS80A	37.6	=	234	550	14000	MG/KG
CH2M HILL	CADMIUM	SB80B	2	=	1.4	3.9	100	MG/KG
CH2M HILL	CADMIUM	SS80A	0.57	=	1.4	3.9	100	MG/KG
CH2M HILL	COBALT	SS80A	2.3	J	18.3	470	12000	MG/KG
CH2M HILL	COPPER	SB80A	18.3	J	33	310	8200	MG/KG
CH2M HILL	COPPER	SB80B	95.6	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SS80A	22.6	J	33	310	8200	MG/KG
CH2M HILL	COPPER	SS80B	63.7	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SS80C	27.4	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SS80C	25.8	=	33	310	8200	MG/KG
CH2M HILL	ETHYLBENZENE	SB80A	0.008	J	NA	780	20000	MG/KG
CH2M HILL	MAGNESIUM	SS80A	7020	=	4600	NA	NA	MG/KG
CH2M HILL	METHYL ETHYL KETONE (2-BUTANONE)	SB80A	0.01	J	.002	4700	100000	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SS80B	0.003	J	NA	85	760	MG/KG
CH2M HILL	NICKEL	SB80A	20.7	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SB80B	12.9	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SS80A	5.5	J	30	160	4100	MG/KG
CH2M HILL	NICKEL	SS80B	27.7	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SS80C	18.4	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SS80C	16.1	=	30	160	4100	MG/KG
CH2M HILL	POTASSIUM	SS80A	360	J	1820	NA	NA	MG/KG
CH2M HILL	SELENIUM	SS80B	2	=	.81	39	1000	MG/KG
CH2M HILL	Total Xylenes	SB80A	0.002	J	.009	NA	NA	MG/KG
CH2M HILL	Total Xylenes	SS80A	0.001	J	.009	NA	NA	MG/KG
CH2M HILL	Total Xylenes	SS80B	0.002	J	.009	NA	NA	MG/KG
CH2M HILL	VANADIUM	SS80A	9.2	=	48.4	55	1400	MG/KG
LAW	ACETONE	SS24	0.005	J	NA	780	20000	MG/KG

Table 80-B
Summary of Detected Compounds in Surface Soils
Compared to Non-BCT Screening Levels for Site 80
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	Risk-Based Concentrations Soil Ingestion[4]		Units
						Residential	Industrial	
LAW	ALPHA ENDOSULFAN	SS24	0.041	=	NA	NA	NA	MG/KG
LAW	BARIUM	SS24	67.5	=	234	550	14000	MG/KG
LAW	bis(2-ETHYLHEXYL) PHTHALATE	SS24	0.47	=	NA	46	410	MG/KG
LAW	COPPER	SS24	18	=	33	310	8200	MG/KG
LAW	DDT	SS24	0.051	=	.074	1.9	17	MG/KG
LAW	DIELDRIN	SS24	0.13	=	.086	.04	.36	MG/KG
LAW	MERCURY	SS24	0.06	=	.43	2.3	61	MG/KG
LAW	METHYLENE CHLORIDE	SS24	0.013	=	NA	85	760	MG/KG
LAW	N-NITROSODIPHENYLAMINE	SS24	0.053	J	NA	130	1200	MG/KG
LAW	NICKEL	SS24	12	=	30	160	4100	MG/KG
LAW	TOLUENE	SS24	0.005	J	.012	1600	41000	MG/KG
LAW	Total Polynuclear Aromatic Hydrocarbons	SS24	0.862	=	NA	NA	NA	MG/KG

Notes:
1. Detected values are obtained from the *Draft Parcel 33 Report-Screening Sites Sampling Program for Defense Depot Memphis, TN*, CH2M HILL, 1997, and the *Remedial Investigation at DDMT Final Report*, Law Environmental, August 1990.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. Risk-Based Concentrations are obtained from the *EPA Region III Risk-based Concentrations Table*, R.L. Smith, April, 1997.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
= - indicates unqualified detection.
J - indicates estimated value above the detection limit but below the reporting limit.

Table 80-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 80
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	ACETONE	SB80A	18 to 20	0.014	=	NA	16	MG/KG
CH2M HILL	ACETONE	SB80A	3 to 5	0.007	J	NA	16	MG/KG
CH2M HILL	ACETONE	SB80A	8 to 10	0.008	J	NA	16	MG/KG
CH2M HILL	ACETONE	SB80B	18 to 20	0.025	=	NA	16	MG/KG
CH2M HILL	ACETONE	SB80B	3 to 5	0.006	J	NA	16	MG/KG
CH2M HILL	ACETONE	SB80B	8 to 10	0.006	J	NA	16	MG/KG
CH2M HILL	ARSENIC	SB80A	18 to 20	10.5	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB80A	3 to 5	17.1	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB80A	8 to 10	25.8	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB80B	18 to 20	10.5	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB80B	3 to 5	21.4	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB80B	8 to 10	18.9	=	17	29	MG/KG
CH2M HILL	BERYLLIUM	SB80A	8 to 10	1.2	=	1.2	63	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB80A	18 to 20	38.9	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB80A	3 to 5	24.6	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB80A	8 to 10	30.7	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB80B	18 to 20	41.2	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB80B	3 to 5	26.5	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB80B	8 to 10	23.1	=	26	38	MG/KG
CH2M HILL	COPPER	SB80A	18 to 20	22.3	=	33	NA	MG/KG
CH2M HILL	COPPER	SB80A	3 to 5	30.8	=	33	NA	MG/KG
CH2M HILL	COPPER	SB80A	8 to 10	45	=	33	NA	MG/KG
CH2M HILL	COPPER	SB80B	18 to 20	18.6	=	33	NA	MG/KG
CH2M HILL	COPPER	SB80B	3 to 5	37.4	=	33	NA	MG/KG
CH2M HILL	COPPER	SB80B	8 to 10	34.1	=	33	NA	MG/KG
CH2M HILL	LEAD	SB80A	18 to 20	20.2	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB80A	3 to 5	20.6	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB80A	8 to 10	29.8	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB80B	18 to 20	17.7	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB80B	3 to 5	24.9	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB80B	8 to 10	20.8	=	24	1.5	MG/KG

Table 80-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 80
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	METHYL ETHYL KETONE (2-BUTANONE)	SB80B	18 to 20	0.003	J	NA	NA	MG/KG
CH2M HILL	NICKEL	SB80A	18 to 20	23.9	=	37	130	MG/KG
CH2M HILL	NICKEL	SB80A	3 to 5	34.8	=	37	130	MG/KG
CH2M HILL	NICKEL	SB80A	8 to 10	49.2	=	37	130	MG/KG
CH2M HILL	NICKEL	SB80B	18 to 20	25.9	=	37	130	MG/KG
CH2M HILL	NICKEL	SB80B	3 to 5	42.8	=	37	130	MG/KG
CH2M HILL	NICKEL	SB80B	8 to 10	37.5	=	37	130	MG/KG
CH2M HILL	SELENIUM	SB80A	8 to 10	1.7	=	.64	5	MG/KG
CH2M HILL	TOTAL 1,2-DICHLOROETHENE	SB80B	18 to 20	0.006	J	NA	.4	MG/KG
CH2M HILL	TRICHLOROETHYLENE (TCE)	SB80B	8 to 10	0.002	J	NA	.06	MG/KG
CH2M HILL	ZINC	SB80A	18 to 20	49	=	110	12000	MG/KG
CH2M HILL	ZINC	SB80A	3 to 5	112	=	110	12000	MG/KG
CH2M HILL	ZINC	SB80A	8 to 10	155	=	110	12000	MG/KG
CH2M HILL	ZINC	SB80B	18 to 20	58.3	=	110	12000	MG/KG
CH2M HILL	ZINC	SB80B	3 to 5	137	=	110	12000	MG/KG
CH2M HILL	ZINC	SB80B	8 to 10	109	=	110	12000	MG/KG

Notes:
1. Detected values are obtained from the *Draft Parcel 33 Report-Screening Sites Sampling Program for Defense Depot Memphis, TN*, CH2M HILL, 1997.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. RBC-GWP values are obtained from the *EPA Region III Risk-based Concentrations Table*, R. L. Smith, April, 1997.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
= - indicates unqualified detection
J - indicates estimated value above the detection limit but below the reporting limit.
RBC-GWP - Risk-Based Concentrations - Groundwater Protection

Table 81-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 81
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
CH2M HILL	ALUMINUM	SS81B	9490	=	24000	24000	Bkgd	MG/KG
CH2M HILL	ARSENIC	SS81B	10.3	=	20	20	Bckg	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	SS81A	0.36	=	.71	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(a)PYRENE	SS81A	0.4	=	.96	0.088	Residential RBC	MG/KG
CH2M HILL	BENZO(a)PYRENE	SS81B	0.044	J	.96	0.088	Residential RBC	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	SS81A	0.37	=	.78	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	SS81B	0.048	J	.78	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(g,h,i)PERYLENE	SS81A	0.28	=	.82	230	Residential RBC	MG/KG
CH2M HILL	BENZO(g,h,i)PERYLENE	SS81B	0.049	J	.82	230	Residential RBC	MG/KG
CH2M HILL	BENZO(k)FLUORANTHENE	SS81A	0.33	=	.78	8.8	Residential RBC	MG/KG
CH2M HILL	BERYLLIUM	SS81B	0.62	=	1.1	1.1	Bckg	MG/KG
CH2M HILL	CARBAZOLE	SS81C	0.061	J	.067	32	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS81B	12.6	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHRYSENE	SS81A	0.39	=	.94	88	Residential RBC	MG/KG
CH2M HILL	CHRYSENE	SS81B	0.054	J	.94	88	Residential RBC	MG/KG
CH2M HILL	FLUORANTHENE	SS81A	0.74	=	1.6	310	Residential RBC	MG/KG
CH2M HILL	FLUORANTHENE	SS81B	0.078	J	1.6	310	Residential RBC	MG/KG
CH2M HILL	INDENO(1,2,3-c,d)PYRENE	SS81A	0.32	=	.7	0.88	Residential RBC	MG/KG
CH2M HILL	IRON	SS81B	17900	J	37000	37000	Bckg	MG/KG
CH2M HILL	LEAD	SS81B	15.2	=	30	400	CERCLA	MG/KG
CH2M HILL	MANGANESE	SS81B	467	=	1300	1300	Bckg	MG/KG
CH2M HILL	PHENANTHRENE	SB81A	0.13	=	.61	2300	Residential RBC	MG/KG
CH2M HILL	PHENANTHRENE	SS81A	0.36	=	.61	2300	Residential RBC	MG/KG
CH2M HILL	PHENANTHRENE	SS81B	0.045	J	.61	2300	Residential RBC	MG/KG
CH2M HILL	PYRENE	SS81A	0.58	=	1.5	230	Residential RBC	MG/KG
CH2M HILL	PYRENE	SS81B	0.09	J	1.5	230	Residential RBC	MG/KG

Table 81-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 81
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
CH2M HILL	ZINC	SS81B	49.4	J	130	23000	Residential RBC	MG/KG

Notes:
1. Detected values are obtained from the *Draft Parcel 24 Report-Screening Sites Sampling Program for Defense Depot* Memphis, TN, CH2M HILL, 1997.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. Based on values selected by the BRAC Cleanup Team in the August 1997 BCT meeting minutes, Memphis, Tennessee.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
J - indicates estimated value above the detection limit but below the reporting limit.
= - indicates unqualified detection
BCT - BRAC Cleanup Team

Table 81-B
Summary of Detected Compounds in Surface Soils
Compared to Non-BCT Screening Levels for Site 81
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	Risk-Based Concentrations Soil Ingestion[4]		Units
						Residential	Industrial	
CH2M HILL	BARIUM	SS81B	82	=	234	550	14000	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB81A	0.056	J	NA	46	410	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB81A	0.061	J	NA	46	410	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SS81A	0.052	J	NA	46	410	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SS81C	0.048	J	NA	46	410	MG/KG
CH2M HILL	CALCIUM	SS81B	32100	=	5840	NA	NA	MG/KG
CH2M HILL	COBALT	SS81B	7.6	=	18.3	470	12000	MG/KG
CH2M HILL	COPPER	SS81B	14.3	J	33	310	8200	MG/KG
CH2M HILL	MAGNESIUM	SS81B	7060	=	4600	NA	NA	MG/KG
CH2M HILL	NICKEL	SS81B	13	J	30	160	4100	MG/KG
CH2M HILL	p,p'-DDE	SS81B	0.014	J	.16	1.9	17	MG/KG
CH2M HILL	p,p'-DDT	SS81B	0.011	J	.074	1.9	17	MG/KG
CH2M HILL	PENTACHLOROPHENOL	SS81A	0.08	J	NA	5.3	48	MG/KG
CH2M HILL	PENTACHLOROPHENOL	SS81C	0.11	J	NA	5.3	48	MG/KG
CH2M HILL	POTASSIUM	SS81B	836	=	1820	NA	NA	MG/KG
CH2M HILL	SODIUM	SS81B	254	J	NA	NA	NA	MG/KG
CH2M HILL	VANADIUM	SS81B	44.9	=	48.4	55	1400	MG/KG

Notes:
1. Detected values are obtained from the *Draft Parcel 24 Report-Screening Sites Sampling Program for Defense Depot Memphis, TN*, CH2M HILL, 1997.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. Risk-Based Concentrations are obtained from the *EPA Region III Risk-based Concentrations Table*, R.L. Smith, April, 1997.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
= - indicates unqualified detection.
J - indicates estimated value above the detection limit but below the reporting limit.

Table 81-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 81
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SB81A	9 to 11	0.085	J	NA	3600	MG/KG

Notes:
1. Detected values are obtained from the *Draft Parcel 24 Report-Screening Sites Sampling Program for Defense Depot Memphis, TN.* CH2M HILL, 1997.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. RBC-GWP values are obtained from the *EPA Region III Risk-based Concentrations Table*, R. L. Smith, April, 1997.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
= - indicates unqualified detection
J - indicates estimated value above the detection limit but below the reporting limit.
RBC-GWP - Risk-Based Concentrations - Groundwater Protection

TAB

Parcel 35

Parcel 35

Screening Sites Sampling Program

for

Defense Distribution Depot Memphis, Tennessee

March 1998

Prepared for

U.S. Army Engineering and Support Center, Huntsville

Prepared by

CH2M HILL

2567 Fairlane Drive

Montgomery, Alabama 36116

137449.RR.ZZ

Parcel 35
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Parcel 35 is a 1,823-square-foot (ft^2) parcel in the southwestern corner of the Main Installation in Operable Unit (OU)-2 (shown in Figure 1). Parcel 35 is made up of Buildings 1084, 1086, 1087, 1088, 1090, and 1091.

The screening sites in this document have been identified by the Defense Distribution Depot Memphis, Tennessee (DDMT) through a review of existing documents, interviews with facility personnel, and knowledge of the facility's operations. Screening sites are locations at DDMT where there is a potential for materials to have been released to the environment from past operations. Screening sites in Parcel 35 include the following:

- Screening Site 31 – Former Spray Paint Booth
- Screening Site 33 – Sandblasting Waste Drum Storage

Sites where there is a confirmed presence of contaminants from past operations are addressed in the Remedial Investigation Sampling Program. Other facilities have been addressed in the Base Realignment and Closure (BRAC) Sampling Program. Results of these programs are addressed in separate reports.

The purpose of the Screening Sites Sampling Program is to identify whether past activities at each site have resulted in releases from the site that would require further investigation. The intent is not to fully delineate the nature and extent of soil or groundwater contamination attributable to past operations, but to conduct technically based screening analyses sufficient to identify the likelihood of contamination. The samples were collected from biased locations within suspected or reported release areas, thus, represent worst case conditions.

The purpose of this letter report is to evaluate the results of the Screening Sites Sampling Program and sampling from previous investigations and to recommend No Further Action or further investigation at screening sites in this parcel. The remainder of this report presents the results of past investigations; Screening Sites Sampling Program strategy, procedures; and results; and recommendations for each site.

Surface soils, subsurface soils, surface water, and sediments were investigated as part of the Screening Sites Sampling Program. Surface soil samples (any sample whose lowest depth is two feet or less) were taken both as independent samples and as the upper interval of a soil boring profile. Thus, surface soil samples taken as part of a soil boring may have an "SB" designation and are initially discussed under Subsurface Soil Sampling Procedure (Section 2.2.2.2). However, the results from that upper interval are presented in the surface soils tables and discussions in Section 3.0.

Screening Site 31–Former Spray Paint Booth

1.0 Introduction

The chart below presents the location and status information for this screening site.

Parcel	Building Number	RI/FS[1] OU	Site Number	CERCLA[2] Status
35	1087	2	31	Screening

[1]RI/FS: Remedial Investigation/Feasibility Study
[2]CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act

Screening Site 31 is located on the Main Installation in the southwestern quadrant (Figure 1). The site is the former location of a drive-through, water cascade, spray paint booth and drying oven, which was used to conduct major stock primer and enamel spray painting operations. Screening Site 31 is believed to have been used from the 1950s through 1985. The water cascade booth in Building 1087 was replaced in late 1985 with a dry filter spray paint booth located in Building 1086; this is described in *Environmental Audit No. 43-1-1387-86* (U.S. Army Environmental Hygiene Agency, 1985).

2.0 Study Area Investigation

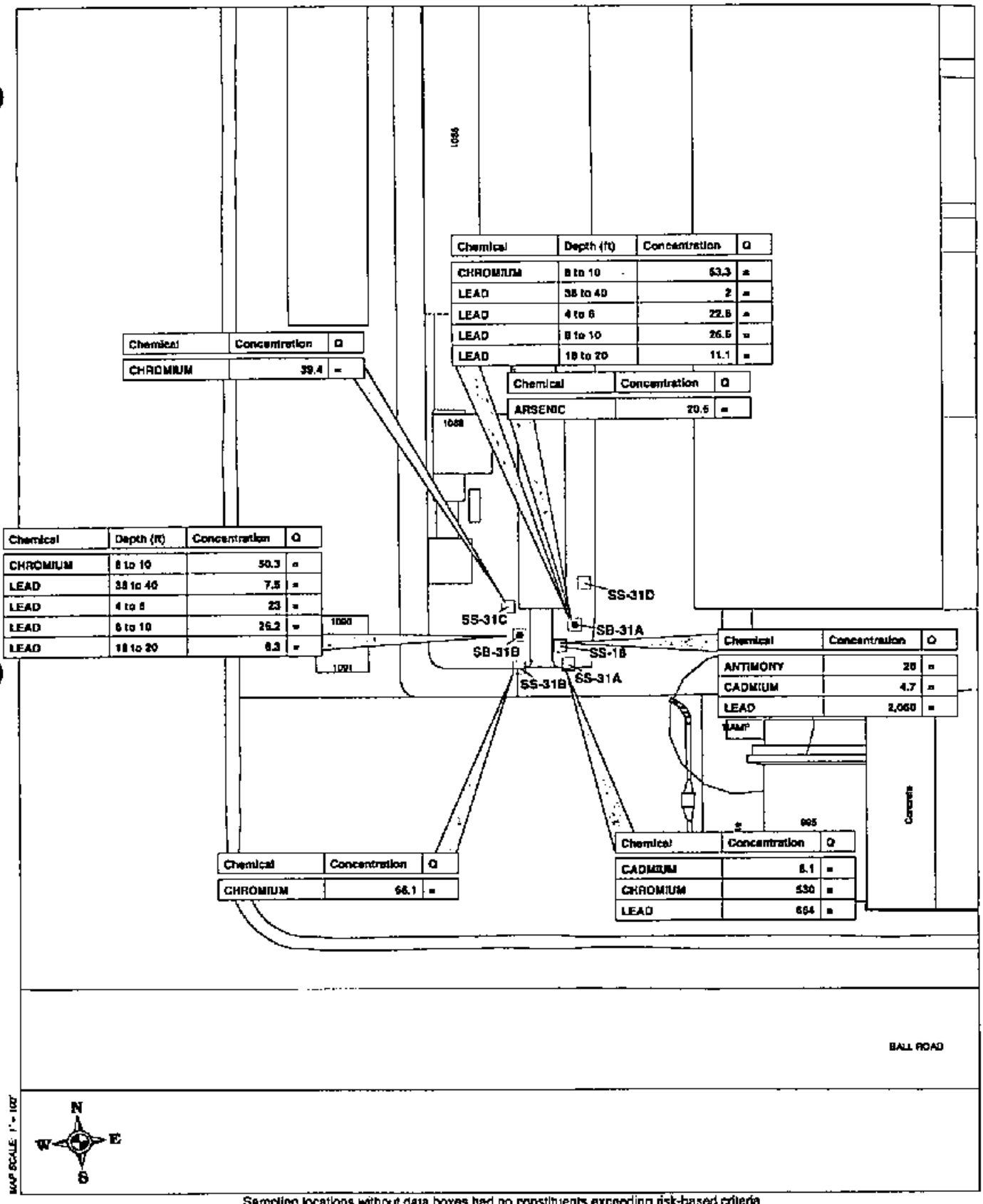
2.1 Previous Investigations

According to the *Remedial Investigations at DDMT, Final Report* (Law Environmental, 1990), one surface soil sample (Sample SS18) was collected March 19, 1989. Significant historical data are shown on Figure 1.

2.1.1 Surface Soil

In SS18, methylene chloride was the only volatile organic compound (VOC) that was detected at concentrations greater than sample quantitation limits (micrograms per kilogram [ug/kg]), however, it was also detected in the method blank. Bis(2-ethylhexyl)phthalate (reported in Sample SS18 at 8100 ug/kg) was the only semivolatile organic compound (SVOC) detected in surface soil at the site at concentrations greater than sample quantitation limits; however, as with methylene chloride, it was detected in the method blank. Both of these chemicals are common laboratory contaminants and may not be site related.

Sample SS18 was reported as containing dichlorodiphenyltrichloroethane (DDT) and dichlorodiphenyldichloroethene (DDE) at 1100 and 400 ug/kg, respectively. Several inorganic compounds commonly found in soil were also detected at elevated levels in Sample SS18. Most notable concentrations are for arsenic, lead, barium, and zinc, which were reported at 15, 2,060, 8,680 and 22,100 milligrams per kilogram (mg/kg). The concentrations of these and other detected compounds will be compared to established background concentrations and screening criteria in Section 3.1.



Chemical	Depth (ft)	Concentration	Q
CHROMIUM	8 to 10	53.3	=
LEAD	38 to 40	2	=
LEAD	4 to 6	22.6	=
LEAD	8 to 10	26.5	=
LEAD	18 to 20	11.1	=

Chemical	Concentration	Q
CHROMIUM	39.4	=

Chemical	Concentration	Q
ARSENIC	20.5	=

Chemical	Depth (ft)	Concentration	Q
CHROMIUM	8 to 10	50.3	=
LEAD	38 to 40	7.5	=
LEAD	4 to 6	23	=
LEAD	8 to 10	26.2	=
LEAD	18 to 20	8.3	=

Chemical	Concentration	Q
ANTIMONY	28	=
CADMIUM	4.7	=
LEAD	2,060	=

Chemical	Concentration	Q
CHROMIUM	66.1	=

Chemical	Concentration	Q
CADMIUM	8.1	=
CHROMIUM	530	=
LEAD	664	=

Sampling locations without data boxes had no constituents exceeding risk-based criteria

LEGEND

Surface Soil Sampling Location (mg/kg)

Soil Boring Sampling Location (mg/kg)

(Q) Qualifier Definitions

= - indicates unqualified detection

J - indicates estimated value above detection limit, but below reporting limit.

Figure 1
Site 31, Former Spray Paint Booth
Constituents Exceeding Risk-Based Criteria
Defense Distribution Depot Memphis, TN

CH2MHILL

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2.2 Screening Site Sampling Program

2.2.1 Sampling Strategy

The samples were collected from suspected release areas and are intended to detect contamination released to in surface and subsurface soils. Samples were analyzed for VOCs, polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyl s(PCBs), and metals.

2.2.2 Sampling Procedures

Sections 2.2.2.1 and 2.2.2.2 describe the sampling procedures and laboratory analyses performed for surface and subsurface soils.

2.2.2.1 Surface Soil Sampling Procedures

With the approval of the Tennessee Department of Environment and Conservation (TDEC) and the U.S. Environmental Protection Agency (EPA), soil samples were collected from six locations (SS31A, SS31B, SS31C, SS31D, SB31A and SB31B) at this site (shown in Figure 1) in accordance with the Screening Sites Field Sampling Plan (CH2M HILL, 1995). The following details the sample locations:

- Sample SS31A was taken in a gravel area southwest of the southeast corner of Building 1087, down hill from the bay door and just east of the concrete pad south of Building 1087.
- Sample SS31B was taken south of the southwest corner of Building 1087 just west of the concrete pad.
- Sample SS31C was taken 3 feet south and 1 foot east of the southwest corner of Building 1087.
- Sample SS31D was taken in a gravel area west of 25th Street and east of the southern end of Building 1087.

The location of surface soil samples associated with borings are described in Section 2.2.2.2.

The soil was removed from the ground using a standard stainless-steel hand auger. VOC samples were immediately collected from the top six inches of soil before being mixed. Part of the VOC sample was placed into a sealable plastic bag and allowed to equilibrate. The head space in the plastic bag was measured for VOCs using a hand-held photoionization detector (PID), and the results were used to determine which sample location was selected for Level 3 analyses. The soil was transferred to a stainless-steel bowl using stainless-steel trowels, mixed, and then placed into the appropriate sample jars.

2.2.2.2 Subsurface Soil Sampling Procedures

With the approval of the TDEC and EPA, subsurface soil was collected from two locations (SB31A and SB31B) at this site. At each location, samples were collected at three depths: zero to 1 foot, 4 to 6 feet, and 8 to 10 feet. Samples were collected from either side (east and west) of the concrete pad south of Building 1087. Sample SB31A was taken 18 feet south of the southeast corner of Building 1087 and 6 feet east of the concrete pad. Sample SB31B was

taken 14 feet south of the southwest corner of Building 1087 and 2 feet west of the concrete pad.

These samples were collected using a 2-inch-diameter stainless-steel push sampler. Samples were also collected at intervals of 18 to 20 feet and 38 to 40 feet using a 1-inch-diameter stainless-steel push sampler. VOC soil samples were collected directly from the continuous sampler using stainless-steel spoons. Part of the VOC sample was placed into a sealable plastic bag and allowed to equilibrate. The head space in the plastic bag was measured for VOCs using a hand-held PID, and the results were used to determine which interval within each boring was selected for Level 3 analyses. The remaining soil was placed into a stainless-steel bowl, mixed, and then transferred into the appropriate sample jars.

All sampling tools were decontaminated before being used at each sample location. Decontamination procedures were followed according to the *Generic Quality Assurance Project Plan* (CH2M HILL, 1995) for the RI/FS currently being conducted at the DDMT.

2.2.3 Analytical Procedures

Four surface and ten subsurface soil samples were sent to CH2M HILL's Analytical Services in Montgomery, Alabama for VOC, PAH, PCB, metal, and TCL/TAL analyses. Samples received at the laboratory were analyzed in accordance with the procedures outlined in the *Generic Quality Assurance Project Plan* (CH2M HILL, 1995).

A data quality evaluation (DQE) was performed to assess the effect of the overall analytical process on the usability of the data. The DQE established that the detection of acetone and bis(2-ethylhexyl)phthalate can be attributed to field sampling and laboratory contamination rather than environmental conditions at the site. Also, low concentrations of dioxins and furans can be attributed to background or instrument noise and are not indicative of environmental conditions. With exception to the qualifications listed above, the DQE concluded that data can be used in the project decision-making process.

3.0 Interpretation of Sampling Results

3.1 Presentation of Results

Sections 3.1.1 through 3.1.4 present results of the Screening Sites Sampling Program for Screening Site 31. Data are presented separately for surface soil and subsurface soil. Data are compared with appropriate screening criteria in three summary tables: Tables 31-A, 31-B, and 31-C. Data from the 1997 CH2M HILL investigation are presented along with historical data from the *Remedial Investigations at DDMT, Final Report* (Law Environmental, 1990). If a value from a sampling location exceeds one of the comparison criteria, that value and the comparison criterion are shown in **bold** on the summary table.

Chemicals of potential concern (COPCs) are parameters that exceed both background values and the screening criteria. Where concentrations exceed the selected background value, the concentration is compared with the observed range of background values as reviewed and established by the BRAC Cleanup Team (BCT).

Five COPCs have been identified for Screening Site 31: antimony, arsenic, cadmium, chromium, and lead. Heavy metals, including chromium and lead, found in surface soil at concentrations above background are possibly from sandblasting operations near this site. Dieldrin and benzo(a)pyrene, which have been identified by the BCT as sitewide COPCs, will be evaluated on a sitewide basis.

3.1.1 Surface Soil

Results of the surface soil analyses with values above detection limits are shown in Tables 31-A and 31-B.

3.1.1.1 BCT Screening Criteria

Table 31-A summarizes constituents for which the BCT has selected a screening criteria. Antimony, arsenic, total chromium, and lead were detected at concentrations exceeding the BCT criteria and background values.

Antimony was detected in a previous sampling event conducted by Law (1990) at 26 mg/kg in Sample SS18, which exceeds the BCT criteria (background) value of 7 mg/kg. Antimony was not detected in the more recent CH2M HILL sampling event for surface soil at Screening Site 31.

Arsenic was detected in eight surface soil samples with concentrations ranging from 4.2 mg/kg to 20.6 mg/kg. The highest concentration detected, 20.6 mg/kg in Sample SB31A, slightly exceeded the BCT criteria (background) value of 20 mg/kg. The Law study detected arsenic in Sample SS18 at 15 mg/kg, which does not exceed screening criteria values. These arsenic levels are similar to background values.

Chromium was detected in eight surface soil samples at concentrations ranging from 29.8 mg/kg to 530 mg/kg. The three highest concentrations detected significantly exceed the BCT criteria value of 39 mg/kg and the background value of 24.8 mg/kg. These exceedances were detected in Samples SS31A, SS31B, and SS31C at 530 mg/kg, 66.1 mg/kg and 39.4 mg/kg, respectively. In addition, the Law study detected a concentration of chromium in Sample SS18 at 8680 mg/kg, which greatly exceeds the screening criteria values. Elevated chromium and lead concentrations are possibly due to sand blasting operations near this site.

Lead was detected in eight surface soil samples at concentrations ranging from 37.3 mg/kg to 664 mg/kg. The highest concentration detected, 664 mg/kg at Sample SS31A, exceeded the BCT criteria value of 400 mg/kg and the background value of 30 mg/kg. The Law study detected a concentration of lead in Sample SS18 at 2060 mg/kg.

3.1.1.2 Other Screening Criteria

Table 31-B compares the remaining constituents with the soil ingestion screening criteria for both residential and industrial exposure scenarios. Cadmium was detected at concentrations exceeding the screening level values.

Cadmium concentrations were detected in Samples SS31A, SS31B, and SS31D at 8.1 mg/kg, 1.7 mg/kg, and 0.51 mg/kg, respectively. The highest concentration detected, 8.1 mg/kg, exceeded the residential soil ingestion screening criteria value of 3.9 mg/kg and the background value of 1.4 mg/kg. The Law study detected chromium in Sample SS18 at 4.7 mg/kg.

3.1.2 Subsurface Soil

Table 31-C summarizes subsurface soil sampling data. Antimony, chromium, and lead were found at concentrations exceeding the background and groundwater protection criteria values.

Antimony was detected in Sample SB31A at 7.8 mg/kg at the 8- to 10-foot depth, which exceeds the groundwater protection value of 5 mg/kg. There is no background value for antimony in subsurface soil for comparison.

Chromium was detected in eight surface soil samples at concentrations ranging from 6.3 mg/kg to 53.3 mg/kg. Chromium concentrations detected in Samples SB31A (8 to 10 feet) and SB31B (8 to 10 feet) at 53.3 mg/kg and 50.3 mg/kg, which exceed the groundwater protection criteria value of 38 mg/kg and the background value of 26 mg/kg.

Lead was detected in eight surface soil samples at concentrations ranging from 2 mg/kg to 26.6 mg/kg. There were two detected concentrations that slightly exceeded the background value of 24 mg/kg and the groundwater protection criteria value of 1.5 mg/kg. These exceedances were detected in Sample SB31A (8 to 10 feet) and Sample SB31B (8 to 10 feet) at 26.6 mg/kg and 26.2 mg/kg., respectively.

Chromium and lead levels were higher in the 8- to 10-foot samples from both Sample SB31A and SB31B relative to the overlying 4- to 6-foot samples. However, the levels are only slightly elevated above background levels.

3.2 Vertical and Lateral Extent

Six soil samples were collected associated with Screening Site 31. This site is located adjacent to Screening Site 33, which has an additional six samples. Six surface and eight subsurface soil samples were collected at the southern end of Building 1087, located topographically downgradient of the building's foundation. Metals and arsenic are slightly elevated above the background and/or criteria values in surface soils and one soil boring location.

The more recent data collected indicates that metals (chromium and lead) persist across the two media evaluated south of Building 1087 at concentrations exceeding screening criteria. The highest metal concentrations were detected in Samples SS31A and SB31A; both samples are located just south of Building 1087 and east of the concrete pad. Cadmium was detected only in the surface soils at concentrations within the background range, with one slight exceedance at the south of Building 1087, east of the concrete pad. Metals in surface soils are possibly due to sand blasting operations near this site. Soil samples were not collected from locations south of Sample SB31A so the southern extent of metals contamination has not been established.

Antimony was detected south of Building 1087 east of the concrete pad in one boring sample (depth of 8 to 10 feet) slightly exceeding the groundwater protection criteria GWP value.

Arsenic was detected in the surface and subsurface soils with one detected concentration slightly exceeding the screening level criteria for surface soils. For the most part, arsenic concentrations in the surface soil and subsurface soils were within the background range. Arsenic was not detected at depths of 38 to 40 feet.

All metals were within the background levels below 10-foot depths, indicating leaching to groundwater is not occurring. The depth to groundwater at this site exceeds approximately 60 feet, thus metal releases to groundwater are not expected at Screening Site 31.

3.3 Migration Pathways

The following paragraphs provide a general discussion of potential migration pathways for COPCs found at Screening Site 31.

Chromium has been reported from surface and subsurface soils at Screening Site 31 in concentrations greater than the screening levels. Chromium occurs in two oxidation states: +3 and +6. The trivalent form readily combines with aqueous hydroxide to form insoluble chromium hydroxide and is not readily available and, therefore, is of little risk. The hexavalent form is soluble and tends to stay in solution, unless some activated carbon material is present for it to sorb onto. Dissolved chromium is readily adsorbed onto sediments but may be bioaccumulated through aquatic organisms.

Lead is present at concentrations greater than background, or above screening criteria, in surface and subsurface soils at Screening Site 31. Lead is moderately soluble and can be leached from any of these forms of occurrence, reaching concentrations in aqueous solution in both groundwater and surface water, which would be of concern to both human and ecological receptors. Additionally, lead in surface soils potentially may move as suspended particulate matter in surface waters and impact aquatic organisms.

Elevated concentrations of chromium and lead in surface soil are likely due to sand-blasting operations near Screening Site 31. Sand blast residue (dust and grit) has been stored in drums in the open sided shed (Screening Site 33). There have also been reports that sand blast residue was temporarily managed in covered piles near the site. This residue can be transported by surface water runoff as suspended particulates and ditch sediments or wind blown dust. The residue is found in surface soil and particulates would likely not penetrate below a one-foot depth.

Subsurface metals concentrations below a one-foot depth are similar to those found at other sites and are considered to represent natural variability of metals with changing soil type. This indicates that leaching of metals is not an important transport mechanism for the site.

Arsenic is present at Screening Site 31 in surface soils and subsurface soils at concentrations above screening levels. Arsenic's mobility and toxicity are tied to its complex geochemistry and its ability to readily form soluble complexes. Arsenic may also readily be adsorbed onto clays, oxides, or humic organic material and migrate as suspended soil in surface water or as a sediment. Arsenic can exist in four common oxidation states, and these control its solubility. It readily transports through aquatic environments as a dissolved salt or as a complex with an organic compound. Arsenic at this site is within the range of background levels.

3.4 Additional Data Needs

If further risk assessment cannot support a finding of No Further Action (see Section 5.0), additional characterization is necessary at this site to determine the extent of metals in

surface soil south of Building 1087. Concentrations in subsurface soil indicative of leaching have not been observed; therefore, additional subsurface characterization is not necessary.

4.0 Interpretation of Screening Criteria Comparisons

4.1 Methodology

The Preliminary Risk Evaluation (PRE) was performed in accordance with the *Guidance on Preliminary Risk Evaluations for the Purpose of Reaching a Finding of Suitability to Lease (FOSL)* (EPA Region IV, 1994). A discussion of the PRE methodology is provided as Appendix A to this document.

4.2 Screening Site 31 Risk

Carcinogenic risks and noncarcinogenic ratios for Screening Site 31 are presented in Table 4-64 of the draft PRE (USAESC, 1998), and detailed chemical-specific PRE estimates are presented in Appendix A of the PRE.

The PRE risk ratio was above one-in-a-million risk levels for industrial worker and residential scenarios, primarily from the presence of arsenic at 20.6 mg/kg compared to the background level at 20 mg/kg.

The noncarcinogenic PRE ratios were above a value of 1.0 for both industrial worker and residential scenarios from the presence of chromium and lead.

5.0 Summary and Recommendations

5.1 Summary

There are some risks associated with Screening Site 31 because arsenic is present just above background levels and because of the presence of chromium and lead. According to Table 5-2, the PRE results indicate that the carcinogenic PRE risk ratio is above 10^{-6} for both residential and industrial scenarios due to arsenic being just above background levels. The PRE results also indicate that noncarcinogenic ratios are above one due to metals.

5.2 Recommendations

It is recommended that a risk assessment be performed to confirm that No Further Action is required at Screening Site 31. If the risk assessment indicates that a No Further Action is not warranted, additional sampling to establish the extent of metals in surface soil will be needed.

Screening Site 33–Sandblasting Waste Drum Storage

1.0 Introduction

The chart below presents the location and status information for this screening site.

Parcel	Building Number	RI/FS[1] OU	Site No.	CERCLA[2] Status
35	1088	2	33	N/A

[1]RI/FS: Remedial Investigation/Feasibility Study
[2]CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act

Screening Site 33, in the southwestern corner of the Main Installation, sits adjacent to Building 1088. The site is located approximately 150 feet from the western boundary and approximately 360 feet from the southern boundary of the installation (see Figure 2).

Screening Site 33 consists of an open-sided, metal-roofed shed with a gravel floor. Historically, 55-gallon drums containing spent sandblasting material have been stored at this site. As of 1990, the existing drums at this site were in good condition, and there was no evidence of any container failures.

2.0 Study Area Investigation

2.1 Previous Investigations

According to the *Remedial Investigations at DDMT, Final Report* (Law Environmental, 1990), five surface soil samples (SS15, SS16, SS17, SS19 and SS46) and three subsurface soil samples (STB-5-1, STB-5-2 and STB-5-3) were collected at Screening Site 33 in 1989. Historical data from Screening Site 33 is summarized by media below. Significant historical data are shown on Figure 1.

2.1.1 Surface Soil

Methylene chloride, acetone, and toluene (the only VOCs present in surface soil) were detected at up to 29, 17, and 6 ug/kg, respectively. The methylene chloride concentration is suspect, however, because it also was detected in the method blank.

Bis(2-ethylhexyl)phthalate, benzo(a)anthracene, benzo(b)fluoranthene, chrysene, fluoranthene, phenanthrene, and pyrene were the only SVOCs that were detected at concentrations greater than sample quantitation limits. Methylene chloride, however, was reported as being found in the method blank. The highest concentrations of fluoranthene and pyrene occurred in Sample SS16 at 5,800 and 4,700 ug/kg, respectively. The highest concentrations of benzo(a)anthracene, benzo(b)fluoranthene, chrysene, and phenanthrene were detected in sample SS19 at 2,200, 4,600, 2,500 and 2,500 ug/kg, respectively.

All five surface soil samples contained detectable amounts of DDE and DDT. The highest concentrations of these pesticides occurred in Sample SS16 at 1,300 and 7,400 ug/kg, respectively. Eight other pesticides were reported in surface soil at Screening Site 33, six of

which were qualified as not being positively identifiable due to matrix interference. Several inorganic compounds common in soil were also detected at elevated levels in Screening Site 33. Most notable concentrations were for lead chromium and zinc in Sample SS16 at 17,500, 6,710 and 21,000 ug/kg. Aroclor-1016, aroclor-1221, aroclor-1232, aroclor-1242, and aroclor-1254 were all reported as being present in the surface soil at Screening Site 33. All aroclor-1254 (detected at 10,000 ug/kg in Sample SS16) were not positively identified due to matrix interference. The concentrations of all detected compounds will be compared to established background concentrations and screening criteria in Section 3.1.

Lead concentrations of 17,500, 10,300, and 2,670 mg/kg at in Samples SS16, SS19, and SS15, respectively, were also very high relative to the BCT criteria of 400 mg/kg.

2.1.2 Subsurface Soil

Methylene chloride and acetone were found in subsurface soil samples at Screening Site 33 at maximum reported concentrations of 21 ug/kg in STB-5-2 and 18 ug/kg in STB-5-1. Methylene chloride, however, was also found in the method blank.

Bis(2-ethylhexly)phthalate (detected in two of three subsurface soil samples) is the only SVOC detected, and it was also detected in the method blank. EP TOX procedure (SW846, Method 13.10) on the subsurface soil samples resulted in maximum barium concentrations of 49 and 10 micrograms per liter (ug/L).

2.2 Screening Site Sampling Program

2.2.1 Sampling Strategy

The sampling strategy was developed to evaluate whether releases have occurred to surface and subsurface soils. Samples were analyzed for VOCs, PCBs, and metals. At least one sample for each media was analyzed for TCL/TAL constituents in accordance with the Screening Sites Sampling Plan (CH2M HILL, 1995).

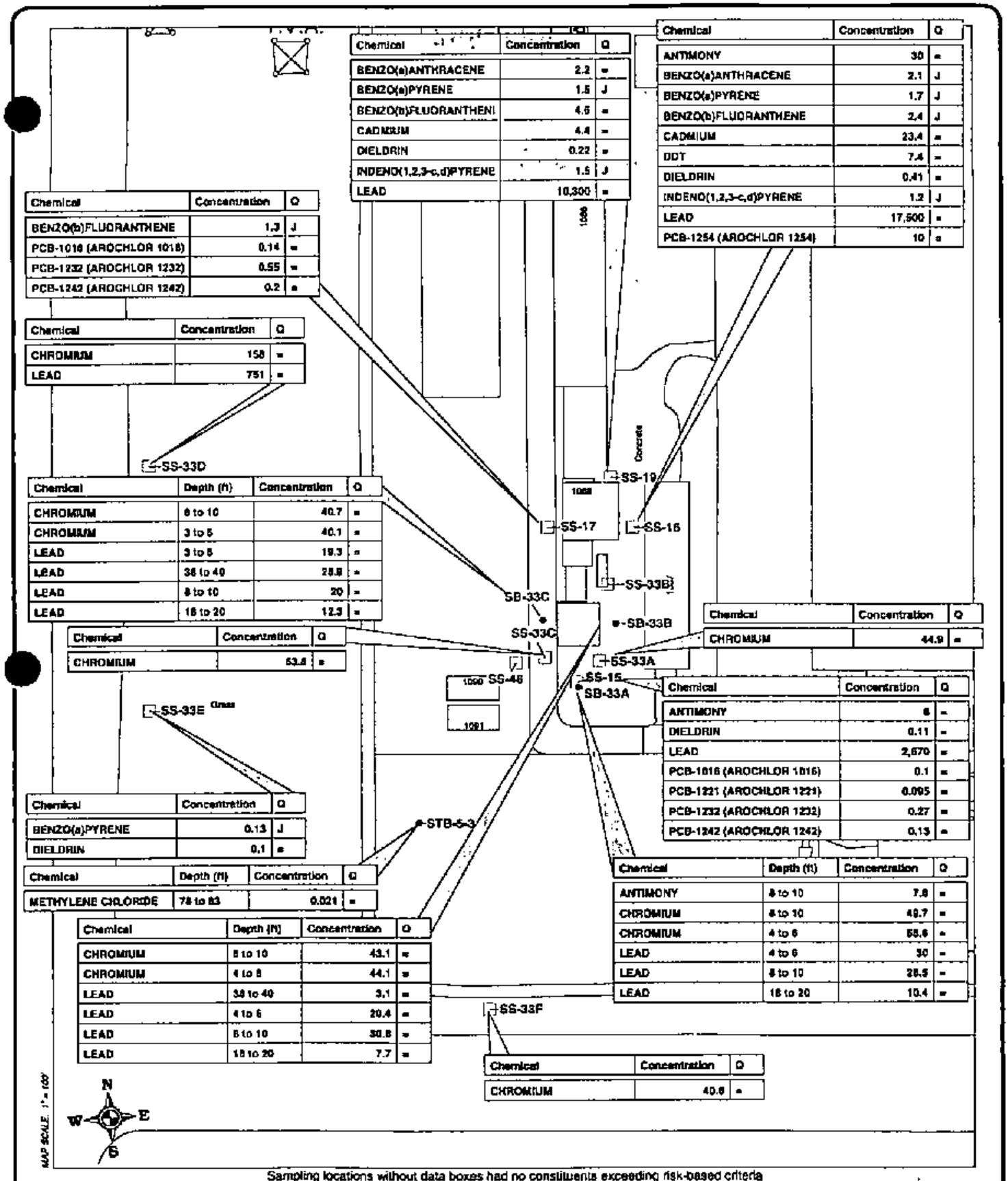
2.2.2 Sampling Procedures

Sections 2.2.2.1 and 2.2.2.2 describe the sampling procedures and laboratory analyses performed for surface and subsurface soils.

2.2.2.1 Surface Soil Sampling Procedures

With the approval of the TDEC and EPA, surface samples were collected from nine locations (SS33A, SS33B, SS33C, SS33D, SS33E, SS33F, SB33A, SB33B, and SB33C) at this site (shown in Figure 2). Samples SS33A, SS33B and SS33C were located around the concrete pad (also described as the open-ended, metal-roofed slab) south of Building 1088. Samples SS33D, SS33E, and SS33F were along the fence line. The following provides specific information about the sample locations:

- Sample SS33A was taken south of the concrete pad, just 4 feet south of the southeast corner of the pad.
- Sample SS33B was taken east of the concrete pad and just west of the baghouse.
- Sample SS33C was taken south of the southwest corner of the concrete pad.



Chemical	Concentration	Q
BENZO(a)ANTHRACENE	2.2	=
BENZO(a)PYRENE	1.5	J
BENZO(b)FLUORANTHENE	4.5	=
CADMIUM	4.4	=
DIELDRIN	0.22	=
INDENO(1,2,3-c,d)PYRENE	1.5	J
LEAD	10,300	=

Chemical	Concentration	Q
ANTIMONY	30	=
BENZO(a)ANTHRACENE	2.1	J
BENZO(a)PYRENE	1.7	J
BENZO(b)FLUORANTHENE	2.4	J
CADMIUM	23.4	=
DDT	7.6	=
DIELDRIN	0.41	=
INDENO(1,2,3-c,d)PYRENE	1.2	J
LEAD	17,500	=
PCB-1254 (AROCHLOR 1254)	10	=

Chemical	Concentration	Q
BENZO(b)FLUORANTHENE	1.3	J
PCB-1016 (AROCHLOR 1016)	0.14	=
PCB-1232 (AROCHLOR 1232)	0.55	=
PCB-1242 (AROCHLOR 1242)	0.2	=

Chemical	Concentration	Q
CHROMIUM	158	=
LEAD	751	=

Chemical	Depth (ft)	Concentration	Q
CHROMIUM	8 to 10	40.7	=
CHROMIUM	3 to 5	40.1	=
LEAD	3 to 5	19.3	=
LEAD	38 to 40	28.8	=
LEAD	8 to 10	20	=
LEAD	18 to 20	12.3	=

Chemical	Concentration	Q
CHROMIUM	53.6	=

Chemical	Concentration	Q
CHROMIUM	44.9	=

Chemical	Concentration	Q
ANTIMONY	6	=
DIELDRIN	0.11	=
LEAD	2,670	=
PCB-1016 (AROCHLOR 1016)	0.1	=
PCB-1221 (AROCHLOR 1221)	0.095	=
PCB-1232 (AROCHLOR 1232)	0.27	=
PCB-1242 (AROCHLOR 1242)	0.13	=

Chemical	Concentration	Q
BENZO(a)PYRENE	0.13	J
DIELDRIN	0.1	=

Chemical	Depth (ft)	Concentration	Q
METHYLENE CHLORIDE	78 to 83	0.021	=

Chemical	Depth (ft)	Concentration	Q
ANTIMONY	8 to 10	7.8	=
CHROMIUM	8 to 10	48.7	=
CHROMIUM	4 to 6	58.6	=
LEAD	4 to 6	30	=
LEAD	8 to 10	28.5	=
LEAD	18 to 20	10.4	=

Chemical	Depth (ft)	Concentration	Q
CHROMIUM	8 to 10	43.1	=
CHROMIUM	4 to 6	44.1	=
LEAD	38 to 40	9.1	=
LEAD	4 to 6	20.4	=
LEAD	8 to 10	30.8	=
LEAD	18 to 20	7.7	=

Chemical	Concentration	Q
CHROMIUM	40.6	=

Sampling locations without data boxes had no constituents exceeding risk-based criteria

LEGEND

Surface Soil Sampling Location (mg/kg)

Soil Boring Sampling Location (mg/kg)

(Q) Qualifer Definitions
= - indicates unqualified detection
J - indicates estimated value above detection limit, but below reporting limit.

Figure 2

Site 33, Sandblasting Waste Drum Storage Constituents Exceeding Risk-Based Criteria

Defense Distribution Depot Memphis, TN

CH2MHILL

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- Sample SS33D was taken 1 foot east of Perry Road which is directly west of Building 1088. The sample location was west of the point that is 48 feet south of Building 1081 and 81 feet north of a power pole that is west of Building 1091.
- Sample SS33E was taken more than 81 feet south of SS33D, directly west of Building 1090 and 1091.
- Sample SS33F was taken 168 feet east from the southwest corner of the fence line and 2 feet north of the south side of the fence.

The locations of surface soil samples associated with borings are discussed in Section 2.2.2.2.

The soil was removed from the ground using a standard stainless-steel hand auger. VOC samples were immediately collected from the top six inches of soil before being mixed. Part of the VOC sample was placed into a sealable plastic bag and allowed to equilibrate. The head space in the plastic bag was measured for VOCs using a hand-held PID, and the results were used to determine which sample location was selected for Level 3 COPC or TCL/TAL analyses. The soil was transferred to a stainless-steel bowl using stainless-steel trowels, mixed, and then placed into the appropriate sample jars.

2.2.2.2 Subsurface Soil Sampling Procedures

With the approval of the TDEC and EPA, three soil borings (SB33A, SB33B, and SB33C) were located at this site. At each location, samples were taken at three depths: zero to 1 foot, 4 to 6 feet, and 8 to 10 feet. The following describes the location of each sample:

- Sample SB33A was taken in a gravel area 11 feet east and 22 feet south of the southwest corner of the concrete pad, which extends south of Building 1088.
- Sample SB33B was taken 30 feet south and 3 feet east of the southeast corner of Building 1088, just east of the girder.
- Sample SB33C was taken 5 feet west and 28 feet south of the southwest corner of the sand blaster.

Samples were collected using a 2-inch-diameter, stainless-steel push sampler. Samples were also collected at intervals of 18 to 20 feet and 38 to 40 feet using a 1-inch-diameter stainless-steel push sampler. VOC soil samples were collected directly from the continuous sampler using stainless-steel spoons. Part of the VOC sample was placed into a sealable plastic bag and allowed to equilibrate. The head space in the sealable bag was measured for VOCs using a hand-held PID, and the results were used to determine which interval within each boring was selected for Level 3 analyses. The remaining soil was placed into a stainless-steel bowl, mixed, and then transferred into the appropriate sample jars.

All sampling tools were decontaminated before being used at each sample location. Decontamination procedures were followed according to the *Generic Quality Assurance Project Plan* (CH2M HILL, 1995) for the RI/FS currently being conducted at DDMT.

2.2.3 Analytical Procedures

Six surface and 15 subsurface soil samples were sent to CH2M HILL's Analytical Services in Montgomery, Alabama for VOC, PCB, metal, and TCL/TAL analyses. Samples received at

the laboratory were analyzed in accordance with the procedures outlined in the *Generic Quality Assurance Project Plan* (CH2M HILL, 1995).

A United States Corps of Engineers (COE) split sample was collected from Sample SS33C. This sample was sent to COE's Atlanta, Georgia laboratory for analysis of VOCs, PCBs, and metals.

A data quality evaluation (DQE) was performed to assess the effect of the overall analytical process on the usability of the data. The DQE established that the detection of acetone and bis(2-ethylhexyl)phthalate can be attributed to field sampling and laboratory contamination rather than environmental conditions at the site. Also, low concentrations of dioxins and furans can be attributed to background or instrument noise and are not indicative of environmental conditions. With exception to the qualifications listed above, the DQE concluded that data can be used in the project decision-making process.

3.0 Interpretation of Sampling Results

3.1 Presentation of Results

Sections 3.1.1 through 3.1.4 present results of the Screening Sites Sampling Program for Screening Site 33. Data are presented separately for surface soil and subsurface soil. Data are compared with appropriate screening criteria in three summary tables: Tables 33-A, 33-B, and 33-C. Data from the 1997 CH2M HILL investigation are presented along with historical data from the *Remedial Investigations at DDMT, Final Report* (Law Environmental, 1990). If a value from a sampling location exceeds one of the comparison criteria, that value and the comparison criterion are shown in bold on the summary table.

COPCs are parameters that exceed both background values and the screening criteria. Where concentrations exceed the selected background value, the concentration is compared with the observed range of background values as reviewed and established by the BCT.

Thirteen COPCs have been identified for Screening Site 33: antimony, benzo(a)anthracene, benzo(a)pyrene, benzo(b)flouranthene, cadmium, chromium, dieldrin, indeno(1,2,3-c,d)pyrene, lead, methylene chloride, PCBs, and DDT. Dieldrin and PAHs have been identified by the BCT as sitewide COPCs, and will be evaluated on a sitewide basis.

3.1.1 Surface Soil

Results of the surface soil analyses with values above detection limits are shown in Tables 33-A and 33-B.

3.1.1.1 BCT Screening Criteria

Table 33-A summarizes constituents for which the BCT has selected a screening criteria. Chromium, lead, antimony, benzo(a)anthracene, benzo(a)pyrene, benzo(b)flouranthene, indeno(1,2,3-c,d)pyrene, and PCB were detected at concentrations exceeding the BCT criteria and background values.

Chromium was detected in ten surface soil samples at concentrations ranging from 22.5 mg/kg to 158 mg/kg. Six of the sample concentrations detected exceed the background value

of 24.8 mg/kg and the BCT criteria value of 39 mg/kg. Exceedances were detected in Samples SB33B at 40.5 mg/kg, SS33A at 44.9 mg/kg, SS33B at 77.1 mg/kg, SS33C at 53.8 mg/kg, SS33D at 158 mg/kg and SS33F at 40.8 mg/kg. The previous investigation conducted by Law (1990) detected chromium in five surface soil samples ranging from 78 mg/kg to 6,710 mg/kg, all of which exceed BCT criteria and background values.

Lead was detected in ten surface soil samples at concentrations ranging from 16.1 mg/kg to 751 mg/kg. The highest concentration detected, 751 mg/kg in Sample SS33D, exceeded the BCT criteria value of 400 mg/kg and the background value of 30 mg/kg. The Law study detected lead concentrations ranging from 166 mg/kg to 17500 mg/kg.

Antimony was detected in two CH2M HILL surface soil samples at concentrations of 2.7 mg/kg and 2 mg/kg, which did not exceed the BCT criteria (background) value of 7 mg/kg. The Law study detected antimony concentrations of 8 mg/kg and 30 mg/kg.

Benzo(a)anthracene was detected in Sample SS33E at 0.11 mg/kg, which does not exceed the BCT criteria value of 0.88 mg/kg or the background value of 0.71 mg/kg. However, the Law study detected benzo(a)anthracene concentrations in Samples SS16 and SS19 at 2.1 mg/kg and 2.2 mg/kg, respectively, which do slightly exceed screening criteria values.

Benzo(a)pyrene was detected in Sample SS33E at 0.13 mg/kg, which exceeds the BCT criteria value of 0.088 mg/kg but does not exceed the background value of 0.96 mg/kg. The Law study detected benzo(a)pyrene concentrations in Samples SS16 and SS19 at 1.7 mg/kg and 1.5 mg/kg, respectively, which exceed background and BCT criteria values.

Benzo(b)flouranthene, detected in the CH2M HILL study, did not exceed the BCT criteria value of 0.88 mg/kg or the background value of 0.78 mg/kg. However, the Law study detected benzo(b)flouranthene concentrations in Samples SS16, SS17, and SS19 at 2.4 mg/kg, 1.3 mg/kg and 4.6 mg/kg, respectively, which do exceed screening criteria values.

Indeno(1,2,3-c,d)pyrene detected in the CH2M HILL study did not exceed the BCT criteria value of 0.88 mg/kg or the background value of 0.7 mg/kg. However, the Law study detected indeno(1,2,3-c,d)pyrene concentrations in Samples SS16 and SS19 at 1.2 mg/kg and 1.5 mg/kg, which do exceed screening criteria values.

PCBs were not detected in the CH2M HILL study. The Law study detected the following PCBs: PCB-1016, PCB-1221, PCB-1232, PCB-1242, and PCB-1254. The concentrations were detected in Samples SS15, SS16, and SS17 ranging from 0.1 mg/kg to 10 mg/kg. All of the PCB detected concentrations exceed the BCT criteria value of 0.083 mg/kg.

The surface soils at this site have elevated metals, PAHs and PCBs, with relatively high concentrations detected along the fenced property boundary, which could have resulted from sand blasting operations.

3.1.1.2 Other Screening Criteria

Table 33-B summarizes the remaining constituents compared with the soil ingestion screening criteria for both residential and industrial exposure scenarios. Dieldrin, cadmium, and DDT were detected at concentrations exceeding the background and health-based concentrations soil screening criteria values.

Dieldrin was detected in Sample SS33E at 0.1 mg/kg, which exceeds the residential and soil ingestion screening values of 0.04 mg/kg and 0.36 mg/kg and the background value of 0.086 mg/kg. Dieldrin was also detected in the Law study at concentrations ranging from 0.11 mg/kg to 0.41 mg/kg. Dieldrin is present in surface soils sitewide at DDMT and is found at low concentrations in surface water runoff, possibly from suspended particulates.

Cadmium detected in the CH2M HILL study did not exceed the soil ingestion screening criteria value. The Law study detected concentrations in Samples SS16 and SS19 at 23.4 mg/kg and 4.4 mg/kg, respectively, which exceed the residential soil ingestion criteria value of 3.9 mg/kg and the background value of 1.4 mg/kg.

The constituent DDT, detected in the CH2M HILL study, did not exceed soil ingestion screening criteria values. The Law study detected DDT in Sample SS16 at 7.4 mg/kg, which exceeds the residential soil ingestion criteria value of 1.9 mg/kg and the background value of 0.074 mg/kg.

3.1.2 Subsurface Soil

Table 33-C summarizes subsurface soil sampling data. Antimony, chromium, lead, and methylene chloride were detected at concentrations exceeding the background value and groundwater protection value.

Antimony was detected in Sample SB33A (8 to 10 feet) at 7.8 mg/kg, which exceeds the groundwater protection value of 5 mg/kg. There is no background value for antimony in subsurface soil for comparison.

Chromium was detected in twelve surface soil samples at concentrations ranging from 12.5 mg/kg to 58.6 mg/kg. Six chromium concentrations detected in Samples SB33A (4 to 6 feet and 8 to 10 feet), SB33B (4 to 6 feet and 8 to 10 feet), and SB33C (3 to 5 feet and 8 to 10 feet) at 58.6 mg/kg, 49.7 mg/kg, 44.1 mg/kg, 43.1 mg/kg, 40.1 mg/kg and 40.7 mg/kg, respectively, exceed the groundwater protection value of 38 mg/kg and the background value of 26 mg/kg. Chromium concentrations are below background in the underlying 18- to 20-foot and 38- to 40-foot interval samples suggesting that the elevated chromium observed in subsurface soil shallower than 10-foot depth potentially results from site operations.

Lead was detected in twelve surface soil samples at concentrations ranging from 3.1 mg/kg to 30.8 mg/kg. There were four detected concentrations that exceed the background concentration of 24 mg/kg and the groundwater protection value of 1.5 mg/kg. These exceedances were detected in Samples SB33A (4 to 6 feet and 8 to 10 feet), SB33B (8 to 10 feet) and SB33C (38 to 40 feet) at 30 mg/kg, 28.5 mg/kg, 30.8 mg/kg and 28.9 mg/kg, respectively. In Samples SB33A and SB33B there is a generally a decreasing concentration of lead with depth, suggesting downward transport from surface sources. Sample SB33C is the exception, with concentrations highest at the 38- to 40-foot interval sample. However, these values do not greatly exceed the background concentration of 24 mg/kg and, therefore, could result from natural variability of metals with depth varying soil conditions.

Methylene chloride concentrations detected in the CH2M HILL study did not exceed background and groundwater protection values. The Law study detected methylene chloride in Sample STB-5-2 (78 to 83 feet) at 0.021 mg/kg, which slightly exceeds the groundwater protection value of 0.02 mg/kg. However, this chemical is a common laboratory contaminant and is not site-related.

3.2 Vertical and Lateral Extent

CH2M HILL surface and subsurface soil samples were collected at the open-sided, metal-roofed shed, just south of Building 1088. Metals are slightly elevated above the background and/or criteria values in the sampling locations. Previous surface soil samples were collected by Law in the northern area surrounding building 1088. Metals, PAHs, pesticides, and PCBs were detected above background and/or criteria values in the sampling locations.

The site has elevated surface soil metals (antimony, cadmium, chromium and lead) across the two media evaluated at Screening Site 33.

The highest concentrations of chromium and lead were detected in the surface soils surrounding the northern area of Building 1088. A number of chromium exceedances were detected in surface and subsurface soils. Cadmium concentrations in surface soils exceed the screening criteria values. Cadmium concentrations detected in the northern area surface soils exceed the residential soil ingestion criteria and background value in the previous investigations (Law, 1990). The more recent sampling did not detect any cadmium above background levels.

Antimony concentrations exceed the screening criteria values in only subsurface soils. Antimony was detected south of Building 1088 in Sample SB33A (at the 8- to 10-foot depth) that slightly exceeded the groundwater protection value.

Elevated concentrations of PAHs were detected in the Law samples (SS16, SS17 and SS19) located in the northern area surrounding Building 1088.

Elevated concentrations of PCBs were detected in two Law samples (SS16 and SS15), in which Sample SS15 is located south of Building 1088 and Sample SS16 is located east of Building 1088 at the northern part.

Elevated concentrations of the dieldrin was detected in surface soils surrounding Building 1088, in one sample, SS33E, located south of Building 1088. Dieldrin was detected in three Law samples: SS15, SS16 and SS19. The pesticide DDT was detected in the Law study Sample SS16.

Chromium and lead concentrations in subsurface soil are elevated above groundwater protection criteria but only slightly elevated above background criteria. With the exception of one sample, concentrations are below background at depths greater than 10 feet indicating that if the slightly higher concentrations in the near surface samples result from sandblasting operations, significant leaching to depths approaching groundwater (greater than 60 feet deep) has not occurred.

3.3 Migration Pathways

The following paragraphs provide a general discussion of potential migration pathways for COPCs found at Screening Site 31.

Chromium has been reported from surface and subsurface soils at Screening Site 31 in concentrations greater than the screening levels. Chromium occurs in two oxidation states: +3 and +6. The trivalent form readily combines with aqueous hydroxide to form insoluble

chromium hydroxide and is of little risk. The hexavalent form is soluble and tends to stay in solution, unless some activated carbon material is present for it to sorb onto. Dissolved chromium is readily adsorbed onto sediments but may be bioaccumulated through aquatic organisms.

Elevated concentrations of chromium and lead in surface soil are likely due to sand blasting operations near Screening Site 33. Sand blast residue (dust and grit) has been stored in drums in the open sided shed. There have also been reports that sand blast residue was temporarily managed in covered piles near the site. This residue can be transported by surface water runoff as suspended particulates and ditch sediments or by wind blown dust. The residue is found in surface soil, and particulates would likely not penetrate below the one-foot depth. Significant leaching at depth has not been observed.

Subsurface metals concentrations below a depth of one foot are similar to those found at other sites and are considered to represent natural variability of metals with changing soil type. This indicates that leaching of metals is not an important transport mechanism for the site.

Additionally, lead in surface soils potentially may move as suspended particulate matter in surface waters and impact aquatic organisms.

Dieldrin exists at the DDMT in surface and subsurface soils. Since this compound is only minutely soluble in water, its most likely migration pathway at this site is via erosion as suspended soil particles in the surface water, where it potentially would be available to aquatic organisms. Dieldrin in the subsurface soils should be relatively immobile and not impact groundwater quality.

DDT and two of its degradation breakdown products, DDD and DDE, exist in subsurface soils at the DDMT and should not be mobile in this environment. These compounds have an extremely high affinity for soil and are essentially insoluble in water. So long as they are buried and the potential for direct contact is controlled, the potential to migrate is minimal. Should soil contaminated with these compounds be uncovered, these pesticides would potentially be able to be moved through wind action and/or as suspended material in surface water. DDT also was reported in sediments at two sites at the DDMT, indicating migration via this pathway has occurred. These compounds can bioaccumulate and become more concentrated as they move up in the food chain and could potentially affect receptors via this migration pathway.

PCBs, as a group, are relatively insoluble in water; therefore, they tend to migrate primarily through physical transport such as erosion via surface water. At the DDMT, PCB-1260 has been detected at concentrations of concern in surface soils. This material is subject to migration either via wind action or surface water transport and the PCB would be present as an absorded chemical on the clay platelets comprising the soil. This material could potentially be ingested either by breathing contaminated dust or by aqueous organisms exposed to turbid water or bottom feeding of contaminated sediment.

Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, indeno(1,2,3-c,d)pyrene, a group of related, long-chain PAHs, have similar chemical and physical characteristics and tend to migrate and behave in the environment in a similar manner. Generally, these compounds have low vapor pressures, are only marginally soluble in water, and have a high affinity for soils. All of these compounds have been detected at concentrations above screening values

for surface soils at the DDMT. They would be expected to migrate as adsorbed components of the soils and would potentially be available to aquatic organisms in turbid surface water or to bottom feeders in areas with contaminated sediments. That none of these compounds was detected in sediments indicates that this is not a major source of contaminant migration for these compounds at this site. These compounds do not bioaccumulate significantly due to their rapid metabolism and excretion by most aquatic organisms.

3.4 Additional Data Needs

No further characterization/investigations are suggested for this site.

4.0 Interpretation of Screening Criteria Comparisons

4.1 Methodology

The Preliminary Risk Evaluation (PRE) was performed in accordance with the *Guidance on Preliminary Risk Evaluations for the Purpose of Reaching a Finding of Suitability to Lease (FOSL)* (EPA Region IV, 1994). A discussion of the PRE methodology is provided as Appendix A to this document. This PRE is based exclusively on the more recent data and does not include data collected by Law (1990).

4.2 Screening Site 33 Risk

Carcinogenic risks and noncarcinogenic ratios for Screening Site 33 are presented in Table 4-65 of the draft PRE (USAESC, 1998), and detailed chemical-specific PRE estimates are presented in Appendix A of the PRE.

The PRE risk ratio is well below an accepted level of one in a million for both industrial and residential scenarios. The noncarcinogenic PRE ratio was below a value of 1.0 for an industrial worker; however, the ratio is above 1.0 for a residential receptor, primarily from chromium and lead that is slightly elevated above background.

Based on the metals concentrations, additional risk evaluation is recommended.

5.0 Summary and Recommendations

5.1 Summary

According to Table 5-2, the PRE results indicate that carcinogenic risks are below 10^{-6} and that noncarcinogenic ratios are less than one for industrial scenarios. Noncarcinogenic ratios are slightly above one for residential scenarios due to metals.

5.2 Recommendations

It is recommended that a risk assessment be performed to confirm that No Further Action is required at Screening Site 33.

Table 31-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 31
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
CH2M HILL	2-METHYLNAPHTHALENE	SS31D	0.084	J	NA	310	Residential RBC	MG/KG
CH2M HILL	ALUMINUM	SS31D	6600	=	24000	24000	Bkgd	MG/KG
CH2M HILL	ARSENIC	SB31A	20.6	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SB31A	8.5	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SB31B	14.9	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SS31A	10.7	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SS31B	4.2	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SS31C	12.6	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SS31C	16.2	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SS31D	6.2	J	20	20	Bckg	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	SS31A	0.34	=	.71	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	SS31B	0.067	=	.71	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	SS31C	0.068	=	.71	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	SS31D	0.084	J	.71	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(a)PYRENE	SS31A	0.33	=	.96	0.088	Residential RBC	MG/KG
CH2M HILL	BENZO(a)PYRENE	SS31D	0.079	J	.96	0.088	Residential RBC	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	SS31A	0.29	=	.78	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	SS31D	0.1	J	.78	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(g,h,i)PERYLENE	SS31A	0.25	=	.82	230	Residential RBC	MG/KG
CH2M HILL	BENZO(k)FLUORANTHENE	SS31A	0.26	=	.78	8.8	Residential RBC	MG/KG
CH2M HILL	BENZO(k)FLUORANTHENE	SS31D	0.049	J	.78	8.8	Residential RBC	MG/KG
CH2M HILL	BERYLLIUM	SS31D	0.72	=	1.1	1.1	Bckg	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB31A	38.7	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB31A	34.7	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB31B	29.8	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS31A	530	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS31B	66.1	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS31C	39.4	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS31C	32.2	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS31D	37.4	J	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHRYSENE	SS31A	0.34	=	.94	88	Residential RBC	MG/KG

Table 31-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 31
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
CH2M HILL	CHRYSENE	SS31B	0.058	=	.94	88	Residential RBC	MG/KG
CH2M HILL	CHRYSENE	SS31D	0.13	J	.94	88	Residential RBC	MG/KG
CH2M HILL	FLUORANTHENE	SS31A	0.52	=	1.6	310	Residential RBC	MG/KG
CH2M HILL	FLUORANTHENE	SS31B	0.095	=	1.6	310	Residential RBC	MG/KG
CH2M HILL	FLUORANTHENE	SS31C	0.082	=	1.6	310	Residential RBC	MG/KG
CH2M HILL	FLUORANTHENE	SS31D	0.16	J	1.6	310	Residential RBC	MG/KG
CH2M HILL	INDENO(1,2,3-c,d)PYRENE	SS31A	0.21	=	.7	0.88	Residential RBC	MG/KG
CH2M HILL	INDENO(1,2,3-c,d)PYRENE	SS31D	0.054	J	.7	0.88	Residential RBC	MG/KG
CH2M HILL	IRON	SS31D	14900	=	37000	37000	Bckg	MG/KG
CH2M HILL	LEAD	SB31A	51.4	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SB31A	57.2	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SB31B	37.3	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SS31A	664	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SS31B	85.5	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SS31C	84.6	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SS31C	71.2	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SS31D	205	=	30	400	CERCLA	MG/KG
CH2M HILL	MANGANESE	SS31D	410	=	1300	1300	Bckg	MG/KG
CH2M HILL	PHENANTHRENE	SS31A	0.37	=	.61	2300	Residential RBC	MG/KG
CH2M HILL	PHENANTHRENE	SS31B	0.071	=	.61	2300	Residential RBC	MG/KG
CH2M HILL	PHENANTHRENE	SS31D	0.23	J	.61	2300	Residential RBC	MG/KG
CH2M HILL	PYRENE	SS31A	0.43	=	1.5	230	Residential RBC	MG/KG
CH2M HILL	PYRENE	SS31B	0.053	=	1.5	230	Residential RBC	MG/KG
CH2M HILL	PYRENE	SS31D	0.19	J	1.5	230	Residential RBC	MG/KG
CH2M HILL	ZINC	SB31A	118	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SB31A	97.1	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SB31B	104	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SS31A	1560	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SS31B	221	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SS31C	275	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SS31C	168	=	130	23000	Residential RBC	MG/KG

Table 31-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 31
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
CH2M HILL	ZINC	SS31D	99.2	=	130	23000	Residential RBC	MG/KG
LAW	ANTIMONY	SS18	26	=	7	7	Bckg	MG/KG
LAW	ARSENIC	SS18	15	=	20	20	Bckg	MG/KG
LAW	BENZO(a)PYRENE	SS18	0.37	J	.96	0.088	Residential RBC	MG/KG
LAW	BENZO(b)FLUORANTHENE	SS18	0.83	J	.78	0.88	Residential RBC	MG/KG
LAW	CHROMIUM, TOTAL	SS18	8680	=	24.8	39	Residential RBC	MG/KG
LAW	CHRYSENE	SS18	1	J	.94	88	Residential RBC	MG/KG
LAW	FLUORANTHENE	SS18	1.3	J	1.6	310	Residential RBC	MG/KG
LAW	LEAD	SS18	2060	=	30	400	CERCLA	MG/KG
LAW	PHENANTHRENE	SS18	0.78	J	.61	2300	Residential RBC	MG/KG
LAW	PYRENE	SS18	0.86	J	1.5	230	Residential RBC	MG/KG
LAW	ZINC	SS18	22100	=	130	23000	Residential RBC	MG/KG

Notes:

1. Detected values are obtained from the *Draft Parcel 35 Report-Screening Sites Sampling Program for Defense Depot* Memphis, TN, CH2M HILL, 1997, and the *Remedial Investigation at DDMT Final Report*, Law Environmental, August 1990.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. Based on values selected by the BRAC Cleanup Team in the August 1997 BCT meeting minutes, Memphis, Tennessee.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
J - indicates estimated value above the detection limit but below the reporting limit.
= - indicates unqualified detection
BCT - BRAC Cleanup Team

Table 31-B
Summary of Detected Compounds in Surface Soils
Compared to Non-BCT Screening Levels for Site 31
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	Risk-Based Concentrations Soil Ingestion[4]		Units
						Residential	Industrial	
CH2M HILL	ACETONE	SB31A	0.007	J	NA	780	20000	MG/KG
CH2M HILL	BARIUM	SS31D	109	=	234	550	14000	MG/KG
CH2M HILL	BROMOMETHANE	SS31C	0.002	J	NA	11	290	MG/KG
CH2M HILL	CADMIUM	SS31A	8.1	=	1.4	3.9	100	MG/KG
CH2M HILL	CADMIUM	SS31B	1.7	=	1.4	3.9	100	MG/KG
CH2M HILL	CADMIUM	SS31D	0.51	J	1.4	3.9	100	MG/KG
CH2M HILL	CALCIUM	SS31D	7100	=	5840	NA	NA	MG/KG
CH2M HILL	COBALT	SS31D	6.8	=	18.3	470	12000	MG/KG
CH2M HILL	COPPER	SB31A	32	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SB31A	23.7	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SB31B	26.7	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SS31A	33.5	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SS31B	11.6	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SS31C	25.5	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SS31C	33	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SS31D	24.3	=	33	310	8200	MG/KG
CH2M HILL	MAGNESIUM	SS31D	885	=	4600	NA	NA	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SS31A	0.004	J	NA	85	760	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SS31B	0.002	J	NA	85	760	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SS31C	0.004	J	NA	85	760	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SS31C	0.007	J	NA	85	760	MG/KG
CH2M HILL	NAPHTHALENE	SS31D	0.1	J	NA	310	8200	MG/KG
CH2M HILL	NICKEL	SB31A	34	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SB31A	33.8	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SB31B	26.9	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SS31A	26.4	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SS31B	20	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SS31C	27	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SS31C	36.9	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SS31D	16.3	=	30	160	4100	MG/KG

Table 31-B
Summary of Detected Compounds in Surface Soils
Compared to Non-BCT Screening Levels for Site 31
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	Risk-Based Concentrations Soil Ingestion[4]		Units
						Residential	Industrial	
CH2M HILL	POTASSIUM	SS31D	651	=	1820	NA	NA	MG/KG
CH2M HILL	SILVER	SS31D	0.31	J	2	39	1000	MG/KG
CH2M HILL	SODIUM	SS31D	336	J	NA	NA	NA	MG/KG
CH2M HILL	VANADIUM	SS31D	17.6	J	48.4	55	1400	MG/KG
LAW	ACETONE	SS18	0.006	J	NA	780	20000	MG/KG
LAW	BARIUM	SS18	409	=	234	550	14000	MG/KG
LAW	BENZYL ALCOHOL	SS18	1	J	NA	2300	61000	MG/KG
LAW	bis(2-ETHYLHEXYL) PHTHALATE	SS18	8.1	=	NA	46	410	MG/KG
LAW	CADMIUM	SS18	4.7	=	1.4	3.9	100	MG/KG
LAW	COPPER	SS18	52	=	33	310	8200	MG/KG
LAW	DDE	SS18	0.4	=	.16	1.9	17	MG/KG
LAW	DDT	SS18	1.1	=	.074	1.9	17	MG/KG
LAW	DI-n-BUTYL PHTHALATE	SS18	0.95	J	NA	780	20000	MG/KG
LAW	MERCURY	SS18	0.06	=	.43	2.3	61	MG/KG
LAW	METHYLENE CHLORIDE	SS18	0.009	=	NA	85	760	MG/KG
LAW	NICKEL	SS18	16	=	30	160	4100	MG/KG
LAW	SELENIUM	SS18	9	=	.81	39	1000	MG/KG
LAW	TOLUENE	SS18	0.002	J	.012	1600	41000	MG/KG
LAW	Total Polynuclear Aromatic Hydrocarbons	SS18	4.77	=	NA	NA	NA	MG/KG

Notes:
1. Detected values are obtained from the *Draft Parcel 35 Report-Screening Sites Sampling Program for Defense Depot Memphis, TN*, CH2M HILL, 1997, or the *Remedial Investigation at DDMT Final Report*, Law Environmental, August 1990.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. Risk-Based Concentrations are obtained from the *EPA Region III Risk-based Concentrations Table*, R. L. Smith, April, 1997.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
J - indicates estimated value above the detection limit but below the reporting limit.
= - indicates unqualified detection.

Table 31-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 31
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	ACETONE	SB31B	38 to 40	0.011	=	NA	16	MG/KG
CH2M HILL	ANTIMONY	SB31A	8 to 10	7.8	=	NA	5	MG/KG
CH2M HILL	ARSENIC	SB31A	18 to 20	5.6	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB31A	4 to 6	9.5	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB31A	8 to 10	15.7	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB31B	18 to 20	3.3	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB31B	4 to 6	9.8	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB31B	8 to 10	17.9	=	17	29	MG/KG
CH2M HILL	BERYLLIUM	SB31A	4 to 6	1.1	=	1.2	63	MG/KG
CH2M HILL	BERYLLIUM	SB31A	8 to 10	1.3	=	1.2	63	MG/KG
CH2M HILL	BERYLLIUM	SB31B	18 to 20	0.25	J	1.2	63	MG/KG
CH2M HILL	BERYLLIUM	SB31B	4 to 6	1.1	=	1.2	63	MG/KG
CH2M HILL	BERYLLIUM	SB31B	8 to 10	1.6	=	1.2	63	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB31A	18 to 20	17.1	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB31A	38 to 40	6.3	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB31A	4 to 6	36.2	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB31A	8 to 10	53.3	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB31B	18 to 20	8.4	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB31B	38 to 40	18.7	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB31B	4 to 6	37	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB31B	8 to 10	50.3	=	26	38	MG/KG
CH2M HILL	COPPER	SB31A	18 to 20	10.8	=	33	NA	MG/KG
CH2M HILL	COPPER	SB31A	4 to 6	17.4	=	33	NA	MG/KG
CH2M HILL	COPPER	SB31A	8 to 10	31.5	=	33	NA	MG/KG
CH2M HILL	COPPER	SB31B	18 to 20	6.1	J	33	NA	MG/KG
CH2M HILL	COPPER	SB31B	38 to 40	3.4	=	33	NA	MG/KG

Table 31-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 31
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	COPPER	SB31B	4 to 6	17.8	=	33	NA	MG/KG
CH2M HILL	COPPER	SB31B	8 to 10	34.9	=	33	NA	MG/KG
CH2M HILL	LEAD	SB31A	18 to 20	11.1	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB31A	38 to 40	2	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB31A	4 to 6	22.6	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB31A	8 to 10	26.6	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB31B	18 to 20	6.3	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB31B	38 to 40	7.5	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB31B	4 to 6	23	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB31B	8 to 10	26.2	=	24	1.5	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SB31B	38 to 40	0.001	J	NA	.02	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SB31B	4 to 6	0.002	J	NA	.02	MG/KG
CH2M HILL	NICKEL	SB31A	18 to 20	9.5	=	37	130	MG/KG
CH2M HILL	NICKEL	SB31A	4 to 6	25.6	=	37	130	MG/KG
CH2M HILL	NICKEL	SB31A	8 to 10	27.9	=	37	130	MG/KG
CH2M HILL	NICKEL	SB31B	18 to 20	5.4	J	37	130	MG/KG
CH2M HILL	NICKEL	SB31B	38 to 40	4.8	=	37	130	MG/KG
CH2M HILL	NICKEL	SB31B	4 to 6	27.9	=	37	130	MG/KG
CH2M HILL	NICKEL	SB31B	8 to 10	30.1	=	37	130	MG/KG
CH2M HILL	ZINC	SB31A	18 to 20	25.1	=	110	12000	MG/KG
CH2M HILL	ZINC	SB31A	38 to 40	15.4	=	110	12000	MG/KG
CH2M HILL	ZINC	SB31A	4 to 6	65.4	=	110	12000	MG/KG
CH2M HILL	ZINC	SB31A	8 to 10	84.2	=	110	12000	MG/KG
CH2M HILL	ZINC	SB31B	18 to 20	14.9	J	110	12000	MG/KG
CH2M HILL	ZINC	SB31B	38 to 40	20.7	=	110	12000	MG/KG

Table 31-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 31
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	ZINC	SB31B	4 to 6	72.9	=	110	12000	MG/KG
CH2M HILL	ZINC	SB31B	8 to 10	76.1	=	110	12000	MG/KG

Notes:
1. Detected values are obtained from the *Draft Parcel 35 Report-Screening Sites Sampling Program for Defense Depot Memphis, TN.* CH2M HILL, 1997.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum* , CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. RBC-GWP values are obtained from the *EPA Region III Risk-based Concentrations Table* , R. L. Smith, April, 1997.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
= - indicates unqualified detection
J - indicates estimated value above the detection limit but below the reporting limit.
RBC-GWP - Risk-Based Concentrations - Groundwater Protection

Table 33-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 33
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
CH2M HILL	ALUMINUM	SS33B	4140	=	24000	24000	Bkgd	MG/KG
CH2M HILL	ALUMINUM	SS33E	7410	=	24000	24000	Bkgd	MG/KG
CH2M HILL	ANTIMONY	SS33B	2.7	J	7	7	Bckg	MG/KG
CH2M HILL	ANTIMONY	SS33E	2	J	7	7	Bckg	MG/KG
CH2M HILL	ARSENIC	SB33A	10.2	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SB33B	9.9	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SB33B	13.9	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SB33C	8.7	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SS33A	8.1	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SS33B	8.2	J	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SS33C	11.8	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SS33D	19.6	=	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SS33E	13.8	J	20	20	Bckg	MG/KG
CH2M HILL	ARSENIC	SS33F	18.4	=	20	20	Bckg	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	SS33E	0.11	J	.71	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(a)PYRENE	SS33E	0.13	J	.96	0.088	Residential RBC	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	SS33B	0.038	J	.78	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	SS33E	0.14	J	.78	0.88	Residential RBC	MG/KG
CH2M HILL	BENZO(g,h,i)PERYLENE	SS33E	0.082	J	.82	230	Residential RBC	MG/KG
CH2M HILL	BENZO(k)FLUORANTHENE	SS33E	0.14	J	.78	8.8	Residential RBC	MG/KG
CH2M HILL	BERYLLIUM	SB33B	0.95	=	1.1	1.1	Bckg	MG/KG
CH2M HILL	BERYLLIUM	SB33B	1.1	=	1.1	1.1	Bckg	MG/KG
CH2M HILL	BERYLLIUM	SB33C	0.99	=	1.1	1.1	Bckg	MG/KG
CH2M HILL	BERYLLIUM	SS33B	0.14	J	1.1	1.1	Bckg	MG/KG
CH2M HILL	BERYLLIUM	SS33E	0.45	J	1.1	1.1	Bckg	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB33A	32.2	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB33B	28.3	=	24.8	39	Residential RBC	MG/KG

Table 33-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 33
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
CH2M HILL	CHROMIUM, TOTAL	SB33B	40.5	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB33C	37.6	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS33A	44.9	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS33B	77.1	J	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS33C	53.8	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS33D	158	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS33E	22.5	J	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SS33F	40.8	=	24.8	39	Residential RBC	MG/KG
CH2M HILL	CHRYSENE	SS33B	0.053	J	.94	88	Residential RBC	MG/KG
CH2M HILL	CHRYSENE	SS33E	0.16	J	.94	88	Residential RBC	MG/KG
CH2M HILL	FLUORANTHENE	SS33B	0.057	J	1.6	310	Residential RBC	MG/KG
CH2M HILL	FLUORANTHENE	SS33E	0.21	J	1.6	310	Residential RBC	MG/KG
CH2M HILL	INDENO(1,2,3-c,d)PYRENE	SS33E	0.064	J	.7	0.88	Residential RBC	MG/KG
CH2M HILL	IRON	SS33B	27900	=	37000	37000	Bckg	MG/KG
CH2M HILL	IRON	SS33E	9280	=	37000	37000	Bckg	MG/KG
CH2M HILL	LEAD	SB33A	46.9	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SB33B	20.1	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SB33B	119	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SB33C	16.1	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SS33A	129	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SS33B	321	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SS33C	200	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SS33D	751	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SS33E	140	=	30	400	CERCLA	MG/KG
CH2M HILL	LEAD	SS33F	79.3	=	30	400	CERCLA	MG/KG
CH2M HILL	MANGANESE	SS33B	201	=	1300	1300	Bckg	MG/KG
CH2M HILL	MANGANESE	SS33E	291	=	1300	1300	Bckg	MG/KG
CH2M HILL	PHENANTHRENE	SS33B	0.072	J	.61	2300	Residential RBC	MG/KG
CH2M HILL	PHENANTHRENE	SS33E	0.15	J	.61	2300	Residential RBC	MG/KG
CH2M HILL	PYRENE	SS33B	0.066	J	1.5	230	Residential RBC	MG/KG
CH2M HILL	PYRENE	SS33E	0.32	J	1.5	230	Residential RBC	MG/KG
CH2M HILL	ZINC	SB33A	93.3	=	130	23000	Residential RBC	MG/KG

Table 33-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 33
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
CH2M HILL	ZINC	SB33B	79.7	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SB33B	124	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SB33C	68.1	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SS33A	91.6	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SS33B	194	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SS33C	187	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SS33D	1090	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SS33E	551	=	130	23000	Residential RBC	MG/KG
CH2M HILL	ZINC	SS33F	211	=	130	23000	Residential RBC	MG/KG
LAW	ACENAPHTHENE	SS19	0.25	J	NA	470	Residential RBC	MG/KG
LAW	ANTHRACENE	SS16	0.67	J	.096	2300	Residential RBC	MG/KG
LAW	ANTHRACENE	SS17	0.2	J	.096	2300	Residential RBC	MG/KG
LAW	ANTHRACENE	SS19	0.26	J	.096	2300	Residential RBC	MG/KG
LAW	ANTIMONY	SS15	8	=	7	7	Bckg	MG/KG
LAW	ANTIMONY	SS16	30	=	7	7	Bckg	MG/KG
LAW	ANTIMONY	SS19	4	=	7	7	Bckg	MG/KG
LAW	ARSENIC	SS15	6	=	20	20	Bckg	MG/KG
LAW	BENZO(a)ANTHRACENE	SS16	2.1	J	.71	0.88	Residential RBC	MG/KG
LAW	BENZO(a)ANTHRACENE	SS17	0.62	J	.71	0.88	Residential RBC	MG/KG
LAW	BENZO(a)ANTHRACENE	SS19	2.2	=	.71	0.88	Residential RBC	MG/KG
LAW	BENZO(a)ANTHRACENE	SS46	0.09	J	.71	0.88	Residential RBC	MG/KG
LAW	BENZO(a)PYRENE	SS16	1.7	J	.96	0.088	Residential RBC	MG/KG
LAW	BENZO(a)PYRENE	SS19	1.5	J	.96	0.088	Residential RBC	MG/KG
LAW	BENZO(a)PYRENE	SS46	0.084	J	.96	0.088	Residential RBC	MG/KG
LAW	BENZO(b)FLUORANTHENE	SS15	0.12	J	.78	0.88	Residential RBC	MG/KG
LAW	BENZO(b)FLUORANTHENE	SS16	2.4	J	.78	0.88	Residential RBC	MG/KG
LAW	BENZO(b)FLUORANTHENE	SS17	1.3	J	.78	0.88	Residential RBC	MG/KG
LAW	BENZO(b)FLUORANTHENE	SS19	4.6	=	.78	0.88	Residential RBC	MG/KG
LAW	BENZO(b)FLUORANTHENE	SS46	0.16	J	.78	0.88	Residential RBC	MG/KG
LAW	BENZO(g,h,i)PERYLENE	SS16	1.4	J	.82	230	Residential RBC	MG/KG
LAW	BENZO(g,h,i)PERYLENE	SS17	0.84	J	.82	230	Residential RBC	MG/KG
LAW	BENZO(k)FLUORANTHENE	SS15	0.1	J	.78	8.8	Residential RBC	MG/KG

Table 33-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 33
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
LAW	BENZO(k)FLUORANTHENE	SS16	2.2	J	.78	8.8	Residential RBC	MG/KG
LAW	BENZOIC ACID	SS19	0.32	J	NA	31000	Residential RBC	MG/KG
LAW	CHROMIUM, TOTAL	SS15	714	=	24.8	39	Residential RBC	MG/KG
LAW	CHROMIUM, TOTAL	SS16	6710	=	24.8	39	Residential RBC	MG/KG
LAW	CHROMIUM, TOTAL	SS17	109	=	24.8	39	Residential RBC	MG/KG
LAW	CHROMIUM, TOTAL	SS19	2230	=	24.8	39	Residential RBC	MG/KG
LAW	CHROMIUM, TOTAL	SS46	78	=	24.8	39	Residential RBC	MG/KG
LAW	CHRYSENE	SS15	0.11	J	.94	88	Residential RBC	MG/KG
LAW	CHRYSENE	SS16	2.5	J	.94	88	Residential RBC	MG/KG
LAW	CHRYSENE	SS17	0.79	J	.94	88	Residential RBC	MG/KG
LAW	CHRYSENE	SS19	2.5	=	.94	88	Residential RBC	MG/KG
LAW	CHRYSENE	SS46	0.13	J	.94	88	Residential RBC	MG/KG
LAW	DIBENZOFURAN	SS19	0.21	J	.647	31	Residential RBC	MG/KG
LAW	FLUORANTHENE	SS15	0.22	J	1.6	310	Residential RBC	MG/KG
LAW	FLUORANTHENE	SS16	5.8	=	1.6	310	Residential RBC	MG/KG
LAW	FLUORANTHENE	SS17	1.8	J	1.6	310	Residential RBC	MG/KG
LAW	FLUORANTHENE	SS19	3.2	=	1.6	310	Residential RBC	MG/KG
LAW	FLUORANTHENE	SS46	0.21	J	1.6	310	Residential RBC	MG/KG
LAW	FLUORENE	SS19	0.31	J	NA	310	Residential RBC	MG/KG
LAW	INDENO(1,2,3-c,d)PYRENE	SS16	1.2	J	.7	0.88	Residential RBC	MG/KG
LAW	INDENO(1,2,3-c,d)PYRENE	SS17	0.63	J	.7	0.88	Residential RBC	MG/KG
LAW	INDENO(1,2,3-c,d)PYRENE	SS19	1.5	J	.7	0.88	Residential RBC	MG/KG
LAW	LEAD	SS15	2670	=	30	400	CERCLA	MG/KG
LAW	LEAD	SS16	17500	=	30	400	CERCLA	MG/KG
LAW	LEAD	SS17	247	=	30	400	CERCLA	MG/KG
LAW	LEAD	SS19	10300	=	30	400	CERCLA	MG/KG
LAW	LEAD	SS46	166	=	30	400	CERCLA	MG/KG
LAW	PCB-1016 (AROCHLOR 1016)	SS15	0.1	=	NA	0.083	Residential RBC	MG/KG
LAW	PCB-1016 (AROCHLOR 1016)	SS17	0.14	=	NA	0.083	Residential RBC	MG/KG
LAW	PCB-1221 (AROCHLOR 1221)	SS15	0.095	=	NA	0.083	Residential RBC	MG/KG
LAW	PCB-1232 (AROCHLOR 1232)	SS15	0.27	=	NA	0.083	Residential RBC	MG/KG
LAW	PCB-1232 (AROCHLOR 1232)	SS17	0.55	=	NA	0.083	Residential RBC	MG/KG

Table 33-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 33
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
LAW	PCB-1242 (AROCHLOR 1242)	SS15	**0.13**	=	NA	**0.083**	Residential RBC	MG/KG
LAW	PCB-1242 (AROCHLOR 1242)	SS17	**0.2**	=	NA	**0.083**	Residential RBC	MG/KG
LAW	PCB-1254 (AROCHLOR 1254)	SS16	**10**	=	NA	**0.083**	Residential RBC	MG/KG
LAW	PHENANTHRENE	SS15	0.13	J	.61	2300	Residential RBC	MG/KG
LAW	PHENANTHRENE	SS16	3	J	.61	2300	Residential RBC	MG/KG
LAW	PHENANTHRENE	SS17	0.76	J	.61	2300	Residential RBC	MG/KG
LAW	PHENANTHRENE	SS19	2.5	=	.61	2300	Residential RBC	MG/KG
LAW	PHENANTHRENE	SS46	0.12	J	.61	2300	Residential RBC	MG/KG
LAW	PYRENE	SS15	0.16	J	1.5	230	Residential RBC	MG/KG
LAW	PYRENE	SS16	4.7	=	1.5	230	Residential RBC	MG/KG
LAW	PYRENE	SS17	1.1	J	1.5	230	Residential RBC	MG/KG
LAW	PYRENE	SS19	2.6	=	1.5	230	Residential RBC	MG/KG
LAW	PYRENE	SS46	0.25	J	1.5	230	Residential RBC	MG/KG
LAW	ZINC	SS15	996	=	130	23000	Residential RBC	MG/KG
LAW	ZINC	SS16	21000	=	130	23000	Residential RBC	MG/KG
LAW	ZINC	SS17	270	=	130	23000	Residential RBC	MG/KG
LAW	ZINC	SS19	4600	=	130	23000	Residential RBC	MG/KG
LAW	ZINC	SS46	146	=	130	23000	Residential RBC	MG/KG

Notes:
1. Detected values are obtained from the *Draft Parcel 35 Report-Screening Sites Sampling Program for Defense Depot Memphis, TN*, CH2M HILL, 1997, and the *Remedial Investigation at DDMT Final Report*, Law Environmental, August 1990.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. Based on values selected by the BRAC Cleanup Team in the August 1997 BCT meeting minutes, Memphis, Tennessee.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
J - indicates estimated value above the detection limit but below the reporting limit.
= - indicates unqualified detection.
BCT - BRAC Cleanup Team

Table 33-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 33
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units

Table 33-B
Summary of Detected Compounds in Surface Soils
Compared to Non-BCT Screening Levels for Site 33
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	Risk-Based Concentrations Soil Ingestion[4]		Units
						Residential	Industrial	
CH2M HILL	ACETONE	SB33B	0.012	=	NA	780	20000	MG/KG
CH2M HILL	ACETONE	SB33C	0.003	J	NA	780	20000	MG/KG
CH2M HILL	ACETONE	SS33A	0.005	J	NA	780	20000	MG/KG
CH2M HILL	ACETONE	SS33D	0.004	J	NA	780	20000	MG/KG
CH2M HILL	ACETONE	SS33F	0.004	J	NA	780	20000	MG/KG
CH2M HILL	BARIUM	SS33B	77.2	=	234	550	14000	MG/KG
CH2M HILL	BARIUM	SS33E	432	=	234	550	14000	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	SS33E	0.041	J	NA	46	410	MG/KG
CH2M HILL	CADMIUM	SB33C	1.2	=	1.4	3.9	100	MG/KG
CH2M HILL	CADMIUM	SS33B	0.97	=	1.4	3.9	100	MG/KG
CH2M HILL	CADMIUM	SS33D	2	=	1.4	3.9	100	MG/KG
CH2M HILL	CALCIUM	SS33B	1240	=	5840	NA	NA	MG/KG
CH2M HILL	CALCIUM	SS33E	7360	=	5840	NA	NA	MG/KG
CH2M HILL	COBALT	SS33B	4.2	J	18.3	470	12000	MG/KG
CH2M HILL	COBALT	SS33E	3.8	J	18.3	470	12000	MG/KG
CH2M HILL	COPPER	SB33A	26.1	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SB33B	22	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SB33B	39	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SB33C	17.1	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SS33A	39.8	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SS33B	84.8	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SS33C	62.8	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SS33D	41.5	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SS33E	14.7	=	33	310	8200	MG/KG
CH2M HILL	COPPER	SS33F	30.7	=	33	310	8200	MG/KG
CH2M HILL	DIELDRIN	SS33E	0.1	=	.086	.04	.36	MG/KG
CH2M HILL	MAGNESIUM	SS33B	380	J	4600	NA	NA	MG/KG
CH2M HILL	MAGNESIUM	SS33E	1380	=	4600	NA	NA	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SB33B	0.003	J	NA	85	760	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SB33B	0.006	J	NA	85	760	MG/KG

Table 33-B
Summary of Detected Compounds in Surface Soils
Compared to Non-BCT Screening Levels for Site 33
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	Risk-Based Concentrations Soil Ingestion[4]		Units
						Residential	Industrial	
CH2M HILL	METHYLENE CHLORIDE	SB33C	0.002	J	NA	85	760	MG/KG
CH2M HILL	NICKEL	SB33A	27.5	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SB33B	30.5	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SB33B	26.2	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SB33C	26.6	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SS33A	16.7	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SS33B	21.8	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SS33C	29.1	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SS33D	27.6	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SS33E	7.5	=	30	160	4100	MG/KG
CH2M HILL	NICKEL	SS33F	26.5	=	30	160	4100	MG/KG
CH2M HILL	p,p'-DDT	SS33B	0.0065	=	.074	1.9	17	MG/KG
CH2M HILL	p,p'-DDT	SS33E	0.021	J	.074	1.9	17	MG/KG
CH2M HILL	POTASSIUM	SS33B	284	J	1820	NA	NA	MG/KG
CH2M HILL	POTASSIUM	SS33E	582	J	1820	NA	NA	MG/KG
CH2M HILL	SELENIUM	SB33B	1.3	=	.81	39	1000	MG/KG
CH2M HILL	SODIUM	SS33E	261	J	NA	NA	NA	MG/KG
CH2M HILL	TOLUENE	SB33B	0.001	J	.012	1600	41000	MG/KG
CH2M HILL	VANADIUM	SS33B	14	J	48.4	55	1400	MG/KG
CH2M HILL	VANADIUM	SS33E	15.1	J	48.4	55	1400	MG/KG
LAW	2,4-DIMETHYLPHENOL	SS19	0.72	J	NA	160	4100	MG/KG
LAW	2-METHYLPHENOL (o-CRESOL)	SS19	1.1	J	NA	390	10000	MG/KG
LAW	4-METHYLPHENOL (p-CRESOL)	SS19	0.5	J	NA	39	1000	MG/KG
LAW	ACETONE	SS15	0.015	=	NA	780	20000	MG/KG
LAW	ACETONE	SS16	0.017	=	NA	780	20000	MG/KG
LAW	ACETONE	SS17	0.012	=	NA	780	20000	MG/KG
LAW	ACETONE	SS19	0.011	J	NA	780	20000	MG/KG
LAW	ACETONE	SS46	0.009	J	NA	780	20000	MG/KG
LAW	ALPHA BHC (ALPHA	SS15	0.012	=	NA	NA	NA	MG/KG
LAW	ALPHA ENDOSULFAN	SS15	0.019	=	NA	NA	NA	MG/KG

Table 33-B
Summary of Detected Compounds in Surface Soils
Compared to Non-BCT Screening Levels for Site 33
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	Risk-Based Concentrations Soil Ingestion[4]		Units
						Residential	Industrial	
LAW	BARIUM	SS15	216	=	234	550	14000	MG/KG
LAW	BARIUM	SS16	313	=	234	550	14000	MG/KG
LAW	BARIUM	SS17	109	=	234	550	14000	MG/KG
LAW	BARIUM	SS19	148	=	234	550	14000	MG/KG
LAW	BARIUM	SS46	91.8	=	234	550	14000	MG/KG
LAW	BENZYL BUTYL PHTHALATE	SS15	0.096	J	.645	1600	41000	MG/KG
LAW	BENZYL BUTYL PHTHALATE	SS16	0.37	J	.645	1600	41000	MG/KG
LAW	BETA BHC (BETA	SS15	0.026	=	NA	NA	NA	MG/KG
LAW	BETA BHC (BETA	SS17	0.043	=	NA	NA	NA	MG/KG
LAW	bis(2-ETHYLHEXYL) PHTHALATE	SS15	1.7	=	NA	46	410	MG/KG
LAW	bis(2-ETHYLHEXYL) PHTHALATE	SS16	4.3	=	NA	46	410	MG/KG
LAW	bis(2-ETHYLHEXYL) PHTHALATE	SS17	0.6	J	NA	46	410	MG/KG
LAW	bis(2-ETHYLHEXYL) PHTHALATE	SS46	1.4	=	NA	46	410	MG/KG
LAW	CADMIUM	SS15	1.9	=	1.4	3.9	100	MG/KG
LAW	CADMIUM	SS16	23.4	=	1.4	3.9	100	MG/KG
LAW	CADMIUM	SS17	0.7	=	1.4	3.9	100	MG/KG
LAW	CADMIUM	SS19	4.4	=	1.4	3.9	100	MG/KG
LAW	COPPER	SS15	124	=	33	310	8200	MG/KG
LAW	COPPER	SS16	240	=	33	310	8200	MG/KG
LAW	COPPER	SS17	72	=	33	310	8200	MG/KG
LAW	COPPER	SS19	148	=	33	310	8200	MG/KG
LAW	COPPER	SS46	76	=	33	310	8200	MG/KG
LAW	DDD	SS15	0.045	=	NA	2.7	24	MG/KG
LAW	DDD	SS16	0.25	=	NA	2.7	24	MG/KG
LAW	DDD	SS17	0.052	=	NA	2.7	24	MG/KG
LAW	DDD	SS46	0.013	J	NA	2.7	24	MG/KG
LAW	DDE	SS15	0.11	=	.16	1.9	17	MG/KG
LAW	DDE	SS16	1.3	=	.16	1.9	17	MG/KG
LAW	DDE	SS17	0.097	=	.16	1.9	17	MG/KG
LAW	DDE	SS19	0.18	=	.16	1.9	17	MG/KG

Table 33-B
Summary of Detected Compounds in Surface Soils
Compared to Non-BCT Screening Levels for Site 33
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	Risk-Based Concentrations Soil Ingestion[4]		Units
						Residential	Industrial	
LAW	DDE	SS46	0.027	=	.16	1.9	17	MG/KG
LAW	DDT	SS15	0.45	=	.074	1.9	17	MG/KG
LAW	DDT	SS16	7.4	=	.074	1.9	17	MG/KG
LAW	DDT	SS17	0.26	=	.074	1.9	17	MG/KG
LAW	DDT	SS19	0.66	=	.074	1.9	17	MG/KG
LAW	DDT	SS46	0.11	=	.074	1.9	17	MG/KG
LAW	DELTA BHC (DELTA	SS17	0.011	=	NA	NA	NA	MG/KG
LAW	DI-n-BUTYL PHTHALATE	SS15	0.16	J	NA	780	20000	MG/KG
LAW	DI-n-BUTYL PHTHALATE	SS16	0.47	J	NA	780	20000	MG/KG
LAW	DIELDRIN	SS15	0.11	=	.086	.04	.36	MG/KG
LAW	DIELDRIN	SS16	0.41	=	.086	.04	.36	MG/KG
LAW	DIELDRIN	SS19	0.22	=	.086	.04	.36	MG/KG
LAW	GAMMA BHC (LINDANE)	SS15	0.011	=	NA	NA	NA	MG/KG
LAW	HEPTACHLOR EPOXIDE	SS15	0.069	=	.0045	.07	.63	MG/KG
LAW	MERCURY	SS15	0.04	=	.43	2.3	61	MG/KG
LAW	MERCURY	SS16	0.26	=	.43	2.3	61	MG/KG
LAW	MERCURY	SS19	0.18	=	.43	2.3	61	MG/KG
LAW	METHYLENE CHLORIDE	SS15	0.016	=	NA	85	760	MG/KG
LAW	METHYLENE CHLORIDE	SS16	0.029	=	NA	85	760	MG/KG
LAW	METHYLENE CHLORIDE	SS17	0.011	=	NA	85	760	MG/KG
LAW	METHYLENE CHLORIDE	SS19	0.011	=	NA	85	760	MG/KG
LAW	METHYLENE CHLORIDE	SS46	0.008	=	NA	85	760	MG/KG
LAW	N-NITROSODIPHENYLAMINE	SS15	0.15	J	NA	130	1200	MG/KG
LAW	N-NITROSODIPHENYLAMINE	SS16	0.59	J	NA	130	1200	MG/KG
LAW	NAPHTHALENE	SS19	0.48	J	NA	310	8200	MG/KG
LAW	NICKEL	SS15	37	=	30	160	4100	MG/KG
LAW	NICKEL	SS16	53	=	30	160	4100	MG/KG
LAW	NICKEL	SS17	23	=	30	160	4100	MG/KG
LAW	NICKEL	SS19	32	=	30	160	4100	MG/KG
LAW	NICKEL	SS46	24	=	30	160	4100	MG/KG

Table 33-B
Summary of Detected Compounds in Surface Soils
Compared to Non-BCT Screening Levels for Site 33
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	Risk-Based Concentrations Soil Ingestion[4]		Units
						Residential	Industrial	
LAW	PCB, TOTAL	SS15	0.595	=	NA	NA	NA	MG/KG
LAW	PCB, TOTAL	SS16	10	=	NA	NA	NA	MG/KG
LAW	PCB, TOTAL	SS17	0.89	=	NA	NA	NA	MG/KG
LAW	PHENOL	SS19	0.55	J	NA	4700	100000	MG/KG
LAW	SILVER	SS16	0.8	=	2	39	1000 .	MG/KG
LAW	TOLUENE	SS15	0.005	J	.012	1600	41000	MG/KG
LAW	TOLUENE	SS16	0.004	J	.012	1600	41000	MG/KG
LAW	TOLUENE	SS19	0.006	=	.012	1600	41000	MG/KG
LAW	Total Polynuclear Aromatic Hydrocarbons	SS15	0.84	=	NA	NA	NA	MG/KG
LAW	Total Polynuclear Aromatic Hydrocarbons	SS16	27.67	=	NA	NA	NA	MG/KG
LAW	Total Polynuclear Aromatic Hydrocarbons	SS17	8.04	=	NA	NA	NA	MG/KG
LAW	Total Polynuclear Aromatic Hydrocarbons	SS19	18.92	=	NA	NA	NA	MG/KG
LAW	Total Polynuclear Aromatic Hydrocarbons	SS46	0.91	=	NA	NA	NA	MG/KG

Notes:
1. Detected values are obtained from the *Draft Parcel 35 Report-Screening Sites Sampling Program for Defense Depot Memphis, TN*, CH2M HILL, 1997, and the *Remedial Investigation at DDMT Final Report*, Law Environmental, August 1990.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. Risk-Based Concentrations are obtained from the *EPA Region III Risk-based Concentrations Table*, R. L. Smith, April, 1997.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
J - indicates estimated value above the detection limit but below the reporting limit.
= - indicates unqualified detection.

Table 33-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 33
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	ACETONE	SB33B	38 to 40	0.005	J	NA	16	MG/KG
CH2M HILL	ACETONE	SB33C	18 to 20	0.01	J	NA	16	MG/KG
CH2M HILL	ACETONE	SB33C	3 to 5	0.004	J	NA	16	MG/KG
CH2M HILL	ACETONE	SB33C	38 to 40	0.004	J	NA	16	MG/KG
CH2M HILL	ACETONE	SB33C	8 to 10	0.007	J	NA	16	MG/KG
CH2M HILL	ANTIMONY	SB33A	8 to 10	7.8	=	NA	5	MG/KG
CH2M HILL	ARSENIC	SB33A	18 to 20	5	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB33A	4 to 6	19.2	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB33A	8 to 10	22.3	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB33B	18 to 20	3.9	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB33B	38 to 40	2.1	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB33B	4 to 6	9	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB33B	8 to 10	17.6	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB33C	18 to 20	6.9	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB33C	3 to 5	9.3	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB33C	38 to 40	5.6	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB33C	8 to 10	14.9	=	17	29	MG/KG
CH2M HILL	BERYLLIUM	SB33A	4 to 6	1.5	=	1.2	63	MG/KG
CH2M HILL	BERYLLIUM	SB33A	8 to 10	1.7	=	1.2	63	MG/KG
CH2M HILL	BERYLLIUM	SB33B	4 to 6	1	=	1.2	63	MG/KG
CH2M HILL	BERYLLIUM	SB33B	8 to 10	1.3	=	1.2	63	MG/KG
CH2M HILL	BERYLLIUM	SB33C	3 to 5	1.1	=	1.2	63	MG/KG
CH2M HILL	BERYLLIUM	SB33C	8 to 10	1.5	=	1.2	63	MG/KG
CH2M HILL	BROMOMETHANE	SB33A	18 to 20	0.003	J	NA	.2	MG/KG
CH2M HILL	CADMIUM	SB33A	8 to 10	1.5	=	1.4	8	MG/KG
CH2M HILL	CHLOROMETHANE	SB33A	18 to 20	0.002	J	NA	.0122	MG/KG

Table 33-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 33
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	CHROMIUM, TOTAL	SB33A	18 to 20	18.4	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB33A	38 to 40	7.5	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB33A	4 to 6	58.6	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB33A	8 to 10	49.7	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB33B	18 to 20	16	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB33B	38 to 40	12.5	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB33B	4 to 6	44.1	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB33B	8 to 10	43.1	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB33C	18 to 20	24.9	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB33C	3 to 5	40.1	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB33C	38 to 40	26.6	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB33C	8 to 10	40.7	=	26	38	MG/KG
CH2M HILL	COPPER	SB33A	18 to 20	9.2	=	33	NA	MG/KG
CH2M HILL	COPPER	SB33A	4 to 6	24.5	=	33	NA	MG/KG
CH2M HILL	COPPER	SB33A	8 to 10	37.5	=	33	NA	MG/KG
CH2M HILL	COPPER	SB33B	18 to 20	9.2	=	33	NA	MG/KG
CH2M HILL	COPPER	SB33B	38 to 40	2.6	=	33	NA	MG/KG
CH2M HILL	COPPER	SB33B	4 to 6	16.8	=	33	NA	MG/KG
CH2M HILL	COPPER	SB33B	8 to 10	32.6	=	33	NA	MG/KG
CH2M HILL	COPPER	SB33C	18 to 20	12.6	=	33	NA	MG/KG
CH2M HILL	COPPER	SB33C	3 to 5	21.5	=	33	NA	MG/KG
CH2M HILL	COPPER	SB33C	38 to 40	7.6	=	33	NA	MG/KG
CH2M HILL	COPPER	SB33C	8 to 10	37.6	=	33	NA	MG/KG
CH2M HILL	LEAD	SB33A	18 to 20	10.4	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB33A	38 to 40	1.1	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB33A	4 to 6	30	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB33A	8 to 10	28.5	=	24	1.5	MG/KG

Table 33-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 33
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	LEAD	SB33B	18 to 20	7.7	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB33B	38 to 40	3.1	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB33B	4 to 6	20.4	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB33B	8 to 10	30.8	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB33C	18 to 20	12.3	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB33C	3 to 5	19.3	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB33C	38 to 40	28.9	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB33C	8 to 10	20	=	24	1.5	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SB33A	18 to 20	0.002	J	NA	.02	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SB33A	4 to 6	0.002	J	NA	.02	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SB33B	4 to 6	0.001	J	NA	.02	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SB33C	3 to 5	0.001	J	NA	.02	MG/KG
CH2M HILL	METHYLENE CHLORIDE	SB33C	8 to 10	0.002	J	NA	.02	MG/KG
CH2M HILL	NICKEL	SB33A	18 to 20	11.5	=	37	130	MG/KG
CH2M HILL	NICKEL	SB33A	38 to 40	5.2	=	37	130	MG/KG
CH2M HILL	NICKEL	SB33A	4 to 6	29.8	=	37	130	MG/KG
CH2M HILL	NICKEL	SB33A	8 to 10	25	=	37	130	MG/KG
CH2M HILL	NICKEL	SB33B	18 to 20	8.2	=	37	130	MG/KG
CH2M HILL	NICKEL	SB33B	38 to 40	6	=	37	130	MG/KG
CH2M HILL	NICKEL	SB33B	4 to 6	25.2	=	37	130	MG/KG
CH2M HILL	NICKEL	SB33B	8 to 10	27.5	=	37	130	MG/KG
CH2M HILL	NICKEL	SB33C	18 to 20	8.8	=	37	130	MG/KG
CH2M HILL	NICKEL	SB33C	3 to 5	25	=	37	130	MG/KG
CH2M HILL	NICKEL	SB33C	38 to 40	11.5	=	37	130	MG/KG
CH2M HILL	NICKEL	SB33C	8 to 10	35.2	=	37	130	MG/KG
CH2M HILL	ZINC	SB33A	18 to 20	24.6	=	110	12000	MG/KG
CH2M HILL	ZINC	SB33A	38 to 40	10.5	=	110	12000	MG/KG
CH2M HILL	ZINC	SB33A	4 to 6	67.4	=	110	12000	MG/KG
CH2M HILL	ZINC	SB33A	8 to 10	70.9	=	110	12000	MG/KG
CH2M HILL	ZINC	SB33B	18 to 20	27.8	=	110	12000	MG/KG
CH2M HILL	ZINC	SB33B	38 to 40	28.7	=	110	12000	MG/KG

Table 33-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 33
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	ZINC	SB33B	4 to 6	65.7	=	110	12000	MG/KG
CH2M HILL	ZINC	SB33B	8 to 10	79.9	=	110	12000	MG/KG
CH2M HILL	ZINC	SB33C	18 to 20	24.2	=	110	12000	MG/KG
CH2M HILL	ZINC	SB33C	3 to 5	64	=	110	12000	MG/KG
CH2M HILL	ZINC	SB33C	38 to 40	40	=	110	12000	MG/KG
CH2M HILL	ZINC	SB33C	8 to 10	85.8	=	110	12000	MG/KG
LAW	ACETONE	STB-5-1	16 to 21	0.018	=	NA	16	MG/KG
LAW	ACETONE	STB-5-2	78 to 83	0.014	=	NA	16	MG/KG
LAW	ACETONE	STB-5-3	83 to 88	0.014	=	NA	16	MG/KG
LAW	bis(2-ETHYLHEXYL) PHTHALATE	STB-5-1	16 to 21	0.45	=	NA	3600	MG/KG
LAW	bis(2-ETHYLHEXYL) PHTHALATE	STB-5-2	78 to 83	0.44	=	NA	3600	MG/KG
LAW	bis(2-ETHYLHEXYL) PHTHALATE	STB-5-3	83 to 88	0.32	J	NA	3600	MG/KG
LAW	METHYLENE CHLORIDE	STB-5-1	16 to 21	0.013	=	NA	.02	MG/KG
LAW	METHYLENE CHLORIDE	STB-5-2	78 to 83	**0.021**	=	NA	.02	MG/KG
LAW	METHYLENE CHLORIDE	STB-5-3	83 to 88	0.012	=	NA	.02	MG/KG

Notes:

1. Detected values are obtained from the *Draft Parcel 35 Report-Screening Sites Sampling Program for Defense Depot Memphis, TN*, CH2M HILL, 1997, and the *Remedial Investigation at DDMT Final Report*, Law Environmental, August 1990.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. RBC-GWP values are obtained from the *EPA Region III Risk-based Concentrations Table*, R. L. Smith, April, 1997.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
= - indicates unqualified detection
J - indicates estimated value above the detection limit but below the reporting limit.
RBC-GWP - Risk-Based Concentrations - Groundwater Protection

TAB

All Grassed Areas

All Grassed Areas

Screening Sites Sampling Program

for

Defense Distribution Depot Memphis, Tennessee

March 1998

Prepared for

U.S. Army Engineering and Support Center, Huntsville

Prepared by

CH2M HILL

2567 Fairlane Drive

Montgomery, Alabama 36116

137449.RR.ZZ

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Multiple Parcel Report
All Grassed Areas
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

This report presents results from the Screening Sites Sampling Program for multiple parcels containing grassed areas at the Defense Distribution Depot Memphis, Tennessee (DDMT).

The screening site in this document, Screening Site 73 – All Grassed Areas, was identified by DDMT through a review of existing documents, interviews with facility personnel, and knowledge of the facility's operations. Screening sites are locations at DDMT where there is a potential for materials to have been released to the environment from past operations.

Sites where there is a confirmed presence of contaminants from past operations are addressed in the Remedial Investigation Sampling Program. Other facilities have been addressed in the Base Realignment and Closure (BRAC) Sampling Program. Results of these programs are addressed in separate reports.

The purpose of the Screening Sites Sampling Program is to identify whether past activities at each of the sites have resulted in releases from the site that would require further investigation. The intent is not necessarily to fully delineate the extent of soil or groundwater contamination attributable to past operations, but to conduct technically based screening analyses sufficient to identify the nature and likelihood of contamination.

The purpose of this letter report is to evaluate the results of the Screening Sites Sampling Program and sampling from previous investigations and to recommend No Further Action or further investigation. The remainder of this report presents the results of past investigations; Screening Sites Sampling Program strategy, procedures, and results; and recommendations for each site.

Surface soils, subsurface soils, surface water, and sediments were investigated as part of the Screening Sites Sampling Program. Surface soil samples (any sample whose lowest depth is two feet or less) were taken both as independent samples and as the upper interval of a soil boring profile. Thus, surface soil samples taken as part of a soil boring may have an "SB" designation and are initially discussed under Subsurface Soil Sampling Procedure (Section 2.2.2.2). However, the results from that upper interval are presented in the surface soils tables and discussions in Section 3.0.

Screening Site 73—All Grassed Areas

1.0 Introduction

Screening Site 73 is a site located in multiple parcels and includes all grassed areas at the facility. Pesticides have been detected throughout the DDMT in surface soils in previous studies at the facility. These constituents are the result of the routine direct application of pesticides.

Screening Site 73 was not investigated independently during the Screening Sites Sampling Program because pesticide contamination is known to exist throughout the facility. However, pesticides were analyzed for surface soil samples at sites across DDMT to evaluate the pesticides issue.

Samples were during this field effort from the following parcels: 3, 4, 15, 21, 23, and 29. There are also grassed areas in several other parcels at the facility. For this phase of the program, only surface soil samples were collected and analyzed to characterize Screening Site 73.

2.0 Study Investigation Area

2.1 Previous Investigations

No previous investigations were performed specifically at the Sitewide Grassed Areas. However, data from the *Remedial Investigations at DDMT, Final Report* (Law Environmental, 1990) were included that were taken in grassed areas for other sites and purposes. These data are discussed in Section 3.1.

2.1.1 Surface Soil

A total of 55 surface soil samples were collected from grassed areas at 13 different screening sites. Thirty-nine of these samples from 11 screening sites were submitted for analysis of pesticides. The 11 sites are listed in the table below:

Parcel	Site Number	Site Name
15	36	Hazardous Materials Storage Area
3	51	Lake Danielson Outlet Stormwater Drainage Ditch
3	52	Golf Course Pond Outlet Drainage Ditch
15	54	DRMO East Stormwater Drainage Canal
29	56	West Stormwater Drainage Canal
4	67	Installation Gas Station, Building 257
3	69	Flamethrower Liquid Fuel Application
15	74	Flammables, Toxics (West End Building 319)
21	75	Unknown Wastes near Building 689
21	76	Unknown Wastes near Building 690
23	82	Flammables Buildings 783 and 793

2.2 Screening Site Sampling Program

2.2.1 Sampling Strategy

The sampling strategy was developed to evaluate whether releases have occurred to surface soils. The following sections present the sampling procedures and laboratory analyses performed for surface and subsurface soils.

Screening Site 73 was not investigated independently because pesticides are known to exist in surface soil sitewide. Surface soil samples from grassed areas for sites across DDMT were analyzed for pesticides to provide a basis for evaluating grassed areas.

2.2.2 Surface Soil Sampling Procedures

The locations of the surface soil samples associated with Screening Site 73 are shown in Figure 1.

2.2.2.2 Subsurface Soil Sampling Procedures

Subsurface soil sampling was not performed for Screening Site 73 because the primary concern is with surface application of pesticides.

2.3 Analytical Procedures

Thirty nine surface soil samples were sent to CH2M HILL's Analytical Services in Montgomery, Alabama for pesticides analyses. Samples received at the laboratory were analyzed in accordance with the procedures outlined in the *Generic Quality Assurance Project Plan* (CH2M HILL, 1995).

A data quality evaluation (DQE) was performed to assess the effect of the overall analytical process on the usability of the data. The DQE established that the detection of acetone and bis(2-ethylhexyl)phthalate can be attributed to field sampling and laboratory contamination rather than environmental conditions at the site. Also, low concentrations of dioxins and furans can be attributed to background or instrument noise and are not indicative of environmental conditions. With exception to the qualifications listed above, the DQE concluded that data can be used in the project decision-making process.

3.0 Interpretation of Sampling Results

3.1 Presentation of Results

Sections 3.1.1 through 3.1.4 present results of the Screening Sites Sampling Program for Screening Site 73. Data are for surface soil only. Data are compared with appropriate screening criteria in Table 73-A. Data from the 1997 CH2M HILL investigation are presented along with historical data from the *Remedial Investigations at DDMT, Final Report* (Law Environmental, 1990). If a value from a sampling location exceeds one of the comparison criteria, that value and the comparison criterion are shown in bold on the summary table.

Constituents of potential concern (COPCs) are parameters that exceed both background values and the screening criteria. Where concentrations exceed the selected background value, the concentration is compared with the observed range of background values as reviewed and established by the BRAC Cleanup Team (BCT).

Pesticides including dieldrin, dichlorodiphenyldichloroethene (DDE), and dichlorodiphenyltrichloroethane (DDT) were found at concentrations exceeding background and screening criteria.

Dieldrin was found in 32 samples at concentrations ranging from 0.0012 milligrams per kilogram (mg/kg) (estimated) to 0.75 mg/kg (estimated). Twelve values exceeded the residential risk-based concentration (RBC) for soil ingestion of 0.04 mg/kg. However, only the highest result (0.75 mg/kg in Sample SS52B) exceeded the industrial RBC of 0.36 mg/kg.

DDE was found in 22 samples at concentrations ranging from 0.0026 mg/kg (estimated) to 0.43 mg/kg. None of the values exceeded the residential RBC for soil ingestion of 1.9 mg/kg.

DDT was found in 21 samples at concentrations from 0.0039 to 6.7 mg/kg. The highest detected value, 6.7 mg/kg in Sample SS52B, exceeded the residential, but not the industrial. RBC for soil ingestion.

3.2 Vertical and Lateral Extent

Pesticides—including dieldrin, DDE, and DDT—are found in surface soil sitewide at DDMT. Data collected in subsurface soils at other screening sites indicates that pesticides are not typically present in subsurface soil. These chlorinated pesticides are no longer in use and have not been applied since the 1950s. Their occurrence indicates their persistence in the environmental media, mostly surface soils and sediments. Dieldrin data are further discussed and additional data are presented in the Executive Summary that accompanies this multiple parcel report.

3.3 Potential Migration Pathways

The following paragraphs discuss potential migration pathways for several constituents found at Screening Site 73.

Dieldrin exists at the DDMT in surface and subsurface soils. Since this compound is only minutely soluble in water, its most likely migration pathway at this site is via erosion as suspended soil particles in the surface water where it potentially would be available to aquatic organisms. Dieldrin in the subsurface soils should be relatively immobile and should not impact groundwater quality. Dieldrin is typically found only in surface soil and is not found in subsurface soils.

DDT and two of its degradation breakdown products, DDD and DDE, exist in surface soils at the DDMT and should not be mobile in this environment. These compounds have an extremely high affinity for soil and are essentially insoluble in water. Surface soils containing these pesticides potentially would be moved through wind action and/or as suspended material in surface water. DDT also was reported in sediments at two sites on the DDMT, indicating migration via this pathway has occurred. These compounds can bioaccumulate and become

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Chemical	Concentration	Q
DIELDRIN	0.009	J

Chemical	Concentration	Q
DDT	5.9	=

Chemical	Concentration	Q
DIELDRIN	0.1	=

SS-79B

SS-79A

SS-5

SS-24

Chemical	Concentration	Q
DIELDRIN	0.12	=

SS-21

Chemical	Concentration	Q
DIELDRIN	0.13	=

Chemical	Concentration	Q
DIELDRIN	0.076	=

SS-22

SS-23

Chemical	Concentration	Q
DIELDRIN	0.16	=

SS-67B

Chemical	Concentration	Q
DIELDRIN	0.006	J

Chemical	Concentration	Q
DIELDRIN	0.063	J

Chemical	Concentration	Q
DDE	2	=
DIELDRIN	0.76	=

SS-68A

SS-82A

SS-82B

SB-75A

SS-51A

SS-12

SS-13

Chemical	Concentration	Q
DIELDRIN	0.83	=

Chemical	Concentration	Q
DIELDRIN	0.0069	J

SS-52D

SB-51C

SB-51B

Chemical	Concentration	Q
DDT	7.4	=

SS-82C

SS-82D

SS-16

SS-52C

SB-78C

SS-52B

SS-14

SB-76A

SB-76B

SB-52A

SS-52A

Chemical	Concentration	Q
DIELDRIN	0.29	=

Chemical	Concentration	Q
DIELDRIN	0.0041	=

SS-51C

SB-51A

SB-51B

Chemical	Concentration	Q
DIELDRIN	0.025	J

Chemical	Concentration	Q
DIELDRIN	2.9	=

Chemical	Concentration	Q
DIELDRIN	0.048	=

N

W E

S

MAP SCALE: 1" = 800'

Sampling locations without data boxes had no constituents exceeding risk-based criteria

LEGEND

- Surface Soil Sampling Location (mg/kg)
- Soil Boring Sampling Location (mg/kg)

(Q) Qualifer Definitions
= - indicates unqualified detection
J - indicates estimated value above detection limit, but below reporting limit.

Figure 1, Sheet 1
Site 73, All Grassed Areas
Constituents Exceeding Risk-Based Criteria
Defense Distribution Depot Memphis, TN

CH2MHILL

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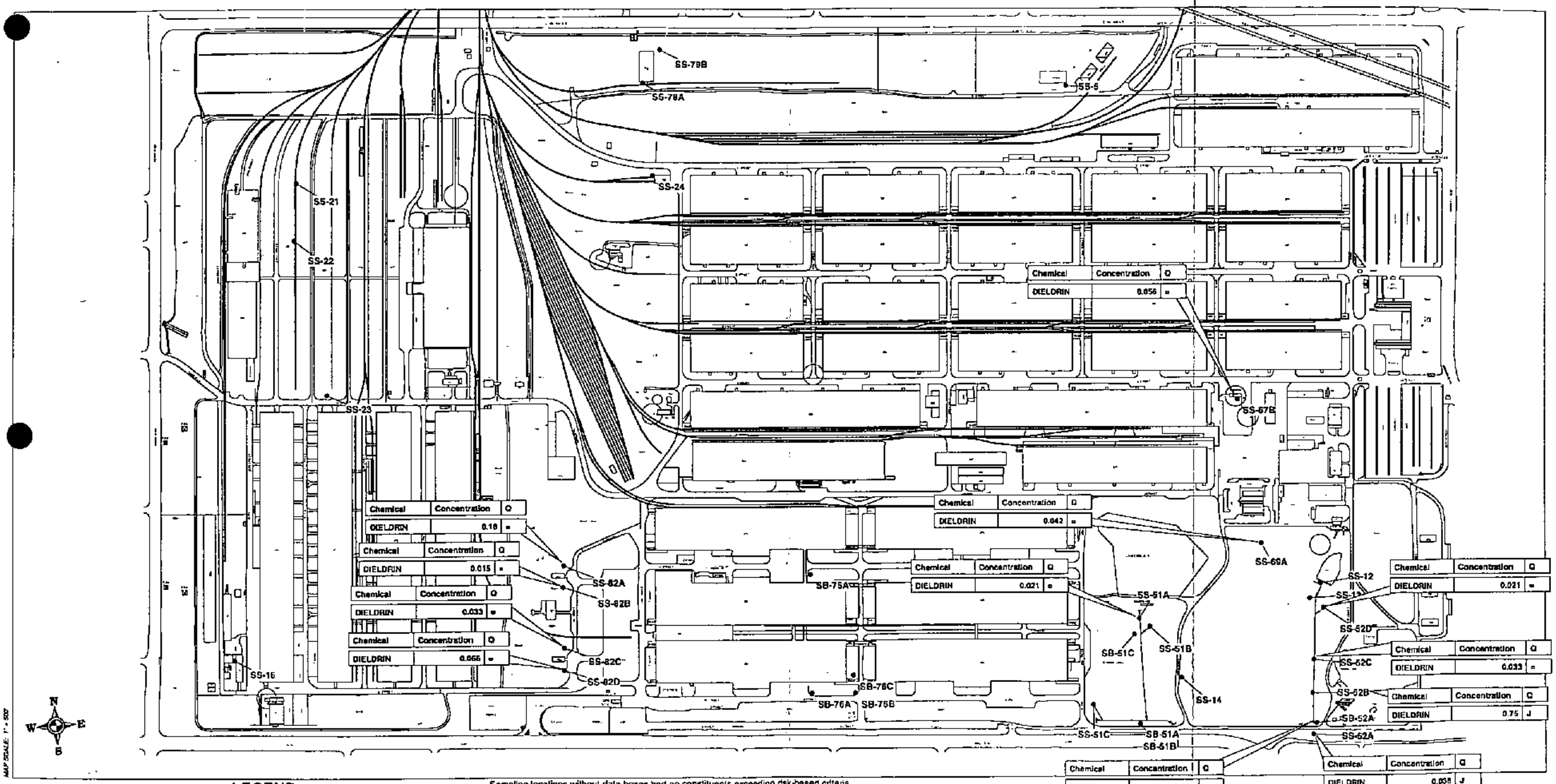

MAP SCALE: 1" = 500'

Sampling locations without data boxes had no constituents exceeding risk-based criteria

LEGEND

- Surface Soil Sampling Location (mg/kg)
- Soil Boring Sampling Location (mg/kg)

(Q) Qualifier Definitions
= - indicates unqualified detection
J - indicates estimated value above detection limit, but below reporting limit.

Figure 1, Sheet 2
Site 73, All Grassed Areas
Constituents Exceeding Risk-Based Criteria
Defense Distribution Depot Memphis, TN

CH2MHILL

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more concentrated as they move up in the food chain and could potentially affect receptors via this migration pathway.

3.4 Additional Data Needs

There are no additional data needs specifically identified at this time for Screening Site 73. A risk assessment for dieldrin is being conducted as part of a sitewide evaluation of this pesticide. Additional dieldrin data, presented in the Executive Summary accompanying this multiple parcel report, will be included in the sitewide evaluation.

4.0 Interpretation of Screening Criteria Comparisons

4.1 Methodology

A preliminary risk evaluation (PRE) has not been conducted specifically for Screening Site 73.

4.2 Screening Site 73 Risk

A risk estimation was not performed for these samples from the grassed areas. Based on the detected pesticide concentrations, risks from dieldrin and DDT are likely to exceed a 10^{-6} levels, primarily due to dieldrin.

5.0 Summary and Recommendations

5.1 Summary

Pesticides have been applied on a routine basis sitewide since the 1950s. Pesticides—including dieldrin, DDE, and DDT—were found in surface soils on a sitewide basis at concentrations exceeding background and screening criteria.

5.2 Recommendations

A risk evaluation is recommended to evaluate pesticides that have been observed in surface soil on a sitewide basis at DDMT. Depending on the outcome of the risk evaluation, this site may require no further action or additional remediation. Critical evaluation of the need for remediation is recommended because the cost benefit aspects may present challenge due to the widespread nature of pesticides in surface soil. Potential remedial alternatives include implementing institutional controls, providing cover for surface soils to eliminate the exposure pathway, removing the surface soils for off-site disposal, and implementing *in situ* treatment for pesticides.

Table 73-A
Summary of Detected Pesticides in Surface Soils
Compared to Screening Levels for Site 73
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	Risk-Based Concentrations Soil Ingestion[4]		Units
						Residential	Industrial	
CH2M HILL	DIELDRIN	SB36B	0.0014	J	.086	.04	.36	MG/KG
CH2M HILL	DIELDRIN	SB36C	0.0012	J	.086	.04	.36	MG/KG
CH2M HILL	DIELDRIN	SB51A	0.025	J	.086	.04	.36	MG/KG
CH2M HILL	DIELDRIN	SB51B	0.048	=	.086	.04	.36	MG/KG
CH2M HILL	DIELDRIN	SB51C	0.063	J	.086	.04	.36	MG/KG
CH2M HILL	DIELDRIN	SS51A	0.021	=	.086	.04	.36	MG/KG
CH2M HILL	DIELDRIN	SS51B	0.32	=	.086	.04	.36	MG/KG
CH2M HILL	DIELDRIN	SS51C	0.14	=	.086	.04	.36	MG/KG
CH2M HILL	DIELDRIN	SB52A	0.29	J	.086	.04	.36	MG/KG
CH2M HILL	DIELDRIN	SB52A	0.022	=	.086	.04	.36	MG/KG
CH2M HILL	DIELDRIN	SB52B	0.0013	J	.086	.04	.36	MG/KG
CH2M HILL	DIELDRIN	SS52A	0.038	J	.086	.04	.36	MG/KG
CH2M HILL	DIELDRIN	SS52B	0.75	J	.086	.04	.36	MG/KG
CH2M HILL	DIELDRIN	SS52C	0.033	=	.086	.04	.36	MG/KG
CH2M HILL	DIELDRIN	SS52D	0.021	=	.086	.04	.36	MG/KG
CH2M HILL	DIELDRIN	SB54B	0.12	=	.086	.04	.36	MG/KG
CH2M HILL	DIELDRIN	SS54A	0.0034	J	.086	.04	.36	MG/KG
CH2M HILL	DIELDRIN	SS54A	0.0036	J	.086	.04	.36	MG/KG
CH2M HILL	DIELDRIN	SS56A	0.0027	J	.086	.04	.36	MG/KG
CH2M HILL	DIELDRIN	SS67B	0.056	=	.086	.04	.36	MG/KG
CH2M HILL	DIELDRIN	SS69A	0.042	=	.086	.04	.36	MG/KG
CH2M HILL	DIELDRIN	SB74B	0.0031	J	.086	.04	.36	MG/KG
CH2M HILL	DIELDRIN	SB74C	0.0015	J	.086	.04	.36	MG/KG
CH2M HILL	DIELDRIN	SB75A	0.006	J	.086	.04	.36	MG/KG
CH2M HILL	DIELDRIN	SB76A	0.29	=	.086	.04	.36	MG/KG
CH2M HILL	DIELDRIN	SB76B	0.0041	=	.086	.04	.36	MG/KG
CH2M HILL	DIELDRIN	SB76C	0.0069	J	.086	.04	.36	MG/KG
CH2M HILL	DIELDRIN	SB82C	0.0038	J	.086	.04	.36	MG/KG
CH2M HILL	DIELDRIN	SS82A	0.18	=	.086	.04	.36	MG/KG
CH2M HILL	DIELDRIN	SS82B	0.015	=	.086	.04	.36	MG/KG
CH2M HILL	DIELDRIN	SS82C	0.033	=	.086	.04	.36	MG/KG

Table 73-A
Summary of Detected Pesticides in Surface Soils
Compared to Screening Levels for Site 73
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	Risk-Based Concentrations Soil Ingestion[4]		Units
						Residential	Industrial	
CH2M HILL	DIELDRIN	SS82D	0.066	=	.086	.04	.36	MG/KG
LAW	DIELDRIN	SS12	0.76	=	.086	.04	.36	MG/KG
LAW	DIELDRIN	SS13	0.83	=	.086	.04	.36	MG/KG
LAW	DIELDRIN	SS25	0.036	=	.086	.04	.36	MG/KG
CH2M HILL	p,p'-DDE	SB51A	0.044	=	.16	1.9	17	MG/KG
CH2M HILL	p,p'-DDE	SB51B	0.08	=	.16	1.9	17	MG/KG
CH2M HILL	p,p'-DDE	SB51C	0.038	J	.16	1.9	17	MG/KG
CH2M HILL	p,p'-DDE	SS51A	0.022	=	.16	1.9	17	MG/KG
CH2M HILL	p,p'-DDE	SS51B	0.1	=	.16	1.9	17	MG/KG
CH2M HILL	p,p'-DDE	SS51C	0.039	J	.16	1.9	17	MG/KG
CH2M HILL	p,p'-DDE	SB52A	0.43	J	.16	1.9	17	MG/KG
CH2M HILL	p,p'-DDE	SB52A	0.0084	=	.16	1.9	17	MG/KG
CH2M HILL	p,p'-DDE	SB52B	0.0043	J	.16	1.9	17	MG/KG
CH2M HILL	p,p'-DDE	SS52A	0.025	J	.16	1.9	17	MG/KG
CH2M HILL	p,p'-DDE	SS52C	0.03	=	.16	1.9	17	MG/KG
CH2M HILL	p,p'-DDE	SS52D	0.0064	J	.16	1.9	17	MG/KG
CH2M HILL	p,p'-DDE	SS52E	0.039	=	.16	1.9	17	MG/KG
CH2M HILL	p,p'-DDE	SB54A	0.005	J	.16	1.9	17	MG/KG
CH2M HILL	p,p'-DDE	SB54B	0.014	J	.16	1.9	17	MG/KG
CH2M HILL	p,p'-DDE	SB54B	0.017	J	.16	1.9	17	MG/KG
CH2M HILL	p,p'-DDE	SS54A	0.0029	J	.16	1.9	17	MG/KG
CH2M HILL	p,p'-DDE	SS54A	0.0026	J	.16	1.9	17	MG/KG
CH2M HILL	p,p'-DDE	SS67B	0.01	J	.16	1.9	17	MG/KG
CH2M HILL	p,p'-DDE	SB75A	0.015	=	.16	1.9	17	MG/KG
CH2M HILL	p,p'-DDE	SB76B	0.0044	=	.16	1.9	17	MG/KG
CH2M HILL	p,p'-DDE	SB76C	0.015	=	.16	1.9	17	MG/KG
LAW	DDE	SS12	2	=	.16	1.9	17	MG/KG
LAW	DDE	SS13	0.34	=	.16	1.9	17	MG/KG
CH2M HILL	p,p'-DDT	SB51A	0.044	=	.074	1.9	17	MG/KG
CH2M HILL	p,p'-DDT	SB51B	0.09	=	.074	1.9	17	MG/KG
CH2M HILL	p,p'-DDT	SB51C	0.56	=	.074	1.9	17	MG/KG

Table 73-A
Summary of Detected Pesticides in Surface Soils
Compared to Screening Levels for Site 73
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	Risk-Based Concentrations Soil Ingestion[4]		Units
						Residential	Industrial	
CH2M HILL	p,p'-DDT	SS51A	0.043	=	.074	1.9	17	MG/KG
CH2M HILL	p,p'-DDT	SS51B	0.077	J	.074	1.9	17	MG/KG
CH2M HILL	p,p'-DDT	SB52A	0.24	J	.074	1.9	17	MG/KG
CH2M HILL	p,p'-DDT	SB52A	0.024	=	.074	1.9	17	MG/KG
CH2M HILL	p,p'-DDT	SB52B	0.0052	J	.074	1.9	17	MG/KG
CH2M HILL	p,p'-DDT	SB52B	0.021	=	.074	1.9	17	MG/KG
CH2M HILL	p,p'-DDT	SS52A	0.21	=	.074	1.9	17	MG/KG
CH2M HILL	p,p'-DDT	SS52B	**6.7**	=	.074	**1.9**	17	MG/KG
CH2M HILL	p,p'-DDT	SS52C	0.073	=	.074	1.9	17	MG/KG
CH2M HILL	p,p'-DDT	SS52D	0.0069	J	.074	1.9	17	MG/KG
CH2M HILL	p,p'-DDT	SS52E	0.042	=	.074	1.9	17	MG/KG
CH2M HILL	p,p'-DDT	SB54A	0.0056	J	.074	1.9	17	MG/KG
CH2M HILL	p,p'-DDT	SS54A	0.0042	=	.074	1.9	17	MG/KG
CH2M HILL	p,p'-DDT	SS54A	0.0039	J	.074	1.9	17	MG/KG
CH2M HILL	p,p'-DDT	SS67B	0.064	=	.074	1.9	17	MG/KG
CH2M HILL	p,p'-DDT	SB75A	0.036	=	.074	1.9	17	MG/KG
CH2M HILL	p,p'-DDT	SB76B	0.0099	=	.074	1.9	17	MG/KG
CH2M HILL	p,p'-DDT	SB76C	0.019	=	.074	1.9	17	MG/KG
LAW	DDT	SS12	**0.87**	=	.074	1.9	17	MG/KG
LAW	DDT	SS13	**0.29**	=	.074	1.9	17	MG/KG

Notes:
1. Detected values are obtained from the *Draft Parcel 3, 4, 15, 21, 22, 23 and 29 Report-Screening Sites Sampling Program for Defense Depot Memphis, TN*, CH2M HILL, 1997, and the *Remedial Investigation at DDMT Final Report*, Law Environmental, August 1990.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. Risk-Based Concentrations are obtained from the *EPA Region III Risk-based Concentrations Table*, R.L. Smith, April, 1997.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
= - indicates unqualified detection.
J - indicates estimated value above the detection limit but below the reporting limit.

TAB

Off-Site Drainage Pathways

Off-Site Drainage Pathways

Screening Sites Sampling Program

for

Defense Distribution Depot Memphis, Tennessee

March 1998

Prepared for

U.S. Army Engineering and Support Center, Huntsville

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Multiple Parcel Report
Off-Site Drainage Pathways
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

This unnumbered site, Off-Site Drainage Pathways, is a site located in multiple parcels. Parcels 3, 15, and 29 contain off-site drainage pathways where sediment samples were collected. The remaining drainage pathways are found in or adjacent to Dunn Field, Operable Unit (OU)-1 (Parcel 36). For this phase of the program, sediment samples were collected and analyzed to characterize the Off-Site Drainage Pathways Site.

The screening sites in this document have been identified by the Defense Distribution Depot Memphis, Tennessee (DDMT) through a review of existing documents, interviews with facility personnel, and knowledge of the facility's operations. Screening sites are locations at DDMT where there is a potential for materials to have been released to the environment from past operations. Parcels with drainage areas contained in this multiple parcel report include the following:

- Parcel 3—Lake Danielson, Golf Course Pond
- Parcel 15—Defense Reutilization and Marketing Office (DRMO) Yard, 319
- Parcel 29—West Storm Water Canal
- Parcel 36—Dunn Field

Sites where there is a confirmed presence of contaminants from past operations are addressed in the Remedial Investigation Sampling Program. Other facilities have been addressed in the Base Realignment and Closure (BRAC) Sampling Program. Results of these programs are addressed in separate reports.

The purpose of the Screening Sites Sampling Program is to identify whether past activities at each site have resulted in releases from the site that would require further investigation. The intent is not to fully delineate the nature and extent of soil or groundwater contamination attributable to past operations, but to conduct technically based screening analyses sufficient to identify the likelihood of contamination.

The purpose of this letter report is to evaluate the results of the Screening Sites Sampling Program and sampling from previous investigations and to recommend No Further Action or further investigation at screening sites in this parcel. The remainder of this report presents the results of past investigations; Screening Sites Sampling Program strategy, procedures, and results; and recommendations for each site.

Off-Site Drainage Pathways Site

The chart below presents the location and status information for this screening site.

Parcel	Building Number	RI/FS[1] OU	Site Number	CERCLA[2] Status
3	Lake Danielson, Golf Course Pond	3	None	Screening
15	DRMO Yard, 319	4	None	Screening
29	West Storm Water Canal	4	None	Screening
36	Dunn Field	1	None	Screening

[1]RI/FS: Remedial Investigation/Feasibility Study
[2]CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act

The Off-Site Drainage Pathways Site consists of drainage pathways that leave the Main Installation and Dunn Field and an off-site drainage ditch west of Dunn Field. Sampling sites included concrete culverts, shallow drainage ditches, topographic depressions, shallow open ditches, and locations downstream from storm sewer outfalls.

2.0 Study Investigation Area

2.1 Previous Investigations

No previous sampling data exist for the Off-Site Drainage Pathways Site.

2.2 Screening Site Sampling Program

2.2.1 Sampling Strategy

The sampling strategy was developed to evaluate whether releases have occurred to sediment. The following sections present the sampling procedures and laboratory analyses performed for sediment.

2.2.2 Sampling Procedures

Sections 2.2.2.1 through 2.2.2.3 describe the sampling procedures and laboratory analyses performed for sediment.

2.2.2.1 Sediment Sampling Procedures

Sediment samples were collected from 18 off-site drainage pathway locations (SD1, SD2, SD3, SD4, SD5, SD6, SD7, SD8, SD9, SD10, SD11, SD12, SD14, SD15, SD16, SD17, SD18, and SD19) to assess the presence of contaminants in sediment from operations at the DDMT. The 18 sampling locations are shown in Figure 1. A nineteenth location was planned at the intersection of LaPaloma and Murley Streets, but it was not possible to obtain a sample from this site. Sampling and analysis for this site were performed by EDAW, Inc. and EARTH TECH as subcontracted to EDAW, Inc.

Chemical	Concentration	Q
ANTHRACENE	0.12	J
BENZO(a)ANTHRACENE	0.55	=
BENZO(a)PYRENE	0.53	=
CHRYSENE	0.6	=
ENDRIN	0.013	J
FLUORANTHENE	1.1	=
FLUORENE	0.036	J
LEAD	76.7	=
p,p'-DDD	0.012	J
p,p'-DDE	0.012	J
p,p'-DDT	0.039	J
PHENANTHRENE	0.61	=
PYRENE	0.84	=
ZINC	154	=

Chemical	Concentration	Q
ANTHRACENE	0.27	J
BENZO(a)ANTHRACENE	1.2	J
BENZO(a)PYRENE	1.4	J
CHRYSENE	1.4	J
COPPER	41.5	=
ENDRIN	0.01	J
FLUORANTHENE	2.6	J
FLUORENE	0.068	J
LEAD	146	=
p,p'-DDD	0.0059	J
p,p'-DDE	0.0068	J
p,p'-DDT	0.019	J
PHENANTHRENE	1.5	J
PYRENE	2.2	J
ZINC	247	=

Chemical	Concentration	Q
LEAD	89	=
ZINC	92.1	=

Chemical	Concentration	Q
BENZO(a)ANTHRACENE	0.67	=
BENZO(a)PYRENE	0.55	=
CHRYSENE	0.51	=
ENDRIN	0.015	J
FLUORANTHENE	0.83	=
FLUORENE	0.039	J
p,p'-DDD	0.0058	J
p,p'-DDE	0.0081	J
PHENANTHRENE	0.46	=
PYRENE	0.9	=

Chemical	Concentration	Q
ANTHRACENE	0.2	J
BENZO(a)ANTHRACENE	0.89	=
BENZO(a)PYRENE	0.96	=
CHRYSENE	1	=
ENDRIN	0.014	J
FLUORANTHENE	1.8	=
FLUORENE	0.1	J
p,p'-DDD	0.011	J
p,p'-DDE	0.029	J
p,p'-DDT	0.093	J
PHENANTHRENE	1.5	=
PYRENE	2.5	=

duplicate sample

Chemical	Concentration	Q
ANTHRACENE	0.2	J
BENZO(a)ANTHRACENE	0.84	=
BENZO(a)PYRENE	0.81	=
CHRYSENE	0.87	=
ENDRIN	0.026	J
FLUORANTHENE	1.6	=
FLUORENE	0.098	J
LEAD	32.4	=
p,p'-DDD	0.016	J
p,p'-DDE	0.026	J
PHENANTHRENE	1.3	=
PYRENE	2	=

Chemical	Concentration	Q
ANTHRACENE	0.14	J
BENZO(a)ANTHRACENE	0.82	=
BENZO(a)PYRENE	0.71	=
CHRYSENE	0.88	=
ENDRIN	0.01	J
FLUORANTHENE	1.2	=
FLUORENE	0.064	J
LEAD	26.2	=
p,p'-DDT	0.0053	J
PHENANTHRENE	0.61	=
PYRENE	1.2	=
ZINC	120	=

Chemical	Concentration	Q
ENDRIN	0.014	J
p,p'-DDD	0.13	=
p,p'-DDE	0.026	J
p,p'-DDT	0.042	J

Chemical	Concentration	Q
ENDRIN	0.011	J
p,p'-DDD	0.066	J
p,p'-DDE	0.13	=
p,p'-DDT	0.035	J
PYRENE	0.42	J

Chemical	Concentration	Q
LEAD	75	=
p,p'-DDD	0.23	=
p,p'-DDE	0.029	J
p,p'-DDT	0.0047	J
ZINC	135	=

Chemical	Concentration	Q
FLUORENE	0.029	J
LEAD	38.4	=
p,p'-DDD	0.0061	J
p,p'-DDE	0.0055	J

SD-01 SD-02 SD-03 SD-04 SD-05 SD-06 SD-07 SD-08 SD-09 SD-10 SD-11 SD-12 SD-14 SD-15 SD-16 SD-17 SD-18 SD-19

MAP SCALE: 1" = 1000'

Sampling locations without data boxes had no constituents exceeding risk-based criteria

LEGEND

- Surface Soil Sampling Location (mg/kg)
- Soil Boring Sampling Location (mg/kg)
- Surface Water Sampling Location (mg/L)
- Sediment Sampling Location (mg/kg)

(Q) Qualifier Definitions
= - indicates unqualified detection
J - indicates estimated value above detection limit, but below reporting limit

Figure 1, Sheet 1
Offsite Drainage Pathways
Constituents Exceeding Risk-Based Criteria
Defense Distribution Depot Memphis, TN

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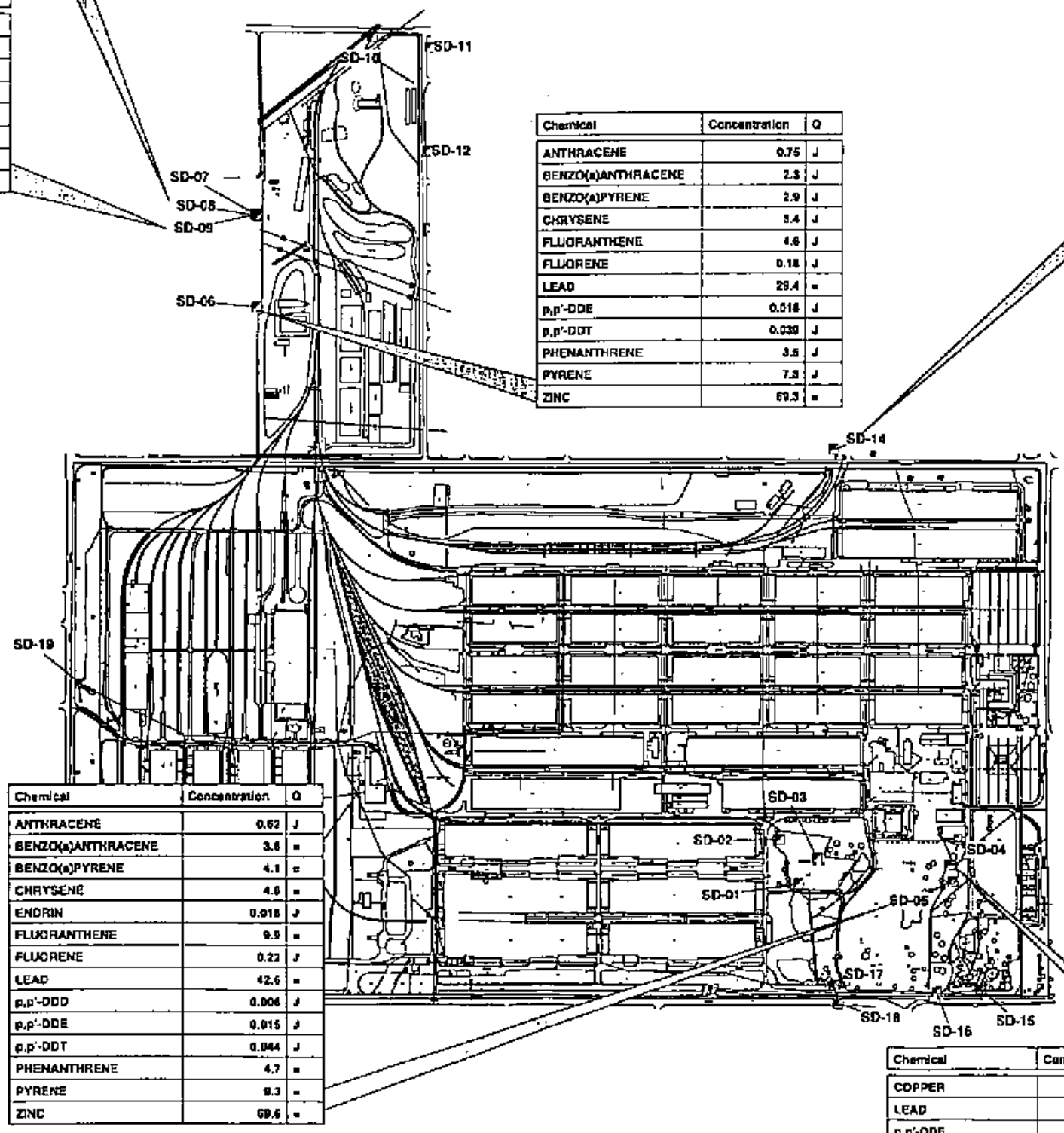
Chemical	Concentration	Q
LEAD	35.4	=
ZINC	68.8	=

Chemical	Concentration	Q
BENZO(a)ANTHRACENE	0.21	J
CHRYSENE	0.35	J
COPPER	83.7	=
LEAD	173	=
p,p'-DDE	0.025	J
p,p'-DDT	0.14	J
PYRENE	0.66	J
ZINC	217	=



Chemical	Concentration	Q
ANTHRACENE	0.75	J
BENZO(a)ANTHRACENE	2.3	J
BENZO(a)PYRENE	2.9	J
CHRYSENE	3.4	J
FLUORANTHENE	4.6	J
FLUORENE	0.18	J
LEAD	29.4	=
p,p'-DDE	0.016	J
p,p'-DDT	0.039	J
PHENANTHRENE	3.5	J
PYRENE	7.3	J
ZINC	69.3	=

Chemical	Concentration	Q
ANTHRACENE	6.8	J
BENZO(a)ANTHRACENE	20	J
BENZO(a)PYRENE	19	J
CHROMIUM, TOTAL	35.2	=
CHRYSENE	30	J
COPPER	53	=
ENDRIN	0.046	J
FLUORANTHENE	30	J
FLUORENE	7.2	J
LEAD	484	=
p,p'-DDD	0.092	J
p,p'-DDE	0.079	J
p,p'-DDT	0.2	J
PHENANTHRENE	33	J
PYRENE	55	J
ZINC	250	=

duplicate sample

Chemical	Concentration	Q
ANTHRACENE	3.2	J
BENZO(a)ANTHRACENE	12	J
BENZO(a)PYRENE	11	J
CHRYSENE	13	J
COPPER	56.6	=
ENDRIN	0.045	J
FLUORANTHENE	32	J
FLUORENE	5.2	J
LEAD	265	=
p,p'-DDD	0.079	J
p,p'-DDE	0.065	J
p,p'-DDT	0.18	J
PHENANTHRENE	31	J
PYRENE	27	J
ZINC	288	=

Chemical	Concentration	Q
ANTHRACENE	0.62	J
BENZO(a)ANTHRACENE	3.6	=
BENZO(a)PYRENE	4.1	=
CHRYSENE	4.6	=
ENDRIN	0.018	J
FLUORANTHENE	9.9	=
FLUORENE	0.22	J
LEAD	42.6	=
p,p'-DDD	0.006	J
p,p'-DDE	0.015	J
p,p'-DDT	0.044	J
PHENANTHRENE	4.7	=
PYRENE	9.3	=
ZINC	69.6	=

Chemical	Concentration	Q
COPPER	34.7	=
LEAD	44	=
p,p'-DDE	0.018	=
SILVER	0.1	=
ZINC	1,170	=

N
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S

MAP SCALE: 1" = 100'

Sampling locations without data boxes had no constituents exceeding risk-based criteria

LEGEND

- Surface Soil Sampling Location (mg/kg)
- Soil Boring Sampling Location (mg/kg)
- Surface Water Sampling Location (mg/L)
- Sediment Sampling Location (mg/kg)

(Q) Qualifier Definitions
= - indicates unqualified detection
J - indicates estimated value above detection limit, but below reporting limit

Figure 1, Sheet 2
Offsite Drainage Pathways
Constituents Exceeding Risk-Based Criteria
Defense Distribution Depot Memphis, TN

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An effort was made to identify the sediment/native soil interface at each sampling location before sampling; in most cases, this attempt was unsuccessful. A dedicated, decontaminated, stainless-steel knife was used, if necessary, to remove grass and debris from the sample location. Using stainless-steel spoons and bowls, grab samples were collected between zero to 8 inches below ground surface (bgs). At each location, sediment was transferred directly into the volatile organic compound (VOC) sample jar. The jar was filled completely to eliminate any headspace in the jar. The remaining sample was placed in a stainless-steel bowl and composited before being transferred to the remaining sample jars.At sample locations SD4, SD17, and SD19, the sediment to be sampled was beneath culverts and drainage areas that were covered with concrete. The sampling team cored a 10-inch-diameter hole at each of these locations. After removing a 4-inch thickness of concrete, the sediment immediately beneath the concrete was discarded because it may have been disturbed by the coring equipment.

Samples SD1, SD2, and SD3 were collected in the vicinity of the southwestern edge of Dunn Field. The following details their exact locations:

- Sample SD1 was collected on DDMT property at the fenceline and discharge point of a concrete culvert next to National Pollutant Discharge Elimination System (NPDES) Outfall 009.
- Sample SD2 was collected just west of the property line in a shallow drainage ditch.
- Sample SD3 was collected 50 feet north of Sample SD2 in a shallow drainage ditch west of the property line.

Samples SD4, SD5, and SD6 were collected in the vicinity of the west-central edge of Dunn Field. The following details their exact locations:

- Sample SD4 was collected on DDMT property below the concrete culvert next to NPDES Outfall 010.
- Sample SD5 was collected off site from the center of a shallow ditch approximately 45 feet downstream of SD4.
- Sample SD6 is located in a shallow ditch approximately 45 feet downstream from SD5.

The locations for Samples SD7, SD8, and SD9 were agreed upon after discussions between staff of the DDMT Environmental Protection and Safety Office, the Tennessee Department of Environment and Conservation (TDEC), and DDMT environmental advisory board. Overland storm flow from the western edge of Dunn Field is believed to migrate through a series of small topographic depressions to the small off-site, east-west trending drainage ditch that crosses under Rozelle Street. The following details their exact locations:

- Sample SD7 was collected from a topographic depression located 116 feet west of the DDMT fenceline.
- Sample SD8 was collected from a topographic depression at a lower elevation than SD7.
- Sample SD9 was collected in the east-west trending drainage ditch, 100 feet east of Rozelle Street.

The following details the remaining sample locations:

- Sample SD10 was collected from a shallow, open ditch that carries runoff away from Dunn Field and under the Illinois Central Gulf Railroad tracks.
- Sample SD11 was collected off site near the intersection of Boyle and Hays Streets, 8.8 feet downstream from a storm sewer outfall.
- Sample SD12 was collected near the intersection of Carver and Hays Streets, 2.5 feet downstream from a storm sewer outfall.
- Sample SD13 could not be sampled.
- Sample SD14 was collected from the bottom of an off-site shallow ditch near the intersection of Dunn Avenue and Custer Street.
- Sample SD15 was collected near the intersection of Ball Road and Mullen Road, 1 foot south of a storm sewer outfall.
- Sample SD16 is located near NPDES Outfall 012 in a shallow ditch that carries runoff away from the southeastern portion of the Main Installation; the location is 5.5 feet south of a storm sewer outfall by the DDMT fenceline.
- Sample SD17 was collected on site near NPDES Outfall 004. The sample was collected 8.5 feet north of the DDMT fenceline near the intersection of "N" Street and 2nd Street.
- Sample SD18 was collected from the on site end of a box culvert near NPDES Outfall 004.
- Sample SD19 was collected 100 feet west of the west-central edge of the DDMT Main Installation from below a concrete drainage culvert that drains the western portion of the installation.

2.2.3 Analytical Procedure

All 18 sediment samples were sent to Southwest Laboratory of Oklahoma, Inc., in Broken Arrow, Oklahoma. Eighteen samples were analyzed for VOCs, semivolatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs)/pesticides, target analyte list (TAL) metals, and cyanide. Also, 14 samples were analyzed for dioxin, and 9 samples were analyzed for thiodyglycol. Samples received at the laboratory were analyzed in accordance with the procedures outlined in the *Generic Quality Assurance Project Plan* (CH2M HILL, 1995).

A data quality evaluation (DQE) was performed to assess the effect of the overall analytical process on the usability of the data. The DQE established that the detection of acetone and bis(2-ethylhexyl)phthalate can be attributed to field sampling and laboratory contamination rather than environmental conditions at the site. Also, low concentrations of dioxins and furans can be attributed to background or instrument noise and are not indicative of environmental conditions. With exception to the qualifications listed above, the DQE concluded that data can be used in the project decision-making process.

3.0 Interpretation of Sampling Results

3.1 Presentation of Results

Section 3.1.1 presents the results of the Screening Sites Sampling Program for Off-Site Drainage Pathways. Data are presented for sediment and compared with appropriate screening criteria in Table ODP. Data from the 1997 CH2M HILL investigation are presented along with historical data from the *Remedial Investigations at DDMT, Final Report* (Law Environmental, 1990). If a value from a sampling location exceeds one of the comparison criteria, that value and the comparison criterion are shown in **bold** on the summary table.

Constituents of potential concern (COPCs) are parameters that exceed both background values and the screening criteria. Where concentrations exceed the selected background value, the concentration is compared with the observed range of background values as reviewed and established by the BRAC Cleanup Team (BCT).

Seventeen COPCs were identified for the Off-Site Drainage Pathways Site: chromium, lead, benzo(a)anthracene, benzo(a)pyrene, copper, dichlorodiphenyldichloroethane (DDD), dichlorodiphenyldichloroethene (DDE), dichlorodiphenyltrichloroethane (DDT), anthracene, endrin, chrysene, flouranthene, flourene, phenanthrene, pyrene, silver, and zinc.

3.1.1 Sediment

Table ODP summarizes the sediment sampling data. Seventeen COPCs were detected at concentrations that exceed the sediment quality screening criteria and background values.

Anthracene was detected in 13 sediment samples at estimated concentrations ranging from 0.019 milligrams per kilogram (mg/kg) to 6.9 mg/kg. Anthracene estimated concentrations detected in Samples SD14 (6.9 mg/kg) and SD21 (3.2 mg/kg) exceed the Preliminary Remediation Goals (PRG) and National Oceanic and Atmospheric Administration (NOAA) sediment values of 0.085 mg/kg and the background value of 1.6 mg/kg.

Benzo(a)anthracene was detected in 18 sediment samples at concentrations ranging from 0.063 mg/kg to 20 mg/kg. Concentrations detected in Samples SD5 (3.8 mg/kg), SD14 (20 mg/kg [estimated]), and SD21 (12 mg/kg [estimated]) exceed the PRG sediment value of 0.16 mg/kg, the NOAA sediment value of 0.23 mg/kg, and the background value of 2.9 mg/kg.

Benzo(a)pyrene was detected in 18 sediment samples at concentrations ranging from 0.041 mg/kg to 19 mg/kg. Concentrations detected in Samples SD5 (4.1 mg/kg), SD6 (2.9 mg/kg [estimated]), SD14 (19 mg/kg [estimated]), and SD21 (11 mg/kg [estimated]) exceed the PRG sediment value of 0.23 mg/kg, the NOAA sediment value of 0.4 mg/kg, and the background value of 2.5 mg/kg.

Chromium was detected in 20 sediment samples at concentrations ranging from 3.1 mg/kg to 36.2 mg/kg. The highest concentration detected in Sample SD14 (36.2 mg/kg) exceeds the PRG sediment value of 33 mg/kg and the background value of 20 mg/kg. The detected concentration does not exceed the NOAA sediment value of 80 mg/kg.

Chrysene was detected in 19 sediment samples at concentrations ranging from 0.064 mg/kg (estimated) to 30 mg/kg (estimated). Concentrations detected in Samples SD5 (4.6 mg/kg), SD6

(3.4 mg/kg [estimated]), SD14 (30 mg/kg [estimated]), and SD21 (13 mg/kg [estimated]) exceed the PRG sediment value of 0.22 mg/kg, the NOAA sediment value of 0.4 mg/kg, and the background value of 3.2 mg/kg.

Copper was detected in 20 sediment samples at concentrations ranging from 4.3 mg/kg (estimated) to 83.7 mg/kg. The highest concentration detected in Sample SD9 (83.7 mg/kg) exceeds the PRG sediment value of 28 mg/kg, the NOAA sediment value of 70 mg/kg, and the background value of 58 mg/kg.

Endrin was detected in 11 sediment samples at estimated concentrations ranging from 0.01 mg/kg to 0.045 mg/kg. All detected endrin concentrations exceed the NOAA sediment value of 0.00002 mg/kg. There is no background value or PRG sediment value for endrin in sediment for comparison.

Flouranthene was detected in 18 sediment samples at concentrations ranging from 0.037 mg/kg (estimated) to 32 mg/kg (estimated). Concentrations detected in Samples SD5 (9.9 mg/kg), SD14 (30 mg/kg [estimated]), and SD21 (32 mg/kg [estimated]) exceed the PRG sediment value of 0.38 mg/kg, the NOAA sediment value of 0.6 mg/kg, and the background value of 7.1 mg/kg.

Flourene was detected in 11 sediment samples (SD1, SD2, SD3, SD5, SD6, SD10, SD11, SD14, SD18, SD20, and SD21) at estimated concentrations ranging from 0.029 mg/kg to 7.2 mg/kg. Estimated concentrations detected in Samples SD14 (7.2 mg/kg) and SD21 (5.2 mg/kg) exceed the PRG sediment value of 0.018 mg/kg, the NOAA sediment value of 0.035 mg/kg, and the background value of 1.69 mg/kg.

Lead was detected in all 20 sediment samples at concentrations ranging from 1.8 mg/kg to 484 mg/kg. Concentrations detected in Samples SD4 (44 mg/kg), SD5 (42.6 mg/kg), SD7 (61.8 mg/kg), SD8 (35.4 mg/kg), SD9 (173 mg/kg), SD10 (76.7 mg/kg), SD11 (146 mg/kg), SD12 (89 mg/kg), SD14 (484 mg/kg), SD17 (75 mg/kg), SD18 (38.4 mg/kg), and SD21 (285 mg/kg) exceed the PRG sediment value of 21 mg/kg, the NOAA sediment value of 35 mg/kg, and the background value of 35.2 mg/kg.

DDD was detected in 12 sediment samples at concentrations ranging from 0.0058 mg/kg (estimated) to 0.23 mg/kg. Concentrations detected in Samples SD1 (0.011 mg/kg [estimated]), SD10 (0.012 mg/kg [estimated]), SD14 (0.092 mg/kg [estimated]), SD15 (0.066 mg/kg [estimated]), SD16 (0.13 mg/kg), SD17 (0.23 mg/kg), SD20 (0.016 mg/kg [estimated]), and SD21 (0.079 mg/kg [estimated]) exceed the background value of 0.0061 mg/kg and the NOAA sediment value of 0.002 mg/kg. There is no PRG sediment value for DDD in sediment for comparison.

DDE was detected in 15 sediment samples at concentrations ranging from 0.0055 mg/kg (estimated) to 0.13 mg/kg. Thirteen detected concentrations (mostly estimated) exceed the background value of 0.0072 mg/kg, the PRG sediment value of 0.0017 mg/kg, and the NOAA sediment value of 0.002 mg/kg. The highest exceedance was detected in Sample SD15 at 0.13 mg/kg, and the lowest exceedance was detected in Sample SD2 at 0.0081 mg/kg (estimated).

DDT was detected in 12 sediment samples at estimated concentrations ranging from 0.0047 mg/kg to 0.2 mg/kg. All estimated concentrations exceed the NOAA sediment value of 0.001 mg/kg. There is no PRG sediment value or background value for DDT in sediment for comparison.

Phenanthrene was detected in 19 sediment samples at concentrations ranging from 0.02 mg/kg (estimated) to 33 mg/kg (estimated). Concentrations detected in Samples SD14 (33 mg/kg [estimated]) and SD21 (31 mg/kg [estimated]) exceed the PRG sediment value of 0.14 mg/kg, the NOAA sediment value of 0.225 mg/kg, and the background value of 6.9 mg/kg. All other detected concentrations were less than 4.7 mg/kg and within background value range.

Pyrene was detected in 19 sediment samples at concentrations ranging from 0.039 mg/kg (estimated) to 55 mg/kg (estimated). Concentrations detected in Samples SD5 (9.3 mg/kg), SD6 (7.3 mg/kg [estimated]), SD14 (55 mg/kg [estimated]), and SD21 (27 mg/kg [estimated]) exceed the PRG sediment value of 0.29 mg/kg and the background value of 2.9 mg/kg. There is no NOAA sediment value for pyrene in sediment for comparison.

Silver was detected in one sediment sample, Sample SD4, at 9.1 mg/kg. This concentration exceeds the PRG sediment value of 0.5 mg/kg, the NOAA sediment value of 1 mg/kg, and the background value of 1.8 mg/kg.

Zinc was detected in 20 sediment samples at concentrations ranging from 17 mg/kg to 1170 mg/kg. The highest concentration detected in Sample SD4 (1170 mg/kg) exceeds the PRG sediment value of 68 mg/kg, the NOAA sediment value of 120 mg/kg, and the background value of 797 mg/kg. Zinc concentrations detected in Samples SD9 (217 mg/kg), SD10 (154 mg/kg), SD11 (247 mg/kg), SD14 (260 mg/kg), SD17 (135 mg/kg), and SD21 (288 mg/kg) exceed the PRG and NOAA sediment values but not the background value. Most other detected concentrations of zinc exceed the PRG sediment value but not the background value or NOAA sediment value.

3.2 Vertical and Lateral Extent

The sampling was performed to address all identified off-site drainage locations. Because the Screening Site Sampling Program was designed only to show the presence or absence of contamination, a complete characterization of vertical and lateral extent could not be conducted. Based on the data collected so far, it appears that polycyclic aromatic hydrocarbon (PAH) compounds and multiple metals at several sampling locations occur at concentrations exceeding screening criteria.

Numerous PAH compounds were detected at all sediment sampling locations. In most cases, these compounds were detected at concentrations that exceeded the PRG and NOAA sediment criteria (where these criteria were available), but did not exceed background values. This is true in 16 cases, where PAH compounds were detected, but not at values exceeding both background and screening criteria.

PAH compounds consistently exceeded screening criteria and background values at two sampling locations: SD5 and SD14. In Sample SD5, five PAH compounds were COPCs, and in Sample SD14, eight PAH compounds were COPCs.

In only one case did a single PAH compound exceeded both background and screening values at a sampling site. Benzo(a)pyrene was found in Sample SD6, with a concentration of 2.9 (estimated) mg/kg, which slightly exceeds the background value of 2.5 mg/kg.

Five metals were detected at at least one sampling location in concentrations that exceeded screening criteria and background values. Total chromium (Sample SD14), copper (Sample

SD9), silver (Sample SD4) and zinc (Sample SD4) each only occur as a COPC at one sampling location.

Lead was detected at all 18 sampling locations, and in 12 of those locations exceeded background values and screening criteria. Lead exceedances ranged from 35.4 mg/kg in Sample SD8 to 484 mg/kg in Sample SD14.

Endrin was detected at seven sites at estimated concentrations that exceeded the NOAA sediment criteria. No background values or PRG criteria are available for this parameter.

DDD was detected at seven sites at concentrations that exceeded both the background value of 0.0061 mg/kg and NOAA sediment criteria of 0.002 mg/kg. All but two of these concentrations (0.13 mg/kg at Sample SD16 and 0.23 mg/kg at Sample SD17) were estimated values.

DDE was detected at 13 sampling locations, and at 11 of those locations, exceeded both the background value of 0.0072 mg/kg and the PRG and NOAA sediment criteria. At Samples SD4 (0.018 mg/kg) and SD15 (0.13 mg/kg) the values were unqualified detections, at all other sites the concentrations were estimated.

DDT was detected at 11 sampling locations at estimated concentrations exceeding the NOAA sediment criteria of 0.001 mg/kg. Background values and PRG values are not available for this parameter.

3.3 Potential Migration Pathways

The following paragraphs provide a general discussion of the potential migration pathways for several constituents found at the Off-Site Drainage Pathways site. PAH compounds will be addressed on a sitewide basis.

Lead is present at concentrations greater than background, or above screening criteria, in surface and subsurface soils, and in sediment at the DDMT. Lead is moderately soluble and potentially can be leached from any of these forms of occurrence, reaching concentrations in aqueous solution in both groundwater and surface water that would be of concern to both human and ecological receptors. Additionally, lead in surface soils and sediment potentially may move as suspended particulate matter in surface waters and impact aquatic organisms.

DDT and two of its degradation breakdown products, DDD and DDE, exist in subsurface soils at the DDMT and should not be mobile in this environment. These compounds have an extremely high affinity for soil and are essentially insoluble in water. So long as they are buried and the potential for direct contact is controlled, the potential to migrate is minimal. Should soil contaminated with these compounds be uncovered, they potentially would be able to be moved through wind action and/or as suspended material in surface water. DDT also was reported in sediments at two sites on the DDMT, indicating migration via this pathway has occurred. These compounds can bioaccumulate and become more concentrated as they move up in the food chain and could potentially affect receptors via this migration pathway.

PAHs have similar chemical and physical characteristics and tend to migrate and behave in the environment in a similar manner. Generally, these compounds have low vapor pressures, are only marginally soluble in water, and have a high affinity for soils. All of these compounds have been detected at concentrations above screening values for surface soils at the DDMT. They would be expected to migrate as adsorbed components of the soils and would potentially

be available to aquatic organisms in turbid surface water or to bottom feeders in areas with contaminated sediments. These compounds do not bioaccumulate significantly due to their rapid metabolism and excretion by most aquatic organisms.

3.4 Additional Data Needs

There are no additional data needs for Off-Site Drainage Pathways site.

4.0 Interpretation of Screening Criteria Comparisons

4.1 Methodology

A Preliminary Risk Evaluation (PRE) was not conducted specifically for the Off-Site Drainage Pathways site. Also, these sediments and surface water are of primary interest for protection against ecological impacts.

4.2 Screening Site Off-Site Drainage Pathways Risk

Risk values are not available for this site because a risk evaluation has not yet been performed.

5.0 Summary and Recommendations

5.1 Summary

PAH compounds were detected at all sediment sampling locations, but exceedances of background and screening criteria were only noted at Samples SD5 and SD14. Benzo(a)pyrene, which is a sitewide problem that will be addressed in an upcoming risk evaluation, was detected at 17 of the 18 sampling locations with exceedances at three locations.

Lead is the only metal that was detected above screening criteria throughout the sampling stations. Lead was detected at 12 of the 18 locations at concentrations exceeding background and screening criteria.

DDD, DDT, and DDE occur at numerous sampling locations at concentrations that exceed background values or the NOAA sediment criteria.

5.2 Recommendations

A full evaluation of potential off-site releases and ecological and human health implications should be evaluated for this site.

Table ODP
Summary of Detected Compounds in Sediment
Compared to Screening Levels for Site ODP
Screening Sites Sampling Program
Defense Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	PRG-Sed[4]	NOAA-Sed[5]	Units
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZO-p-DIOXIN	M-SD01	0.00644	=	.00058	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZO-p-DIOXIN	M-SD02	0.00131	J	.00058	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZO-p-DIOXIN	M-SD03	0.00063	J	.00058	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZO-p-DIOXIN	M-SD04	0.000385	J	.00058	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZO-p-DIOXIN	M-SD05	0.0021	J	.00058	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZO-p-DIOXIN	M-SD06	0.003	J	.00058	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZO-p-DIOXIN	M-SD07	0.000103	J	.00058	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZO-p-DIOXIN	M-SD08	0.00017	J	.00058	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZO-p-DIOXIN	M-SD09	0.000351	J	.00058	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZO-p-DIOXIN	M-SD10	0.00191	J	.00058	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZO-p-DIOXIN	M-SD11	0.000783	J	.00058	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZO-p-DIOXIN	M-SD12	0.000175	J	.00058	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZO-p-DIOXIN	M-SD14	0.0054	J	.00058	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZO-p-DIOXIN	M-SD20	0.00608	=	.00058	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZO-p-DIOXIN	M-SD21	0.005	J	.00058	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZOFURAN	M-SD01	0.000556	=	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZOFURAN	M-SD02	0.000307	=	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZOFURAN	M-SD03	0.000226	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZOFURAN	M-SD04	5.96E-05	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZOFURAN	M-SD05	0.00045	=	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZOFURAN	M-SD07	0.00001	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZOFURAN	M-SD08	1.86E-05	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZOFURAN	M-SD09	0.000306	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZOFURAN	M-SD10	0.000366	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZOFURAN	M-SD11	0.000134	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZOFURAN	M-SD12	4.39E-05	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZOFURAN	M-SD14	0.0019	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZOFURAN	M-SD19	6.9E-06	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZOFURAN	M-SD20	0.000427	=	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,6,7,8-HEPTACHLORODIBENZOFURAN	M-SD21	0.0018	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,4,7,8,9-HEPTACHLORODIBENZOFURAN	M-SD07	2.8E-06	J	NA	NA	NA	MG/KG

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Screening Sites Sampling Program
Defense Depot Memphis, Tennessee

Data	Parameter[2]	StationID	Detected	Project	Background	PRG-Sed[4]	NOAA-Sed[5]	Units
CH2M HILL	1,2,3,4,7,8-HEXACHLORODIBENZOFURAN	M-SD09	5.83E-05	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,6,7,8-HEXACHLORODIBENZO-P-DIOXIN	M-SD01	9.29E-05	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,6,7,8-HEXACHLORODIBENZO-P-DIOXIN	M-SD03	1.75E-05	=	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,6,7,8-HEXACHLORODIBENZO-P-DIOXIN	M-SD04	1.16E-05	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,6,7,8-HEXACHLORODIBENZO-P-DIOXIN	M-SD09	1.33E-05	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,6,7,8-HEXACHLORODIBENZO-P-DIOXIN	M-SD10	5.71E-05	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,6,7,8-HEXACHLORODIBENZO-P-DIOXIN	M-SD20	7.67E-05	=	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,6,7,8-HEXACHLORODIBENZOFURAN	M-SD09	2.86E-05	=	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,7,8,9-HEXACHLORODIBENZO-P-DIOXIN	M-SD01	0.000146	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,7,8,9-HEXACHLORODIBENZO-P-DIOXIN	M-SD03	2.36E-05	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,7,8,9-HEXACHLORODIBENZO-P-DIOXIN	M-SD04	4.3E-06	J	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,7,8,9-HEXACHLORODIBENZO-P-DIOXIN	M-SD10	6.64E-05	=	NA	NA	NA	MG/KG
CH2M HILL	1,2,3,7,8,9-HEXACHLORODIBENZO-P-DIOXIN	M-SD20	7.82E-05	=	NA	NA	NA	MG/KG
CH2M HILL	2,3,7,8-TETRACHLORODIBENZOFURAN	M-SD09	2.92E-05	J	NA	NA	NA	MG/KG
CH2M HILL	2-METHYLNAPHTHALENE	M-SD01	0.018	J	NA	NA	NA	MG/KG
CH2M HILL	2-METHYLNAPHTHALENE	M-SD14	10	J	NA	NA	NA	MG/KG
CH2M HILL	2-METHYLNAPHTHALENE	M-SD19	0.026	J	NA	NA	NA	MG/KG
CH2M HILL	2-METHYLNAPHTHALENE	M-SD21	7.2	J	NA	NA	NA	MG/KG
CH2M HILL	ACENAPHTHENE	M-SD01	0.059	J	.77	.022	.15	MG/KG
CH2M HILL	ACENAPHTHENE	M-SD02	0.027	J	.77	.022	.15	MG/KG
CH2M HILL	ACENAPHTHENE	M-SD03	0.096	J	.77	.022	.15	MG/KG
CH2M HILL	ACENAPHTHENE	M-SD05	0.26	J	.77	.022	.15	MG/KG
CH2M HILL	ACENAPHTHENE	M-SD06	0.27	J	.77	.022	.15	MG/KG
CH2M HILL	ACENAPHTHENE	M-SD10	0.038	J	.77	.022	.15	MG/KG
CH2M HILL	ACENAPHTHENE	M-SD11	0.086	J	.77	.022	.15	MG/KG
CH2M HILL	ACENAPHTHENE	M-SD20	0.052	J	.77	.022	.15	MG/KG
CH2M HILL	ACENAPHTHYLENE	M-SD01	0.058	J	NA	NA	NA	MG/KG
CH2M HILL	ACENAPHTHYLENE	M-SD02	0.066	J	NA	NA	NA	MG/KG
CH2M HILL	ACENAPHTHYLENE	M-SD03	0.029	J	NA	NA	NA	MG/KG
CH2M HILL	ACENAPHTHYLENE.	M-SD11	0.024	J	NA	NA	NA	MG/KG
CH2M HILL	ACENAPHTHYLENE	M-SD20	0.062	J	NA	NA	NA	MG/KG
CH2M HILL	ACETONE	M-SD01	0.007	J	NA	NA	NA	MG/KG

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Defense Depot Memphis, Tennessee

Data	Parameter[2]	StationID	Detected	Project	Background	PRG-Sed[4]	NOAA-Sed[5]	Units
CH2M HILL	ACETONE	M-SD05	0.023	=	NA	NA	NA	MG/KG
CH2M HILL	ACETONE	M-SD06	0.012	=	NA	NA	NA	MG/KG
CH2M HILL	ACETONE	M-SD07	0.028	J	NA	NA	NA	MG/KG
CH2M HILL	ACETONE	M-SD08	0.029	J	NA	NA	NA	MG/KG
CH2M HILL	ACETONE	M-SD09	0.024	J	NA	NA	NA	MG/KG
CH2M HILL	ACETONE	M-SD14	0.025	J	NA	NA	NA	MG/KG
CH2M HILL	ACETONE	M-SD18	0.013	J	NA	NA	NA	MG/KG
CH2M HILL	ALDRIN	M-SD15	0.014	J	NA	NA	NA	MG/KG
CH2M HILL	ALDRIN	M-SD17	0.0092	J	NA	NA	NA	MG/KG
CH2M HILL	ALPHA ENDOSULFAN	M-SD02	0.0076	J	NA	NA	NA	MG/KG
CH2M HILL	ALPHA ENDOSULFAN	M-SD03	0.0045	J	NA	NA	NA	MG/KG
CH2M HILL	ALPHA ENDOSULFAN	M-SD10	0.0033	J	NA	NA	NA	MG/KG
CH2M HILL	ALPHA ENDOSULFAN	M-SD11	0.011	J	NA	NA	NA	MG/KG
CH2M HILL	ALPHA ENDOSULFAN	M-SD16	0.0081	J	NA	NA	NA	MG/KG
CH2M HILL	ALPHA ENDOSULFAN	M-SD20	0.0055	J	NA	NA	NA	MG/KG
CH2M HILL	ALPHA ENDOSULFAN	M-SD21	0.032	J	NA	NA	NA	MG/KG
CH2M HILL	ALPHA-CHLORDANE	M-SD01	0.014	J	2.4	NA	NA	MG/KG
CH2M HILL	ALPHA-CHLORDANE	M-SD02	0.0095	J	2.4	NA	NA	MG/KG
CH2M HILL	ALPHA-CHLORDANE	M-SD03	0.0043	J	2.4	NA	NA	MG/KG
CH2M HILL	ALPHA-CHLORDANE	M-SD05	0.0054	J	2.4	NA	NA	MG/KG
CH2M HILL	ALPHA-CHLORDANE	M-SD10	0.024	J	2.4	NA	NA	MG/KG
CH2M HILL	ALPHA-CHLORDANE	M-SD11	0.0094	J	2.4	NA	NA	MG/KG
CH2M HILL	ALPHA-CHLORDANE	M-SD12	0.0057	J	2.4	NA	NA	MG/KG
CH2M HILL	ALPHA-CHLORDANE	M-SD14	0.036	J	2.4	NA	NA	MG/KG
CH2M HILL	ALPHA-CHLORDANE	M-SD15	0.021	J	2.4	NA	NA	MG/KG
CH2M HILL	ALPHA-CHLORDANE	M-SD16	0.02	J	2.4	NA	NA	MG/KG
CH2M HILL	ALPHA-CHLORDANE	M-SD17	0.0099	J	2.4	NA	NA	MG/KG
CH2M HILL	ALPHA-CHLORDANE	M-SD20	0.026	J	2.4	NA	NA	MG/KG
CH2M HILL	ALPHA-CHLORDANE	M-SD21	0.033	J	2.4	NA	NA	MG/KG
CH2M HILL	ALUMINUM	M-SD01	2170	=	10000	NA	NA	mg/kg
CH2M HILL	ALUMINUM	M-SD02	6580	=	10000	NA	NA	mg/kg
CH2M HILL	ALUMINUM	M-SD03	2420	=	10000	NA	NA	mg/kg

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Defense Depot Memphis, Tennessee

Data	Parameter[2]	StationID	Detected	Project	Background	PRG-Sed[4]	NOAA-Sed[5]	Units
CH2M HILL	ALUMINUM	M-SD04	3500	=	10000	NA	NA	mg/kg
CH2M HILL	ALUMINUM	M-SD05	6320	=	10000	NA	NA	mg/kg
CH2M HILL	ALUMINUM	M-SD06	18400	=	10000	NA	NA	mg/kg
CH2M HILL	ALUMINUM	M-SD07	6210	=	10000	NA	NA	mg/kg
CH2M HILL	ALUMINUM	M-SD08	7410	=	10000	NA	NA	mg/kg
CH2M HILL	ALUMINUM	M-SD09	6700	=	10000	NA	NA	mg/kg
CH2M HILL	ALUMINUM	M-SD10	3420	=	10000	NA	NA	mg/kg
CH2M HILL	ALUMINUM	M-SD11	2750	=	10000	NA	NA	mg/kg
CH2M HILL	ALUMINUM	M-SD12	8660	=	10000	NA	NA	mg/kg
CH2M HILL	ALUMINUM	M-SD14	3180	=	10000	NA	NA	mg/kg
CH2M HILL	ALUMINUM	M-SD15	1130	=	10000	NA	NA	mg/kg
CH2M HILL	ALUMINUM	M-SD16	662	=	10000	NA	NA	mg/kg
CH2M HILL	ALUMINUM	M-SD17	4270	=	10000	NA	NA	mg/kg
CH2M HILL	ALUMINUM	M-SD18	5340	=	10000	NA	NA	mg/kg
CH2M HILL	ALUMINUM	M-SD19	203	=	10000	NA	NA	mg/kg
CH2M HILL	ALUMINUM	M-SD20	2810	=	10000	NA	NA	mg/kg
CH2M HILL	ALUMINUM	M-SD21	3450	=	10000	NA	NA	mg/kg
CH2M HILL	ANTHRACENE	M-SD01	0.2	J	1.6	.085	.085	MG/KG
CH2M HILL	ANTHRACENE	M-SD02	0.057	J	1.6	.085	.085	MG/KG
CH2M HILL	ANTHRACENE	M-SD03	0.16	J	1.6	.085	.085	MG/KG
CH2M HILL	ANTHRACENE	M-SD05	0.62	J	1.6	.085	.085	MG/KG
CH2M HILL	ANTHRACENE	M-SD06	0.75	J	1.6	.085	.085	MG/KG
CH2M HILL	ANTHRACENE	M-SD09	0.061	J	1.6	.085	.085	MG/KG
CH2M HILL	ANTHRACENE	M-SD10	0.12	J	1.6	.085	.085	MG/KG
CH2M HILL	ANTHRACENE	M-SD11	0.27	J	1.6	.085	.085	MG/KG
CH2M HILL	ANTHRACENE	M-SD14	6.9	J	1.6	.085	.085	MG/KG
CH2M HILL	ANTHRACENE	M-SD16	0.019	J	1.6	.085	.085	MG/KG
CH2M HILL	ANTHRACENE	M-SD18	0.025	J	1.6	.085	.085	MG/KG
CH2M HILL	ANTHRACENE	M-SD20	0.2	J	1.6	.085	.085	MG/KG
CH2M HILL	ANTHRACENE	M-SD21	3.2	J	1.6	.085	.085	MG/KG
CH2M HILL	ANTIMONY	M-SD03	0.44	J	7.6	NA	2	mg/kg
CH2M HILL	ANTIMONY	M-SD09	0.67	J	7.6	NA	2	mg/kg

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Defense Depot Memphis, Tennessee

Data	Parameter[2]	StationID	Detected	Project	Background	PRG-Sed[4]	NOAA-Sed[5]	Units
CH2M HILL	ANTIMONY	M-SD11	0.82	J	7.6	NA	2	mg/kg
CH2M HILL	ANTIMONY	M-SD14	1.3	J	7.6	NA	2	mg/kg
CH2M HILL	ANTIMONY	M-SD21	1.4	J	7.6	NA	2	mg/kg
CH2M HILL	ARSENIC	M-SD01	2	J	12	8	3.3	mg/kg
CH2M HILL	ARSENIC	M-SD02	1.7	J	12	8	3.3	mg/kg
CH2M HILL	ARSENIC	M-SD03	1.8	J	12	8	3.3	mg/kg
CH2M HILL	ARSENIC	M-SD04	2.5	=	12	8	3.3	mg/kg
CH2M HILL	ARSENIC	M-SD05	3.1	=	12	8	3.3	mg/kg
CH2M HILL	ARSENIC	M-SD06	8.7	=	12	8	3.3	mg/kg
CH2M HILL	ARSENIC	M-SD07	8.2	=	12	8	3.3	mg/kg
CH2M HILL	ARSENIC	M-SD08	8.3	=	12	8	3.3	mg/kg
CH2M HILL	ARSENIC	M-SD09	10.6	=	12	8	3.3	mg/kg
CH2M HILL	ARSENIC	M-SD10	6.3	=	12	8	3.3	mg/kg
CH2M HILL	ARSENIC	M-SD11	2.8	=	12	8	3.3	mg/kg
CH2M HILL	ARSENIC	M-SD12	5.9	=	12	8	3.3	mg/kg
CH2M HILL	ARSENIC	M-SD14	9.1	=	12	8	3.3	mg/kg
CH2M HILL	ARSENIC	M-SD15	1.4	J	12	8	3.3	mg/kg
CH2M HILL	ARSENIC	M-SD16	2.1	=	12	8	3.3	mg/kg
CH2M HILL	ARSENIC	M-SD17	6	=	12	8	3.3	mg/kg
CH2M HILL	ARSENIC	M-SD18	3	=	12	8	3.3	mg/kg
CH2M HILL	ARSENIC	M-SD20	1.8	J	12	8	3.3	mg/kg
CH2M HILL	ARSENIC	M-SD21	10.1	=	12	8	3.3	mg/kg
CH2M HILL	BARIUM	M-SD01	24.1	J	118	NA	NA	mg/kg
CH2M HILL	BARIUM	M-SD02	142	=	118	NA	NA	mg/kg
CH2M HILL	BARIUM	M-SD03	53	=	118	NA	NA	mg/kg
CH2M HILL	BARIUM	M-SD04	74.9	=	118	NA	NA	mg/kg
CH2M HILL	BARIUM	M-SD05	47.6	=	118	NA	NA	mg/kg
CH2M HILL	BARIUM	M-SD06	98.4	=	118	NA	NA	mg/kg
CH2M HILL	BARIUM	M-SD07	97.8	=	118	NA	NA	mg/kg
CH2M HILL	BARIUM	M-SD08	94.1	=	118	NA	NA	mg/kg
CH2M HILL	BARIUM	M-SD09	142	=	118	NA	NA	mg/kg
CH2M HILL	BARIUM	M-SD10	77.3	=	118	NA	NA	mg/kg

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Data	Parameter[2]	StationID	Detected	Project	Background	PRG-Sed[4]	NOAA-Sed[5]	Units
CH2M HILL	BARIUM	M-SD11	68.1	=	118	NA	NA	mg/kg
CH2M HILL	BARIUM	M-SD12	86.7	=	118	NA	NA	mg/kg
CH2M HILL	BARIUM	M-SD14	76.2	=	118	NA	NA	mg/kg
CH2M HILL	BARIUM	M-SD15	15.7	J	118	NA	NA	mg/kg
CH2M HILL	BARIUM	M-SD16	16.7	J	118	NA	NA	mg/kg
CH2M HILL	BARIUM	M-SD17	62.8	=	118	NA	NA	mg/kg
CH2M HILL	BARIUM	M-SD18	145	=	118	NA	NA	mg/kg
CH2M HILL	BARIUM	M-SD19	5.8	J	118	NA	NA	mg/kg
CH2M HILL	BARIUM	M-SD20	45.2	=	118	NA	NA	mg/kg
CH2M HILL	BARIUM	M-SD21	78.6	=	118	NA	NA	mg/kg
CH2M HILL	BENZO(a)ANTHRACENE	M-SD01	**0.89**	=	2.9	**.16**	**.23**	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	M-SD02	**0.67**	=	2.9	**.16**	**.23**	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	M-SD03	**0.82**	=	2.9	**.16**	**.23**	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	M-SD04	0.072	J	2.9	.16	.23	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	M-SD05	**3.8**	=	2.9	**.16**	**.23**	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	M-SD06	**2.3**	**J**	2.9	**.16**	**.23**	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	M-SD07	0.077	J	2.9	.16	.23	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	M-SD08	0.08	J	2.9	.16	.23	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	M-SD09	**0.21**	**J**	2.9	.16	.23	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	M-SD10	**0.55**	=	2.9	**.16**	**.23**	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	M-SD11	**1.2**	**J**	2.9	**.16**	**.23**	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	M-SD12	0.066	J	2.9	.16	.23	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	M-SD14	**20**	**J**	2.9	**.16**	**.23**	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	M-SD15	0.12	J	2.9	.16	.23	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	M-SD16	0.15	J	2.9	.16	.23	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	M-SD18	0.063	J	2.9	.16	.23	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	M-SD20	**0.84**	=	2.9	**.16**	**.23**	MG/KG
CH2M HILL	BENZO(a)ANTHRACENE	M-SD21	**12**	**J**	2.9	**.16**	**.23**	MG/KG
CH2M HILL	BENZO(a)PYRENE	M-SD01	**0.96**	=	2.5	**.23**	**.4**	MG/KG
CH2M HILL	BENZO(a)PYRENE	M-SD02	**0.55**	=	2.5	**.23**	**.4**	MG/KG
CH2M HILL	BENZO(a)PYRENE	M-SD03	**0.71**	=	2.5	**.23**	**.4**	MG/KG
CH2M HILL	BENZO(a)PYRENE	M-SD04	0.086	J	2.5	.23	.4	MG/KG

Table ODP
Summary of Detected Compounds in Sediment
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Screening Sites Sampling Program
Defense Depot Memphis, Tennessee

Data	Parameter[2]	StationID	Detected	Project	Background	PRG-Sed[4]	NOAA-Sed[5]	Units
CH2M HILL	BENZO(a)PYRENE	M-SD05	4.1	=	2.5	.23	.4	MG/KG
CH2M HILL	BENZO(a)PYRENE	M-SD06	2.9	J	2.5	.23	.4	MG/KG
CH2M HILL	BENZO(a)PYRENE	M-SD07	0.068	J	2.5	.23	.4	MG/KG
CH2M HILL	BENZO(a)PYRENE	M-SD08	0.091	J	2.5	.23	.4	MG/KG
CH2M HILL	BENZO(a)PYRENE	M-SD10	0.53	=	2.5	.23	.4	MG/KG
CH2M HILL	BENZO(a)PYRENE	M-SD11	1.4	J	2.5	.23	.4	MG/KG
CH2M HILL	BENZO(a)PYRENE	M-SD12	0.069	J	2.5	.23	.4	MG/KG
CH2M HILL	BENZO(a)PYRENE	M-SD14	19	J	2.5	.23	.4	MG/KG
CH2M HILL	BENZO(a)PYRENE	M-SD15	0.089	J	2.5	.23	.4	MG/KG
CH2M HILL	BENZO(a)PYRENE	M-SD16	0.17	J	2.5	.23	.4	MG/KG
CH2M HILL	BENZO(a)PYRENE	M-SD17	0.084	J	2.5	.23	.4	MG/KG
CH2M HILL	BENZO(a)PYRENE	M-SD18	0.041	J	2.5	.23	.4	MG/KG
CH2M HILL	BENZO(a)PYRENE	M-SD20	0.81	=	2.5	.23	.4	MG/KG
CH2M HILL	BENZO(a)PYRENE	M-SD21	11	J	2.5	.23	.4	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	M-SD01	1.3	=	2.2	NA	NA	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	M-SD02	1.2	=	2.2	NA	NA	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	M-SD03	1.4	=	2.2	NA	NA	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	M-SD04	0.15	J	2.2	NA	NA	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	M-SD05	4.9	=	2.2	NA	NA	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	M-SD06	4.7	J	2.2	NA	NA	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	M-SD07	0.16	J	2.2	NA	NA	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	M-SD08	0.14	J	2.2	NA	NA	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	M-SD09	0.53	J	2.2	NA	NA	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	M-SD10	1	=	2.2	NA	NA	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	M-SD11	2.3	J	2.2	NA	NA	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	M-SD12	0.12	J	2.2	NA	NA	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	M-SD14	26	J	2.2	NA	NA	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	M-SD15	0.15	J	2.2	NA	NA	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	M-SD16	0.26	J	2.2	NA	NA	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	M-SD17	0.12	J	2.2	NA	NA	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	M-SD18	0.056	J	2.2	NA	NA	MG/KG
CH2M HILL	BENZO(b)FLUORANTHENE	M-SD20	1.3	=	2.2	NA	NA	MG/KG

Table ODP
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Screening Sites Sampling Program
Defense Depot Memphis, Tennessee

Data	Parameter[2]	StationID	Detected	Project	Background	PRG-Sed[4]	NOAA-Sed[5]	Units
CH2M HILL	BENZO(b)FLUORANTHENE	M-SD21	16	J	2.2	NA	NA	MG/KG
CH2M HILL	BENZO(g,h,i)PERYLENE	M-SD01	0.77	=	1.8	NA	NA	MG/KG
CH2M HILL	BENZO(g,h,i)PERYLENE	M-SD02	0.44	=	1.8	NA	NA	MG/KG
CH2M HILL	BENZO(g,h,i)PERYLENE	M-SD03	0.46	=	1.8	NA	NA	MG/KG
CH2M HILL	BENZO(g,h,i)PERYLENE	M-SD04	0.054	J	1.8	NA	NA	MG/KG
CH2M HILL	BENZO(g,h,i)PERYLENE	M-SD05	3	=	1.8	NA	NA	MG/KG
CH2M HILL	BENZO(g,h,i)PERYLENE	M-SD06	2.8	J	1.8	NA	NA	MG/KG
CH2M HILL	BENZO(g,h,i)PERYLENE	M-SD10	0.26	J	1.8	NA	NA	MG/KG
CH2M HILL	BENZO(g,h,i)PERYLENE	M-SD11	0.73	J	1.8	NA	NA	MG/KG
CH2M HILL	BENZO(g,h,i)PERYLENE	M-SD12	0.04	J	1.8	NA	NA	MG/KG
CH2M HILL	BENZO(g,h,i)PERYLENE	M-SD16	0.091	J	1.8	NA	NA	MG/KG
CH2M HILL	BENZO(g,h,i)PERYLENE	M-SD18	0.034	J	1.8	NA	NA	MG/KG
CH2M HILL	BENZO(g,h,i)PERYLENE	M-SD20	0.54	=	1.8	NA	NA	MG/KG
CH2M HILL	BENZO(g,h,i)PERYLENE	M-SD21	9.5	J	1.8	NA	NA	MG/KG
CH2M HILL	BENZO(k)FLUORANTHENE	M-SD01	0.72	=	2.3	NA	NA	MG/KG
CH2M HILL	BENZO(k)FLUORANTHENE	M-SD05	4.6	=	2.3	NA	NA	MG/KG
CH2M HILL	BENZO(k)FLUORANTHENE	M-SD06	3.5	J	2.3	NA	NA	MG/KG
CH2M HILL	BENZO(k)FLUORANTHENE	M-SD08	0.082	J	2.3	NA	NA	MG/KG
CH2M HILL	BENZO(k)FLUORANTHENE	M-SD14	25	J	2.3	NA	NA	MG/KG
CH2M HILL	BENZO(k)FLUORANTHENE	M-SD18	0.041	J	2.3	NA	NA	MG/KG
CH2M HILL	BENZO(k)FLUORANTHENE	M-SD20	0.68	=	2.3	NA	NA	MG/KG
CH2M HILL	BENZO(k)FLUORANTHENE	M-SD21	11	J	2.3	NA	NA	MG/KG
CH2M HILL	BENZYL BUTYL PHTHALATE	M-SD10	0.078	J	NA	NA	NA	MG/KG
CH2M HILL	BENZYL BUTYL PHTHALATE	M-SD11	0.21	J	NA	NA	NA	MG/KG
CH2M HILL	BENZYL BUTYL PHTHALATE	M-SD16	0.084	J	NA	NA	NA	MG/KG
CH2M HILL	BERYLLIUM	M-SD01	0.23	J	1.3	NA	NA	mg/kg
CH2M HILL	BERYLLIUM	M-SD02	1.2	J	1.3	NA	NA	mg/kg
CH2M HILL	BERYLLIUM	M-SD03	0.22	J	1.3	NA	NA	mg/kg
CH2M HILL	BERYLLIUM	M-SD05	0.27	J	1.3	NA	NA	mg/kg
CH2M HILL	BERYLLIUM	M-SD06	0.44	J	1.3	NA	NA	mg/kg
CH2M HILL	BERYLLIUM	M-SD07	0.48	J	1.3	NA	NA	mg/kg
CH2M HILL	BERYLLIUM	M-SD08	0.47	J	1.3	NA	NA	mg/kg

Table ODP
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Screening Sites Sampling Program
Defense Depot Memphis, Tennessee

Data	Parameter[2]	StationID	Detected	Project	Background	PRG-Sed[4]	NOAA-Sed[5]	Units
CH2M HILL	BERYLLIUM	M-SD09	0.58	J	1.3	NA	NA	mg/kg
CH2M HILL	BERYLLIUM	M-SD10	0.35	J	1.3	NA	NA	mg/kg
CH2M HILL	BERYLLIUM	M-SD11	0.29	J	1.3	NA	NA	mg/kg
CH2M HILL	BERYLLIUM	M-SD12	0.49	J	1.3	NA	NA	mg/kg
CH2M HILL	BERYLLIUM	M-SD14	0.32	J	1.3	NA	NA	mg/kg
CH2M HILL	BERYLLIUM	M-SD17	0.4	J	1.3	NA	NA	mg/kg
CH2M HILL	BERYLLIUM	M-SD18	0.62	J	1.3	NA	NA	mg/kg
CH2M HILL	BERYLLIUM	M-SD20	0.29	J	1.3	NA	NA	mg/kg
CH2M HILL	BERYLLIUM	M-SD21	0.35	J	1.3	NA	NA	mg/kg
CH2M HILL	BETA BHC (BETA HEXACHLOROCYCLOHEXANE)	M-SD11	0.0036	J	NA	NA	NA	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	M-SD01	0.082	J	.48	NA	NA	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	M-SD02	0.29	J	.48	NA	NA	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	M-SD03	0.3	J	.48	NA	NA	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	M-SD04	0.051	J	.48	NA	NA	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	M-SD07	0.063	J	.48	NA	NA	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	M-SD08	0.076	J	.48	NA	NA	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	M-SD09	0.37	=	.48	NA	NA	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	M-SD10	1.4	=	.48	NA	NA	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	M-SD11	2.9	J	.48	NA	NA	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	M-SD12	0.085	J	.48	NA	NA	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	M-SD14	1.5	J	.48	NA	NA	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	M-SD15	1.2	J	.48	NA	NA	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	M-SD16	0.19	J	.48	NA	NA	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	M-SD17	0.21	J	.48	NA	NA	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	M-SD18	0.13	J	.48	NA	NA	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	M-SD19	0.074	J	.48	NA	NA	MG/KG
CH2M HILL	bis(2-ETHYLHEXYL) PHTHALATE	M-SD20	0.12	J	.48	NA	NA	MG/KG
CH2M HILL	CADMIUM	M-SD01	0.38	J	29	1	5	mg/kg
CH2M HILL	CADMIUM	M-SD02	1.2	=	29	1	5	mg/kg
CH2M HILL	CADMIUM	M-SD03	2.4	=	29	1	5	mg/kg
CH2M HILL	CADMIUM	M-SD05	0.4	J	29	1	5	mg/kg
CH2M HILL	CADMIUM	M-SD06	0.28	J	29	1	5	mg/kg

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Defense Depot Memphis, Tennessee

Data	Parameter[2]	StationID	Detected	Project	Background	PRG-Sed[4]	NOAA-Sed[3]	Units
CH2M HILL	CADMIUM	M-SD09	1.2	=	29	1	5	mg/kg
CH2M HILL	CADMIUM	M-SD10	0.49	J	29	1	5	mg/kg
CH2M HILL	CADMIUM	M-SD11	1.1	J	29	1	5	mg/kg
CH2M HILL	CADMIUM	M-SD14	2.6	=	29	1	5	mg/kg
CH2M HILL	CADMIUM	M-SD16	0.26	J	29	1	5	mg/kg
CH2M HILL	CADMIUM	M-SD17	0.46	J	29	1	5	mg/kg
CH2M HILL	CADMIUM	M-SD20	0.44	J	29	1	5	mg/kg
CH2M HILL	CADMIUM	M-SD21	3	=	29	1	5	mg/kg
CH2M HILL	CALCIUM	M-SD01	19200	=	15000	NA	NA	mg/kg
CH2M HILL	CALCIUM	M-SD02	37900	=	15000	NA	NA	mg/kg
CH2M HILL	CALCIUM	M-SD03	148000	=	15000	NA	NA	mg/kg
CH2M HILL	CALCIUM	M-SD04	13300	=	15000	NA	NA	mg/kg
CH2M HILL	CALCIUM	M-SD05	43100	=	15000	NA	NA	mg/kg
CH2M HILL	CALCIUM	M-SD06	15500	=	15000	NA	NA	mg/kg
CH2M HILL	CALCIUM	M-SD07	1160	=	15000	NA	NA	mg/kg
CH2M HILL	CALCIUM	M-SD08	1180	=	15000	NA	NA	mg/kg
CH2M HILL	CALCIUM	M-SD09	4190	=	15000	NA	NA	mg/kg
CH2M HILL	CALCIUM	M-SD10	17600	=	15000	NA	NA	mg/kg
CH2M HILL	CALCIUM	M-SD11	15000	=	15000	NA	NA	mg/kg
CH2M HILL	CALCIUM	M-SD12	3140	=	15000	NA	NA	mg/kg
CH2M HILL	CALCIUM	M-SD14	24800	=	15000	NA	NA	mg/kg
CH2M HILL	CALCIUM	M-SD15	4470	=	15000	NA	NA	mg/kg
CH2M HILL	CALCIUM	M-SD16	158000	=	15000	NA	NA	mg/kg
CH2M HILL	CALCIUM	M-SD17	1820	=	15000	NA	NA	mg/kg
CH2M HILL	CALCIUM	M-SD18	1620	=	15000	NA	NA	mg/kg
CH2M HILL	CALCIUM	M-SD19	134000	=	15000	NA	NA	mg/kg
CH2M HILL	CALCIUM	M-SD20	19200	=	15000	NA	NA	mg/kg
CH2M HILL	CALCIUM	M-SD21	27900	=	15000	NA	NA	mg/kg
CH2M HILL	CARBAZOLE	M-SD01	0.17	J	1.1	NA	NA	MG/KG
CH2M HILL	CARBAZOLE	M-SD02	0.072	J	1.1	NA	NA	MG/KG
CH2M HILL	CARBAZOLE	M-SD03	0.19	J	1.1	NA	NA	MG/KG
CH2M HILL	CARBAZOLE	M-SD05	0.66	J	1.1	NA	NA	MG/KG

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Screening Sites Sampling Program
Defense Depot Memphis, Tennessee

Data	Parameter[2]	StationID	Detected	Project	Background	PRG-Sed[4]	NOAA-Sed[5]	Units
CH2M HILL	CARBAZOLE	M-SD06	0.54	J	1.1	NA	NA	MG/KG
CH2M HILL	CARBAZOLE	M-SD09	0.028	J	1.1	NA	NA	MG/KG
CH2M HILL	CARBAZOLE	M-SD10	0.099	J	1.1	NA	NA	MG/KG
CH2M HILL	CARBAZOLE	M-SD11	0.21	J	1.1	NA	NA	MG/KG
CH2M HILL	CARBAZOLE	M-SD14	2.4	J	1.1	NA	NA	MG/KG
CH2M HILL	CARBAZOLE	M-SD18	0.023	J	1.1	NA	NA	MG/KG
CH2M HILL	CARBAZOLE	M-SD20	0.16	J	1.1	NA	NA	MG/KG
CH2M HILL	CARBAZOLE	M-SD21	2.1	J	1.1	NA	NA	MG/KG
CH2M HILL	CARBON TETRACHLORIDE	M-SD01	0.007	J	NA	NA	NA	MG/KG
CH2M HILL	CARBON TETRACHLORIDE	M-SD02	0.11	=	NA	NA	NA	MG/KG
CH2M HILL	CARBON TETRACHLORIDE	M-SD03	0.005	J	NA	NA	NA	MG/KG
CH2M HILL	CARBON TETRACHLORIDE	M-SD08	0.019	=	NA	NA	NA	MG/KG
CH2M HILL	CARBON TETRACHLORIDE	M-SD10	0.089	J	NA	NA	NA	MG/KG
CH2M HILL	CARBON TETRACHLORIDE	M-SD18	0.044	=	NA	NA	NA	MG/KG
CH2M HILL	CARBON TETRACHLORIDE	M-SD19	0.078	=	NA	NA	NA	MG/KG
CH2M HILL	CHROMIUM, TOTAL	M-SD01	8.4	=	20	33	80	mg/kg
CH2M HILL	CHROMIUM, TOTAL	M-SD02	5.1	=	20	33	80	mg/kg
CH2M HILL	CHROMIUM, TOTAL	M-SD03	10.7	=	20	33	80	mg/kg
CH2M HILL	CHROMIUM, TOTAL	M-SD04	14.6	=	20	33	80	mg/kg
CH2M HILL	CHROMIUM, TOTAL	M-SD05	16.7	=	20	33	80	mg/kg
CH2M HILL	CHROMIUM, TOTAL	M-SD06	17.7	=	20	33	80	mg/kg
CH2M HILL	CHROMIUM, TOTAL	M-SD07	10.2	=	20	33	80	mg/kg
CH2M HILL	CHROMIUM, TOTAL	M-SD08	10.8	=	20	33	80	mg/kg
CH2M HILL	CHROMIUM, TOTAL	M-SD09	12	=	20	33	80	mg/kg
CH2M HILL	CHROMIUM, TOTAL	M-SD10	8.4	=	20	33	80	mg/kg
CH2M HILL	CHROMIUM, TOTAL	M-SD11	12.1	=	20	33	80	mg/kg
CH2M HILL	CHROMIUM, TOTAL	M-SD12	10.6	=	20	33	80	mg/kg
CH2M HILL	CHROMIUM, TOTAL	M-SD14	36.2	=	20	33	80	mg/kg
CH2M HILL	CHROMIUM, TOTAL	M-SD15	3.1	=	20	33	80	mg/kg
CH2M HILL	CHROMIUM, TOTAL	M-SD16	5.6	=	20	33	80	mg/kg
CH2M HILL	CHROMIUM, TOTAL	M-SD17	7.8	=	20	33	80	mg/kg
CH2M HILL	CHROMIUM, TOTAL	M-SD18	10.7	=	20	33	80	mg/kg

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Data	Parameter[2]	StationID	Detected	Project	Background	PRG-Sed[4]	NOAA-Sed[5]	Units
CH2M HILL	CHROMIUM, TOTAL	M-SD19	3.7	=	20	33	80	mg/kg
CH2M HILL	CHROMIUM, TOTAL	M-SD20	6.9	=	20	33	80	mg/kg
CH2M HILL	CHROMIUM, TOTAL	M-SD21	28	=	20	33	80	mg/kg
CH2M HILL	CHRYSENE	M-SD01	1	=	3.2	.22	.4	MG/KG
CH2M HILL	CHRYSENE	M-SD02	0.51	=	3.2	.22	.4	MG/KG
CH2M HILL	CHRYSENE	M-SD03	0.88	=	3.2	.22	.4	MG/KG
CH2M HILL	CHRYSENE	M-SD04	0.059	J	3.2	.22	.4	MG/KG
CH2M HILL	CHRYSENE	M-SD05	4.6	=	3.2	.22	.4	MG/KG
CH2M HILL	CHRYSENE	M-SD06	3.4	J	3.2	.22	.4	MG/KG
CH2M HILL	CHRYSENE	M-SD07	0.1	J	3.2	.22	.4	MG/KG
CH2M HILL	CHRYSENE	M-SD08	0.1	J	3.2	.22	.4	MG/KG
CH2M HILL	CHRYSENE	M-SD09	0.35	J	3.2	.22	.4	MG/KG
CH2M HILL	CHRYSENE	M-SD10	0.6	=	3.2	.22	.4	MG/KG
CH2M HILL	CHRYSENE	M-SD11	1.4	J	3.2	.22	.4	MG/KG
CH2M HILL	CHRYSENE	M-SD12	0.073	J	3.2	.22	.4	MG/KG
CH2M HILL	CHRYSENE	M-SD14	30	J	3.2	.22	.4	MG/KG
CH2M HILL	CHRYSENE	M-SD15	0.14	J	3.2	.22	.4	MG/KG
CH2M HILL	CHRYSENE	M-SD16	0.17	J	3.2	.22	.4	MG/KG
CH2M HILL	CHRYSENE	M-SD17	0.064	J	3.2	.22	.4	MG/KG
CH2M HILL	CHRYSENE	M-SD18	0.065	J	3.2	.22	.4	MG/KG
CH2M HILL	CHRYSENE	M-SD20	0.87	=	3.2	.22	.4	MG/KG
CH2M HILL	CHRYSENE	M-SD21	13	J	3.2	.22	.4	MG/KG
CH2M HILL	COBALT	M-SD01	0.76	J	14	NA	NA	mg/kg
CH2M HILL	COBALT	M-SD02	0.8	J	14	NA	NA	mg/kg
CH2M HILL	COBALT	M-SD03	1.5	J	14	NA	NA	mg/kg
CH2M HILL	COBALT	M-SD04	219	=	14	NA	NA	mg/kg
CH2M HILL	COBALT	M-SD05	2.6	J	14	NA	NA	mg/kg
CH2M HILL	COBALT	M-SD06	8.1	J	14	NA	NA	mg/kg
CH2M HILL	COBALT	M-SD07	7.6	J	14	NA	NA	mg/kg
CH2M HILL	COBALT	M-SD08	6.1	J	14	NA	NA	mg/kg
CH2M HILL	COBALT	M-SD09	9.4	J	14	NA	NA	mg/kg
CH2M HILL	COBALT	M-SD10	5.4	J	14	NA	NA	mg/kg

Table ODP
Summary of Detected Compounds in Sediment
Compared to Screening Levels for Site ODP
Screening Sites Sampling Program
Defense Depot Memphis, Tennessee

Data	Parameter[2]	StationID	Detected	Project	Background	PRG-Sed[4]	NOAA-Sed[5]	Units
CH2M HILL	COBALT	M-SD11	3.2	J	14	NA	NA	mg/kg
CH2M HILL	COBALT	M-SD12	8.3	J	14	NA	NA	mg/kg
CH2M HILL	COBALT	M-SD14	4.6	J	14	NA	NA	mg/kg
CH2M HILL	COBALT	M-SD15	2.5	J	14	NA	NA	mg/kg
CH2M HILL	COBALT	M-SD16	1.6	J	14	NA	NA	mg/kg
CH2M HILL	COBALT	M-SD17	6.8	J	14	NA	NA	mg/kg
CH2M HILL	COBALT	M-SD18	6.3	J	14	NA	NA	mg/kg
CH2M HILL	COBALT	M-SD19	10.8	J	14	NA	NA	mg/kg
CH2M HILL	COBALT	M-SD20	1	J	14	NA	NA	mg/kg
CH2M HILL	COBALT	M-SD21	5.1	J	14	NA	NA	mg/kg
CH2M HILL	COPPER	M-SD01	11.9	=	58	28	70	mg/kg
CH2M HILL	COPPER	M-SD02	6.9	=	58	28	70	mg/kg
CH2M HILL	COPPER	M-SD03	15.4	=	58	28	70	mg/kg
CH2M HILL	COPPER	M-SD04	34.7	=	58	28	70	mg/kg
CH2M HILL	COPPER	M-SD05	7.4	=	58	28	70	mg/kg
CH2M HILL	COPPER	M-SD06	14.9	=	58	28	70	mg/kg
CH2M HILL	COPPER	M-SD07	19.1	=	58	28	70	mg/kg
CH2M HILL	COPPER	M-SD08	14.1	=	58	28	70	mg/kg
CH2M HILL	COPPER	M-SD09	83.7	=	58	28	70	mg/kg
CH2M HILL	COPPER	M-SD10	14.3	=	58	28	70	mg/kg
CH2M HILL	COPPER	M-SD11	41.5	=	58	28	70	mg/kg
CH2M HILL	COPPER	M-SD12	20.9	=	58	28	70	mg/kg
CH2M HILL	COPPER	M-SD14	53	=	58	28	70	mg/kg
CH2M HILL	COPPER	M-SD15	9.6	=	58	28	70	mg/kg
CH2M HILL	COPPER	M-SD16	7.1	=	58	28	70	mg/kg
CH2M HILL	COPPER	M-SD17	15.3	=	58	28	70	mg/kg
CH2M HILL	COPPER	M-SD18	11.2	=	58	28	70	mg/kg
CH2M HILL	COPPER	M-SD19	4.5	J	58	28	70	mg/kg
CH2M HILL	COPPER	M-SD20	4.3	J	58	28	70	mg/kg
CH2M HILL	COPPER	M-SD21	56.5	=	58	28	70	mg/kg
CH2M HILL	CYANIDE	M-SD05	0.34	J	NA	NA	NA	mg/kg
CH2M HILL	CYANIDE	M-SD06	0.18	J	NA	NA	NA	mg/kg

Table ODP
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Screening Sites Sampling Program
Defense Depot Memphis, Tennessee

Data	Parameter[1]	StationID	Detected	Project	Background	PRG-Sed[4]	NOAA-Sed[5]	Units
CH2M HILL	CYANIDE	M-SD07	0.31	J	NA	NA	NA	mg/kg
CH2M HILL	CYANIDE	M-SD08	0.23	J	NA	NA	NA	mg/kg
CH2M HILL	CYANIDE	M-SD09	0.59	=	NA	NA	NA	mg/kg
CH2M HILL	CYANIDE	M-SD10	0.26	J	NA	NA	NA	mg/kg
CH2M HILL	CYANIDE	M-SD11	0.28	J	NA	NA	NA	mg/kg
CH2M HILL	CYANIDE	M-SD14	0.6	J	NA	NA	NA	mg/kg
CH2M HILL	CYANIDE	M-SD20	0.23	J	NA	NA	NA	mg/kg
CH2M HILL	CYANIDE	M-SD21	0.7	=	NA	NA	NA	mg/kg
CH2M HILL	DI-n-BUTYL PHTHALATE	M-SD01	0.023	J	NA	NA	NA	MG/KG
CH2M HILL	DI-n-BUTYL PHTHALATE	M-SD02	0.044	J	NA	NA	NA	MG/KG
CH2M HILL	DI-n-BUTYL PHTHALATE	M-SD03	0.022	J	NA	NA	NA	MG/KG
CH2M HILL	DI-n-BUTYL PHTHALATE	M-SD04	0.022	J	NA	NA	NA	MG/KG
CH2M HILL	DI-n-BUTYL PHTHALATE	M-SD09	0.05	J	NA	NA	NA	MG/KG
CH2M HILL	DI-n-BUTYL PHTHALATE	M-SD10	0.045	J	NA	NA	NA	MG/KG
CH2M HILL	DI-n-BUTYL PHTHALATE	M-SD11	0.064	J	NA	NA	NA	MG/KG
CH2M HILL	DI-n-BUTYL PHTHALATE	M-SD12	0.022	J	NA	NA	NA	MG/KG
CH2M HILL	DI-n-BUTYL PHTHALATE	M-SD15	0.026	J	NA	NA	NA	MG/KG
CH2M HILL	DI-n-BUTYL PHTHALATE	M-SD16	0.02	J	NA	NA	NA	MG/KG
CH2M HILL	DI-n-BUTYL PHTHALATE	M-SD17	0.045	J	NA	NA	NA	MG/KG
CH2M HILL	DI-n-BUTYL PHTHALATE	M-SD18	0.034	J	NA	NA	NA	MG/KG
CH2M HILL	DI-n-BUTYL PHTHALATE	M-SD19	0.034	J	NA	NA	NA	MG/KG
CH2M HILL	DI-n-BUTYL PHTHALATE	M-SD20	0.019	J	NA	NA	NA	MG/KG
CH2M HILL	DI-n-OCTYLPHTHALATE	M-SD16	0.021	J	1.66	NA	NA	MG/KG
CH2M HILL	DI-n-OCTYLPHTHALATE	M-SD17	0.09	J	1.66	NA	NA	MG/KG
CH2M HILL	DIBENZ(a,h)ANTHRACENE	M-SD01	0.25	J	.7	.031	.06	MG/KG
CH2M HILL	DIBENZ(a,h)ANTHRACENE	M-SD02	0.12	J	.7	.031	.06	MG/KG
CH2M HILL	DIBENZ(a,h)ANTHRACENE	M-SD03	0.18	J	.7	.031	.06	MG/KG
CH2M HILL	DIBENZ(a,h)ANTHRACENE	M-SD04	0.032	J	.7	.031	.06	MG/KG
CH2M HILL	DIBENZ(a,h)ANTHRACENE	M-SD05	0.48	J	.7	.031	.06	MG/KG
CH2M HILL	DIBENZ(a,h)ANTHRACENE	M-SD10	0.12	J	.7	.031	.06	MG/KG
CH2M HILL	DIBENZ(a,h)ANTHRACENE	M-SD11	0.31	J	.7	.031	.06	MG/KG
CH2M HILL	DIBENZ(a,h)ANTHRACENE	M-SD16	0.028	J	.7	.031	.06	MG/KG

Table ODP
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Screening Sites Sampling Program
Defense Depot Memphis, Tennessee

Data	Parameter[2]	StationID	Detected	Project	Background	PRG-Sed[4]	NOAA-Sed[5]	Units
CH2M HILL	DIBENZ(a,h)ANTHRACENE	M-SD20	0.24	J	.7	.031	.06	MG/KG
CH2M HILL	DIBENZOFURAN	M-SD01	0.073	J	1.64	NA	NA	MG/KG
CH2M HILL	DIBENZOFURAN	M-SD03	0.022	J	1.64	NA	NA	MG/KG
CH2M HILL	DIBENZOFURAN	M-SD06	0.1	J	1.64	NA	NA	MG/KG
CH2M HILL	DIBENZOFURAN	M-SD11	0.04	J	1.64	NA	NA	MG/KG
CH2M HILL	DIBENZOFURAN	M-SD20	0.056	J	1.64	NA	NA	MG/KG
CH2M HILL	DIELDRIN	M-SD01	0.012	J	.011	NA	NA	MG/KG
CH2M HILL	DIELDRIN	M-SD02	0.0063	J	.011	NA	NA	MG/KG
CH2M HILL	DIELDRIN	M-SD03	0.014	J	.011	NA	NA	MG/KG
CH2M HILL	DIELDRIN	M-SD05	0.038	J	.011	NA	NA	MG/KG
CH2M HILL	DIELDRIN	M-SD06	0.086	J	.011	NA	NA	MG/KG
CH2M HILL	DIELDRIN	M-SD07	0.052	J	.011	NA	NA	MG/KG
CH2M HILL	DIELDRIN	M-SD08	0.13	J	.011	NA	NA	MG/KG
CH2M HILL	DIELDRIN	M-SD09	0.26	J	.011	NA	NA	MG/KG
CH2M HILL	DIELDRIN	M-SD10	0.13	=	.011	NA	NA	MG/KG
CH2M HILL	DIELDRIN	M-SD11	0.06	J	.011	NA	NA	MG/KG
CH2M HILL	DIELDRIN	M-SD12	0.058	J	.011	NA	NA	MG/KG
CH2M HILL	DIELDRIN	M-SD14	0.31	J	.011	NA	NA	MG/KG
CH2M HILL	DIELDRIN	M-SD15	0.16	=	.011	NA	NA	MG/KG
CH2M HILL	DIELDRIN	M-SD16	0.031	J	.011	NA	NA	MG/KG
CH2M HILL	DIELDRIN	M-SD17	0.038	J	.011	NA	NA	MG/KG
CH2M HILL	DIELDRIN	M-SD18	0.0046	J	.011	NA	NA	MG/KG
CH2M HILL	DIELDRIN	M-SD20	0.0081	J	.011	NA	NA	MG/KG
CH2M HILL	DIELDRIN	M-SD21	0.3	J	.011	NA	NA	MG/KG
CH2M HILL	DIETHYL PHTHALATE	M-SD02	0.027	J	NA	NA	NA	MG/KG
CH2M HILL	DIETHYL PHTHALATE	M-SD10	0.03	J	NA	NA	NA	MG/KG
CH2M HILL	DIETHYL PHTHALATE	M-SD11	0.046	J	NA	NA	NA	MG/KG
CH2M HILL	DIETHYL PHTHALATE	M-SD12	0.033	J	NA	NA	NA	MG/KG
CH2M HILL	DIETHYL PHTHALATE	M-SD14	7.7	J	NA	NA	NA	MG/KG
CH2M HILL	DIETHYL PHTHALATE	M-SD15	0.52	J	NA	NA	NA	MG/KG
CH2M HILL	DIETHYL PHTHALATE	M-SD16	0.026	J	NA	NA	NA	MG/KG
CH2M HILL	DIETHYL PHTHALATE	M-SD17	0.076	J	NA	NA	NA	MG/KG

Table ODP
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Screening Sites Sampling Program
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Data	Parameter[1]	StationID	Detected	Project	Background	PRG-Sed[4]	NOAA-Sed[5]	Units
CH2M HILL	DIETHYL PHTHALATE	M-SD18	0.38	J	NA	NA	NA	MG/KG
CH2M HILL	DIMETHYL PHTHALATE	M-SD18	0.11	J	NA	NA	NA	MG/KG
CH2M HILL	ENDRIN	M-SD01	0.014	J	NA	NA	.00002	MG/KG
CH2M HILL	ENDRIN	M-SD02	0.015	J	NA	NA	.00002	MG/KG
CH2M HILL	ENDRIN	M-SD03	0.01	J	NA	NA	.00002	MG/KG
CH2M HILL	ENDRIN	M-SD05	0.018	J	NA	NA	.00002	MG/KG
CH2M HILL	ENDRIN	M-SD10	0.013	J	NA	NA	.00002	MG/KG
CH2M HILL	ENDRIN	M-SD11	0.01	J	NA	NA	.00002	MG/KG
CH2M HILL	ENDRIN	M-SD14	0.048	J	NA	NA	.00002	MG/KG
CH2M HILL	ENDRIN	M-SD15	0.011	J	NA	NA	.00002	MG/KG
CH2M HILL	ENDRIN	M-SD16	0.014	J	NA	NA	.00002	MG/KG
CH2M HILL	ENDRIN	M-SD20	0.026	J	NA	NA	.00002	MG/KG
CH2M HILL	ENDRIN	M-SD21	0.045	J	NA	NA	.00002	MG/KG
CH2M HILL	ENDRIN ALDEHYDE	M-SD02	0.019	J	NA	NA	NA	MG/KG
CH2M HILL	ENDRIN ALDEHYDE	M-SD03	0.0097	J	NA	NA	NA	MG/KG
CH2M HILL	ENDRIN ALDEHYDE	M-SD10	0.027	J	NA	NA	NA	MG/KG
CH2M HILL	ENDRIN ALDEHYDE	M-SD11	0.011	J	NA	NA	NA	MG/KG
CH2M HILL	ENDRIN ALDEHYDE	M-SD14	0.029	J	NA	NA	NA	MG/KG
CH2M HILL	ENDRIN ALDEHYDE	M-SD15	0.0082	J	NA	NA	NA	MG/KG
CH2M HILL	ENDRIN ALDEHYDE	M-SD16	0.004	J	NA	NA	NA	MG/KG
CH2M HILL	ENDRIN ALDEHYDE	M-SD20	0.0046	J	NA	NA	NA	MG/KG
CH2M HILL	ENDRIN ALDEHYDE	M-SD21	0.043	J	NA	NA	NA	MG/KG
CH2M HILL	FLUORANTHENE	M-SD01	1.8	=	7.1	.38	.6	MG/KG
CH2M HILL	FLUORANTHENE	M-SD02	0.83	=	7.1	.38	.6	MG/KG
CH2M HILL	FLUORANTHENE	M-SD03	1.2	=	7.1	.38	.6	MG/KG
CH2M HILL	FLUORANTHENE	M-SD04	0.037	J	7.1	.38	.6	MG/KG
CH2M HILL	FLUORANTHENE	M-SD05	9.9	=	7.1	.38	.6	MG/KG
CH2M HILL	FLUORANTHENE	M-SD06	4.6	J	7.1	.38	.6	MG/KG
CH2M HILL	FLUORANTHENE	M-SD07	0.14	J	7.1	.38	.6	MG/KG
CH2M HILL	FLUORANTHENE	M-SD08	0.14	J	7.1	.38	.6	MG/KG
CH2M HILL	FLUORANTHENE	M-SD09	0.2	J	7.1	.38	.6	MG/KG
CH2M HILL	FLUORANTHENE	M-SD10	1.1	=	7.1	.38	.6	MG/KG

Table ODP
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Screening Sites Sampling Program
Defense Depot Memphis, Tennessee

Data	Parameter[2]	StationID	Detected		Project	Background	PRG-Sed[4]	NOAA-Sed[5]	Units
CH2M HILL	FLUORANTHENE	M-SD11	2.6	J		7.1	.38	.6	MG/KG
CH2M HILL	FLUORANTHENE	M-SD12	0.11	J		7.1	.38	.6	MG/KG
CH2M HILL	FLUORANTHENE	M-SD14	30	J		7.1	.38	.6	MG/KG
CH2M HILL	FLUORANTHENE	M-SD15	0.28	J		7.1	.38	.6	MG/KG
CH2M HILL	FLUORANTHENE	M-SD16	0.18	J		7.1	.38	.6	MG/KG
CH2M HILL	FLUORANTHENE	M-SD18	0.15	J		7.1	.38	.6	MG/KG
CH2M HILL	FLUORANTHENE	M-SD20	1.6	=		7.1	.38	.6	MG/KG
CH2M HILL	FLUORANTHENE	M-SD21	32	J		7.1	.38	.6	MG/KG
CH2M HILL	FLUORENE	M-SD01	0.1	J		1.69	.018	.035	MG/KG
CH2M HILL	FLUORENE	M-SD02	0.039	J		1.69	.018	.035	MG/KG
CH2M HILL	FLUORENE	M-SD03	0.084	J		1.69	.018	.035	MG/KG
CH2M HILL	FLUORENE	M-SD05	0.22	J		1.69	.018	.035	MG/KG
CH2M HILL	FLUORENE	M-SD06	0.18	J		1.69	.018	.035	MG/KG
CH2M HILL	FLUORENE	M-SD10	0.038	J		1.69	.018	.035	MG/KG
CH2M HILL	FLUORENE	M-SD11	0.068	J		1.69	.018	.035	MG/KG
CH2M HILL	FLUORENE	M-SD14	7.2	J		1.69	.018	.035	MG/KG
CH2M HILL	FLUORENE	M-SD18	0.029	J		1.69	.018	.035	MG/KG
CH2M HILL	FLUORENE	M-SD20	0.098	J		1.69	.018	.035	MG/KG
CH2M HILL	FLUORENE	M-SD21	5.2	J		1.69	.018	.035	MG/KG
CH2M HILL	GAMMA-CHLORDANE	M-SD01	0.018	J		2	NA	NA	MG/KG
CH2M HILL	GAMMA-CHLORDANE	M-SD02	0.011	J		2	NA	NA	MG/KG
CH2M HILL	GAMMA-CHLORDANE	M-SD03	0.0051	J		2	NA	NA	MG/KG
CH2M HILL	GAMMA-CHLORDANE	M-SD05	0.0048	J		2	NA	NA	MG/KG
CH2M HILL	GAMMA-CHLORDANE	M-SD10	0.02	J		2	NA	NA	MG/KG
CH2M HILL	GAMMA-CHLORDANE	M-SD11	0.012	J		2	NA	NA	MG/KG
CH2M HILL	GAMMA-CHLORDANE	M-SD12	0.0062	J		2	NA	NA	MG/KG
CH2M HILL	GAMMA-CHLORDANE	M-SD14	0.044	J		2	NA	NA	MG/KG
CH2M HILL	GAMMA-CHLORDANE	M-SD15	0.017	J		2	NA	NA	MG/KG
CH2M HILL	GAMMA-CHLORDANE	M-SD16	0.023	J		2	NA	NA	MG/KG
CH2M HILL	GAMMA-CHLORDANE	M-SD17	0.0075	J		2	NA	NA	MG/KG
CH2M HILL	GAMMA-CHLORDANE	M-SD20	0.027	J		2	NA	NA	MG/KG
CH2M HILL	GAMMA-CHLORDANE	M-SD21	0.036	J		2	NA	NA	MG/KG

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Data	Parameter[2]	StationID	Detected	Project	Background	PRG-Sed[4]	NOAA-Sed[5]	Units
CH2M HILL	HEPTACHLOR	M-SD01	0.0018	J	NA	NA	NA	MG/KG
CH2M HILL	HEPTACHLOR	M-SD20	0.002	J	NA	NA	NA	MG/KG
CH2M HILL	HEPTACHLOR EPOXIDE	M-SD01	0.0037	J	.23	NA	NA	MG/KG
CH2M HILL	HEPTACHLOR EPOXIDE	M-SD10	0.0026	J	.23	NA	NA	MG/KG
CH2M HILL	HEPTACHLORINATED DIBENZO-p-DIOXINS, (TOTAL)	M-SD01	0.0123	=	NA	NA	NA	MG/KG
CH2M HILL	HEPTACHLORINATED DIBENZO-p-DIOXINS, (TOTAL)	M-SD02	0.00262	=	NA	NA	NA	MG/KG
CH2M HILL	HEPTACHLORINATED DIBENZO-p-DIOXINS, (TOTAL)	M-SD03	0.00145	=	NA	NA	NA	MG/KG
CH2M HILL	HEPTACHLORINATED DIBENZO-p-DIOXINS, (TOTAL)	M-SD04	0.00078	=	NA	NA	NA	MG/KG
CH2M HILL	HEPTACHLORINATED DIBENZO-p-DIOXINS, (TOTAL)	M-SD05	0.0043	=	NA	NA	NA	MG/KG
CH2M HILL	HEPTACHLORINATED DIBENZO-p-DIOXINS, (TOTAL)	M-SD06	0.0063	J	NA	NA	NA	MG/KG
CH2M HILL	HEPTACHLORINATED DIBENZO-p-DIOXINS, (TOTAL)	M-SD07	0.000103	=	NA	NA	NA	MG/KG
CH2M HILL	HEPTACHLORINATED DIBENZO-p-DIOXINS, (TOTAL)	M-SD08	0.000387	=	NA	NA	NA	MG/KG
CH2M HILL	HEPTACHLORINATED DIBENZO-p-DIOXINS, (TOTAL)	M-SD09	0.000745	=	NA	NA	NA	MG/KG
CH2M HILL	HEPTACHLORINATED DIBENZO-p-DIOXINS, (TOTAL)	M-SD10	0.00386	=	NA	NA	NA	MG/KG
CH2M HILL	HEPTACHLORINATED DIBENZO-p-DIOXINS, (TOTAL)	M-SD11	0.0013	J	NA	NA	NA	MG/KG
CH2M HILL	HEPTACHLORINATED DIBENZO-p-DIOXINS, (TOTAL)	M-SD12	0.000175	=	NA	NA	NA	MG/KG
CH2M HILL	HEPTACHLORINATED DIBENZO-p-DIOXINS, (TOTAL)	M-SD14	0.0093	J	NA	NA	NA	MG/KG
CH2M HILL	HEPTACHLORINATED DIBENZO-p-DIOXINS, (TOTAL)	M-SD20	0.0126	=	NA	NA	NA	MG/KG
CH2M HILL	HEPTACHLORINATED DIBENZO-p-DIOXINS, (TOTAL)	M-SD21	0.0084	J	NA	NA	NA	MG/KG
CH2M HILL	HEPTACHLORINATED DIBENZOFURANS, (TOTAL)	M-SD01	0.00198	=	NA	NA	NA	MG/KG
CH2M HILL	HEPTACHLORINATED DIBENZOFURANS, (TOTAL)	M-SD02	0.000883	=	NA	NA	NA	MG/KG
CH2M HILL	HEPTACHLORINATED DIBENZOFURANS, (TOTAL)	M-SD03	0.00078	=	NA	NA	NA	MG/KG
CH2M HILL	HEPTACHLORINATED DIBENZOFURANS, (TOTAL)	M-SD04	0.000166	=	NA	NA	NA	MG/KG
CH2M HILL	HEPTACHLORINATED DIBENZOFURANS, (TOTAL)	M-SD05	0.0013	J	NA	NA	NA	MG/KG
CH2M HILL	HEPTACHLORINATED DIBENZOFURANS, (TOTAL)	M-SD07	2.16E-05	=	NA	NA	NA	MG/KG
CH2M HILL	HEPTACHLORINATED DIBENZOFURANS, (TOTAL)	M-SD08	0.00004	=	NA	NA	NA	MG/KG
CH2M HILL	HEPTACHLORINATED DIBENZOFURANS, (TOTAL)	M-SD09	0.000384	=	NA	NA	NA	MG/KG
CH2M HILL	HEPTACHLORINATED DIBENZOFURANS, (TOTAL)	M-SD10	0.00146	=	NA	NA	NA	MG/KG
CH2M HILL	HEPTACHLORINATED DIBENZOFURANS, (TOTAL)	M-SD11	0.000134	J	NA	NA	NA	MG/KG
CH2M HILL	HEPTACHLORINATED DIBENZOFURANS, (TOTAL)	M-SD12	4.39E-05	=	NA	NA	NA	MG/KG
CH2M HILL	HEPTACHLORINATED DIBENZOFURANS, (TOTAL)	M-SD14	0.0043	J	NA	NA	NA	MG/KG
CH2M HILL	HEPTACHLORINATED DIBENZOFURANS, (TOTAL)	M-SD19	6.9E-06	=	NA	NA	NA	MG/KG

Table ODP
Summary of Detected Compounds in Sediment
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Screening Sites Sampling Program
Defense Depot Memphis, Tennessee

Data	Parameter[2]	StationID	Detected	Project	Background	PRG-Sed[4]	NOAA-Sed[5]	Units
CH2M HILL	HEPTACHLORINATED DIBENZOFURANS, (TOTAL)	M-SD20	0.00167	=	NA	NA	NA	MG/KG
CH2M HILL	HEPTACHLORINATED DIBENZOFURANS, (TOTAL)	M-SD21	0.0018	J	NA	NA	NA	MG/KG
CH2M HILL	HEXACHLORINATED DIBENZO-p-DIOXINS, (TOTAL)	M-SD01	0.00103	=	NA	NA	NA	MG/KG
CH2M HILL	HEXACHLORINATED DIBENZO-p-DIOXINS, (TOTAL)	M-SD02	0.00017	=	NA	NA	NA	MG/KG
CH2M HILL	HEXACHLORINATED DIBENZO-p-DIOXINS, (TOTAL)	M-SD03	0.000178	=	NA	NA	NA	MG/KG
CH2M HILL	HEXACHLORINATED DIBENZO-p-DIOXINS, (TOTAL)	M-SD04	5.59E-05	=	NA	NA	NA	MG/KG
CH2M HILL	HEXACHLORINATED DIBENZO-p-DIOXINS, (TOTAL)	M-SD07	3.05E-05	=	NA	NA	NA	MG/KG
CH2M HILL	HEXACHLORINATED DIBENZO-p-DIOXINS, (TOTAL)	M-SD08	2.52E-05	=	NA	NA	NA	MG/KG
CH2M HILL	HEXACHLORINATED DIBENZO-p-DIOXINS, (TOTAL)	M-SD09	0.000192	=	NA	NA	NA	MG/KG
CH2M HILL	HEXACHLORINATED DIBENZO-p-DIOXINS, (TOTAL)	M-SD10	0.000736	=	NA	NA	NA	MG/KG
CH2M HILL	HEXACHLORINATED DIBENZO-p-DIOXINS, (TOTAL)	M-SD12	8.92E-05	=	NA	NA	NA	MG/KG
CH2M HILL	HEXACHLORINATED DIBENZO-p-DIOXINS, (TOTAL)	M-SD20	0.000649	=	NA	NA	NA	MG/KG
CH2M HILL	HEXACHLORINATED DIBENZOFURANS, (TOTAL)	M-SD01	0.000495	=	NA	NA	NA	MG/KG
CH2M HILL	HEXACHLORINATED DIBENZOFURANS, (TOTAL)	M-SD02	0.000345	=	NA	NA	NA	MG/KG
CH2M HILL	HEXACHLORINATED DIBENZOFURANS, (TOTAL)	M-SD03	0.000289	=	NA	NA	NA	MG/KG
CH2M HILL	HEXACHLORINATED DIBENZOFURANS, (TOTAL)	M-SD09	0.000231	=	NA	NA	NA	MG/KG
CH2M HILL	HEXACHLORINATED DIBENZOFURANS, (TOTAL)	M-SD10	0.000529	=	NA	NA	NA	MG/KG
CH2M HILL	HEXACHLORINATED DIBENZOFURANS, (TOTAL)	M-SD11	6.75E-05	J	NA	NA	NA	MG/KG
CH2M HILL	HEXACHLORINATED DIBENZOFURANS, (TOTAL)	M-SD12	7.41E-05	=	NA	NA	NA	MG/KG
CH2M HILL	HEXACHLORINATED DIBENZOFURANS, (TOTAL)	M-SD20	0.000598	=	NA	NA	NA	MG/KG
CH2M HILL	INDENO(1,2,3-c,d)PYRENE	M-SD01	0.77	=	1.7	NA	NA	MG/KG
CH2M HILL	INDENO(1,2,3-c,d)PYRENE	M-SD02	0.62	=	1.7	NA	NA	MG/KG
CH2M HILL	INDENO(1,2,3-c,d)PYRENE	M-SD03	0.47	=	1.7	NA	NA	MG/KG
CH2M HILL	INDENO(1,2,3-c,d)PYRENE	M-SD04	0.041	J	1.7	NA	NA	MG/KG
CH2M HILL	INDENO(1,2,3-c,d)PYRENE	M-SD05	3.2	=	1.7	NA	NA	MG/KG
CH2M HILL	INDENO(1,2,3-c,d)PYRENE	M-SD06	2.7	J	1.7	NA	NA	MG/KG
CH2M HILL	INDENO(1,2,3-c,d)PYRENE	M-SD10	0.26	J	1.7	NA	NA	MG/KG
CH2M HILL	INDENO(1,2,3-c,d)PYRENE	M-SD11	0.73	J	1.7	NA	NA	MG/KG
CH2M HILL	INDENO(1,2,3-c,d)PYRENE	M-SD12	0.039	J	1.7	NA	NA	MG/KG
CH2M HILL	INDENO(1,2,3-c,d)PYRENE	M-SD16	0.092	J	1.7	NA	NA	MG/KG
CH2M HILL	INDENO(1,2,3-c,d)PYRENE	M-SD17	0.028	J	1.7	NA	NA	MG/KG
CH2M HILL	INDENO(1,2,3-c,d)PYRENE	M-SD18	0.033	J	1.7	NA	NA	MG/KG

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Data	Parameter[2]	StationID	Detected	Project	Background	PRG-Sed[4]	NOAA-Sed[5]	Units
CH2M HILL	INDENO(1,2,3-c,d)PYRENE	M-SD20	0.62	=	1.7	NA	NA	MG/KG
CH2M HILL	INDENO(1,2,3-c,d)PYRENE	M-SD21	9.1	J	1.7	NA	NA	MG/KG
CH2M HILL	IRON	M-SD01	3470	=	23000	NA	NA	mg/kg
CH2M HILL	IRON	M-SD02	2470	=	23000	NA	NA	mg/kg
CH2M HILL	IRON	M-SD03	4500	=	23000	NA	NA	mg/kg
CH2M HILL	IRON	M-SD04	6870	=	23000	NA	NA	mg/kg
CH2M HILL	IRON	M-SD05	4700	=	23000	NA	NA	mg/kg
CH2M HILL	IRON	M-SD06	13600	=	23000	NA	NA	mg/kg
CH2M HILL	IRON	M-SD07	14900	=	23000	NA	NA	mg/kg
CH2M HILL	IRON	M-SD08	15200	=	23000	NA	NA	mg/kg
CH2M HILL	IRON	M-SD09	17000	=	23000	NA	NA	mg/kg
CH2M HILL	IRON	M-SD10	9820	=	23000	NA	NA	mg/kg
CH2M HILL	IRON	M-SD11	8100	=	23000	NA	NA	mg/kg
CH2M HILL	IRON	M-SD12	12900	=	23000	NA	NA	mg/kg
CH2M HILL	IRON	M-SD14	11200	=	23000	NA	NA	mg/kg
CH2M HILL	IRON	M-SD15	3100	=	23000	NA	NA	mg/kg
CH2M HILL	IRON	M-SD16	3340	=	23000	NA	NA	mg/kg
CH2M HILL	IRON	M-SD17	9090	=	23000	NA	NA	mg/kg
CH2M HILL	IRON	M-SD18	9840	=	23000	NA	NA	mg/kg
CH2M HILL	IRON	M-SD19	3490	=	23000	NA	NA	mg/kg
CH2M HILL	IRON	M-SD20	2810	=	23000	NA	NA	mg/kg
CH2M HILL	IRON	M-SD21	12200	=	23000	NA	NA	mg/kg
CH2M HILL	LEAD	M-SD01	17.7	=	35.2	21	35	mg/kg
CH2M HILL	LEAD	M-SD02	19.9	=	35.2	21	35	mg/kg
CH2M HILL	LEAD	M-SD03	28.2	=	35.2	21	35	mg/kg
CH2M HILL	LEAD	M-SD04	44	=	35.2	21	35	mg/kg
CH2M HILL	LEAD	M-SD05	42.6	=	35.2	21	35	mg/kg
CH2M HILL	LEAD	M-SD06	29.4	=	35.2	21	35	mg/kg
CH2M HILL	LEAD	M-SD07	61.8	=	35.2	21	35	mg/kg
CH2M HILL	LEAD	M-SD08	35.4	=	35.2	21	35	mg/kg
CH2M HILL	LEAD	M-SD09	173	=	35.2	21	35	mg/kg
CH2M HILL	LEAD	M-SD10	76.7	=	35.2	21	35	mg/kg

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Data	Parameter[2]	StationID	Detected	Project	Background	PRG-Sed[4]	NOAA-Sed[5]	Units
CH2M HILL	LEAD	M-SD11	146	=	35.2	21	35	mg/kg
CH2M HILL	LEAD	M-SD12	89	=	35.2	21	35	mg/kg
CH2M HILL	LEAD	M-SD14	484	=	35.2	21	35	mg/kg
CH2M HILL	LEAD	M-SD15	7.7	=	35.2	21	35	mg/kg
CH2M HILL	LEAD	M-SD16	9.3	=	35.2	21	35	mg/kg
CH2M HILL	LEAD	M-SD17	75	=	35.2	21	35	mg/kg
CH2M HILL	LEAD	M-SD18	38.4	=	35.2	21	35	mg/kg
CH2M HILL	LEAD	M-SD19	1.8	=	35.2	21	35	mg/kg
CH2M HILL	LEAD	M-SD20	22.4	=	35.2	21	35	mg/kg
CH2M HILL	LEAD	M-SD21	285	=	35.2	21	35	mg/kg
CH2M HILL	MAGNESIUM	M-SD01	884	J	2400	NA	NA	mg/kg
CH2M HILL	MAGNESIUM	M-SD02	5830	=	2400	NA	NA	mg/kg
CH2M HILL	MAGNESIUM	M-SD03	19100	=	2400	NA	NA	mg/kg
CH2M HILL	MAGNESIUM	M-SD04	786	J	2400	NA	NA	mg/kg
CH2M HILL	MAGNESIUM	M-SD05	9390	=	2400	NA	NA	mg/kg
CH2M HILL	MAGNESIUM	M-SD06	2410	=	2400	NA	NA	mg/kg
CH2M HILL	MAGNESIUM	M-SD07	1340	=	2400	NA	NA	mg/kg
CH2M HILL	MAGNESIUM	M-SD08	1550	=	2400	NA	NA	mg/kg
CH2M HILL	MAGNESIUM	M-SD09	2040	=	2400	NA	NA	mg/kg
CH2M HILL	MAGNESIUM	M-SD10	1680	=	2400	NA	NA	mg/kg
CH2M HILL	MAGNESIUM	M-SD11	2400	=	2400	NA	NA	mg/kg
CH2M HILL	MAGNESIUM	M-SD12	1860	=	2400	NA	NA	mg/kg
CH2M HILL	MAGNESIUM	M-SD14	1990	=	2400	NA	NA	mg/kg
CH2M HILL	MAGNESIUM	M-SD15	714	J	2400	NA	NA	mg/kg
CH2M HILL	MAGNESIUM	M-SD16	3930	=	2400	NA	NA	mg/kg
CH2M HILL	MAGNESIUM	M-SD17	1030	J	2400	NA	NA	mg/kg
CH2M HILL	MAGNESIUM	M-SD18	1130	J	2400	NA	NA	mg/kg
CH2M HILL	MAGNESIUM	M-SD19	3020	=	2400	NA	NA	mg/kg
CH2M HILL	MAGNESIUM	M-SD20	1210	=	2400	NA	NA	mg/kg
CH2M HILL	MAGNESIUM	M-SD21	2260	=	2400	NA	NA	mg/kg
CH2M HILL	MANGANESE	M-SD01	74	J	870	NA	NA	mg/kg
CH2M HILL	MANGANESE	M-SD02	232	J	870	NA	NA	mg/kg

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Data	Parameter[2]	StationID	Detected	Project	Background	PRG-Sed[4]	NOAA-Sed[5]	Units
CH2M HILL	MANGANESE	M-SD03	77	J	870	NA	NA	mg/kg
CH2M HILL	MANGANESE	M-SD04	160	J	870	NA	NA	mg/kg
CH2M HILL	MANGANESE	M-SD05	697	J	870	NA	NA	mg/kg
CH2M HILL	MANGANESE	M-SD06	908	J	870	NA	NA	mg/kg
CH2M HILL	MANGANESE	M-SD07	487	J	870	NA	NA	mg/kg
CH2M HILL	MANGANESE	M-SD08	359	J	870	NA	NA	mg/kg
CH2M HILL	MANGANESE	M-SD09	746	J	870	NA	NA	mg/kg
CH2M HILL	MANGANESE	M-SD10	526	J	870	NA	NA	mg/kg
CH2M HILL	MANGANESE	M-SD11	216	J	870	NA	NA	mg/kg
CH2M HILL	MANGANESE	M-SD12	207	J	870	NA	NA	mg/kg
CH2M HILL	MANGANESE	M-SD14	313	J	870	NA	NA	mg/kg
CH2M HILL	MANGANESE	M-SD15	23.6	J	870	NA	NA	mg/kg
CH2M HILL	MANGANESE	M-SD16	112	J	870	NA	NA	mg/kg
CH2M HILL	MANGANESE	M-SD17	218	J	870	NA	NA	mg/kg
CH2M HILL	MANGANESE	M-SD18	191	J	870	NA	NA	mg/kg
CH2M HILL	MANGANESE	M-SD19	37.3	J	870	NA	NA	mg/kg
CH2M HILL	MANGANESE	M-SD20	115	J	870	NA	NA	mg/kg
CH2M HILL	MANGANESE	M-SD21	341	J	870	NA	NA	mg/kg
CH2M HILL	MERCURY	M-SD09	**0.25**	=	4	.1	.15	mg/kg
CH2M HILL	METHYLENE CHLORIDE	M-SD02	0.001	J	NA	NA	NA	MG/KG
CH2M HILL	METHYLENE CHLORIDE	M-SD03	0.006	J	NA	NA	NA	MG/KG
CH2M HILL	METHYLENE CHLORIDE	M-SD04	0.004	J	NA	NA	NA	MG/KG
CH2M HILL	METHYLENE CHLORIDE	M-SD05	0.015	=	NA	NA	NA	MG/KG
CH2M HILL	METHYLENE CHLORIDE	M-SD06	0.022	=	NA	NA	NA	MG/KG
CH2M HILL	METHYLENE CHLORIDE	M-SD07	0.033	=	NA	NA	NA	MG/KG
CH2M HILL	METHYLENE CHLORIDE	M-SD08	0.028	=	NA	NA	NA	MG/KG
CH2M HILL	METHYLENE CHLORIDE	M-SD09	0.019	=	NA	NA	NA	MG/KG
CH2M HILL	METHYLENE CHLORIDE	M-SD12	0.002	J	NA	NA	NA	MG/KG
CH2M HILL	METHYLENE CHLORIDE	M-SD14	0.045	=	NA	NA	NA	MG/KG
CH2M HILL	METHYLENE CHLORIDE	M-SD16	0.008	J	NA	NA	NA	MG/KG
CH2M HILL	METHYLENE CHLORIDE	M-SD21	0.032	=	NA	NA	NA	MG/KG
CH2M HILL	NAPHTHALENE	M-SD01	0.072	J	1.63	.13	.34	MG/KG

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Data	Parameter[2]	StationID	Detected	Project	Background	PRG-Sed[4]	NOAA-Sed[5]	Units
CH2M HILL	NAPHTHALENE	M-SD20	0.052	J	1.63	.13	.34	MG/KG
CH2M HILL	NICKEL	M-SD01	2.3	J	30	NA	30	mg/kg
CH2M HILL	NICKEL	M-SD02	2.2	J	30	NA	30	mg/kg
CH2M HILL	NICKEL	M-SD03	4.3	J	30	NA	30	mg/kg
CH2M HILL	NICKEL	M-SD04	26.2	=	30	NA	30	mg/kg
CH2M HILL	NICKEL	M-SD05	4.8	J	30	NA	30	mg/kg
CH2M HILL	NICKEL	M-SD06	11	=	30	NA	30	mg/kg
CH2M HILL	NICKEL	M-SD07	9.6	=	30	NA	30	mg/kg
CH2M HILL	NICKEL	M-SD08	10.8	=	30	NA	30	mg/kg
CH2M HILL	NICKEL	M-SD09	13.4	=	30	NA	30	mg/kg
CH2M HILL	NICKEL	M-SD10	8.8	J	30	NA	30	mg/kg
CH2M HILL	NICKEL	M-SD11	11.4	=	30	NA	30	mg/kg
CH2M HILL	NICKEL	M-SD12	15.4	=	30	NA	30	mg/kg
CH2M HILL	NICKEL	M-SD14	15.5	=	30	NA	30	mg/kg
CH2M HILL	NICKEL	M-SD15	3.4	J	30	NA	30	mg/kg
CH2M HILL	NICKEL	M-SD16	3.7	J	30	NA	30	mg/kg
CH2M HILL	NICKEL	M-SD17	9.9	J	30	NA	30	mg/kg
CH2M HILL	NICKEL	M-SD18	9.5	J	30	NA	30	mg/kg
CH2M HILL	NICKEL	M-SD19	3.9	J	30	NA	30	mg/kg
CH2M HILL	NICKEL	M-SD20	2.1	J	30	NA	30	mg/kg
CH2M HILL	NICKEL	M-SD21	17.7	=	30	NA	30	mg/kg
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	M-SD01	0.051	=	.0086	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	M-SD02	0.0154	=	.0086	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	M-SD03	0.00844	=	.0086	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	M-SD04	0.0043	J	.0086	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	M-SD05	0.02	=	.0086	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	M-SD06	0.02	J	.0086	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	M-SD07	0.00498	J	.0086	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	M-SD08	0.00576	=	.0086	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	M-SD09	0.00738	=	.0086	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	M-SD10	0.0186	=	.0086	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	M-SD11	0.00466	J	.0086	NA	NA	MG/KG

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Data	Parameter[2]	StationID	Detected	Project	Background	PRG-Sed[4]	NOAA-Sed[5]	Units
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	M-SD12	0.0025	J	.0086	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	M-SD14	0.029	J	.0086	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	M-SD19	0.000207	J	.0086	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	M-SD20	0.0616	=	.0086	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZO-p-DIOXIN	M-SD21	0.028	J	.0086	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	M-SD01	0.00236	J	NA	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	M-SD02	0.00106	J	NA	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	M-SD03	0.000831	J	NA	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	M-SD04	0.000117	J	NA	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	M-SD05	0.0024	J	NA	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	M-SD06	0.0021	J	NA	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	M-SD07	2.24E-05	J	NA	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	M-SD08	0.000066	J	NA	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	M-SD09	0.000401	J	NA	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	M-SD10	0.00127	J	NA	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	M-SD11	0.000252	J	NA	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	M-SD12	9.68E-05	J	NA	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	M-SD14	0.0038	J	NA	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	M-SD19	2.43E-05	J	NA	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	M-SD20	0.0019	J	NA	NA	NA	MG/KG
CH2M HILL	OCTACHLORODIBENZOFURAN	M-SD21	0.0035	J	NA	NA	NA	MG/KG
CH2M HILL	p,p'-DDD	M-SD01	0.011	J	.0061	NA	.002	MG/KG
CH2M HILL	p,p'-DDD	M-SD02	0.0058	J	.0061	NA	.002	MG/KG
CH2M HILL	p,p'-DDD	M-SD05	0.006	J	.0061	NA	.002	MG/KG
CH2M HILL	p,p'-DDD	M-SD10	0.012	J	.0061	NA	.002	MG/KG
CH2M HILL	p,p'-DDD	M-SD11	0.0059	J	.0061	NA	.002	MG/KG
CH2M HILL	p,p'-DDD	M-SD14	0.092	J	.0061	NA	.002	MG/KG
CH2M HILL	p,p'-DDD	M-SD15	0.066	J	.0061	NA	.002	MG/KG
CH2M HILL	p,p'-DDD	M-SD16	0.13	=	.0061	NA	.002	MG/KG
CH2M HILL	p,p'-DDD	M-SD17	0.23	=	.0061	NA	.002	MG/KG
CH2M HILL	p,p'-DDD	M-SD18	0.0061	J	.0061	NA	.002	MG/KG
CH2M HILL	p,p'-DDD	M-SD20	0.016	J	.0061	NA	.002	MG/KG

Table ODP
Summary of Detected Compounds in Sediment
Compared to Screening Levels for Site ODP
Screening Sites Sampling Program
Defense Depot Memphis, Tennessee

Data	Parameter[2]	StationID	Detected	Project	Background	PRG-Sed[4]	NOAA-Sed[5]	Units
CH2M HILL	p,p'-DDD	M-SD21	0.079	J	.0061	NA	.002	MG/KG
CH2M HILL	p,p'-DDE	M-SD01	0.029	J	.0072	.0017	.002	MG/KG
CH2M HILL	p,p'-DDE	M-SD02	0.0081	J	.0072	.0017	.002	MG/KG
CH2M HILL	p,p'-DDE	M-SD04	0.018	=	.0072	.0017	.002	MG/KG
CH2M HILL	p,p'-DDE	M-SD05	0.015	J	.0072	.0017	.002	MG/KG
CH2M HILL	p,p'-DDE	M-SD06	0.018	J	.0072	.0017	.002	MG/KG
CH2M HILL	p,p'-DDE	M-SD09	0.025	J	.0072	.0017	.002	MG/KG
CH2M HILL	p,p'-DDE	M-SD10	0.012	J	.0072	.0017	.002	MG/KG
CH2M HILL	p,p'-DDE	M-SD11	0.0068	J	.0072	.0017	.002	MG/KG
CH2M HILL	p,p'-DDE	M-SD14	0.079	J	.0072	.0017	.002	MG/KG
CH2M HILL	p,p'-DDE	M-SD15	0.13	=	.0072	.0017	.002	MG/KG
CH2M HILL	p,p'-DDE	M-SD16	0.026	J	.0072	.0017	.002	MG/KG
CH2M HILL	p,p'-DDE	M-SD17	0.029	J	.0072	.0017	.002	MG/KG
CH2M HILL	p,p'-DDE	M-SD18	0.0055	J	.0072	.0017	.002	MG/KG
CH2M HILL	p,p'-DDE	M-SD20	0.026	J	.0072	.0017	.002	MG/KG
CH2M HILL	p,p'-DDE	M-SD21	0.065	J	.0072	.0017	.002	MG/KG
CH2M HILL	p,p'-DDT	M-SD01	0.093	J	NA	NA	.001	MG/KG
CH2M HILL	p,p'-DDT	M-SD03	0.0053	J	NA	NA	.001	MG/KG
CH2M HILL	p,p'-DDT	M-SD05	0.044	J	NA	NA	.001	MG/KG
CH2M HILL	p,p'-DDT	M-SD06	0.039	J	NA	NA	.001	MG/KG
CH2M HILL	p,p'-DDT	M-SD09	0.14	J	NA	NA	.001	MG/KG
CH2M HILL	p,p'-DDT	M-SD10	0.039	J	NA	NA	.001	MG/KG
CH2M HILL	p,p'-DDT	M-SD11	0.019	J	NA	NA	.001	MG/KG
CH2M HILL	p,p'-DDT	M-SD14	0.2	J	NA	NA	.001	MG/KG
CH2M HILL	p,p'-DDT	M-SD15	0.036	J	NA	NA	.001	MG/KG
CH2M HILL	p,p'-DDT	M-SD16	0.042	J	NA	NA	.001	MG/KG
CH2M HILL	p,p'-DDT	M-SD17	0.0047	J	NA	NA	.001	MG/KG
CH2M HILL	p,p'-DDT	M-SD21	0.18	J	NA	NA	.001	MG/KG
CH2M HILL	PENTACHLORINATED DIBENZO-p-DIOXINS, (TOTAL)	M-SD01	1.28E-05	=	NA	NA	NA	MG/KG
CH2M HILL	PENTACHLORINATED DIBENZO-p-DIOXINS, (TOTAL)	M-SD09	2.2E-06	=	NA	NA	NA	MG/KG
CH2M HILL	PENTACHLORINATED DIBENZOFURANS, (TOTAL)	M-SD01	0.000106	=	NA	NA	NA	MG/KG
CH2M HILL	PENTACHLORINATED DIBENZOFURANS, (TOTAL)	M-SD02	3.42E-05	=	NA	NA	NA	MG/KG

Table ODP
Summary of Detected Compounds in Sediment
Compared to Screening Levels for Site ODP
Screening Sites Sampling Program
Defense Depot Memphis, Tennessee

Data	Parameter[2]	StationID	Detected	Project	Background	PRG-Sed[4]	NOAA-Sed[5]	Units
CH2M HILL	PENTACHLORINATED DIBENZOFURANS, (TOTAL)	M-SD03	4.34E-05	=	NA	NA	NA	MG/KG
CH2M HILL	PENTACHLORINATED DIBENZOFURANS, (TOTAL)	M-SD08	1.27E-06	=	NA	NA	NA	MG/KG
CH2M HILL	PENTACHLORINATED DIBENZOFURANS, (TOTAL)	M-SD09	0.000126	=	NA	NA	NA	MG/KG
CH2M HILL	PENTACHLORINATED DIBENZOFURANS, (TOTAL)	M-SD10	0.000112	=	NA	NA	NA	MG/KG
CH2M HILL	PENTACHLORINATED DIBENZOFURANS, (TOTAL)	M-SD12	1.56E-05	=	NA	NA	NA	MG/KG
CH2M HILL	PENTACHLORINATED DIBENZOFURANS, (TOTAL)	M-SD20	8.29E-05	=	NA	NA	NA	MG/KG
CH2M HILL	PHENANTHRENE	M-SD01	**1.5**	=	6.9	**.14**	**.225**	MG/KG
CH2M HILL	PHENANTHRENE	M-SD02	**0.46**	=	6.9	**.14**	**.225**	MG/KG
CH2M HILL	PHENANTHRENE	M-SD03	**0.61**	=	6.9	**.14**	**.225**	MG/KG
CH2M HILL	PHENANTHRENE	M-SD05	**4.7**	=	6.9	**.14**	**.225**	MG/KG
CH2M HILL	PHENANTHRENE	M-SD06	**3.5**	J	6.9	**.14**	**.225**	MG/KG
CH2M HILL	PHENANTHRENE	M-SD07	0.079	J	6.9	.14	.225	MG/KG
CH2M HILL	PHENANTHRENE	M-SD08	0.095	J	6.9	.14	.225	MG/KG
CH2M HILL	PHENANTHRENE	M-SD09	0.11	J	6.9	.14	.225	MG/KG
CH2M HILL	PHENANTHRENE	M-SD10	**0.61**	=	6.9	**.14**	**.225**	MG/KG
CH2M HILL	PHENANTHRENE	M-SD11	**1.5**	J	6.9	**.14**	**.225**	MG/KG
CH2M HILL	PHENANTHRENE	M-SD12	0.041	J	6.9	.14	.225	MG/KG
CH2M HILL	PHENANTHRENE	M-SD14	**33**	J	6.9	**.14**	**.225**	MG/KG
CH2M HILL	PHENANTHRENE	M-SD15	0.14	J	6.9	.14	.225	MG/KG
CH2M HILL	PHENANTHRENE	M-SD16	0.063	J	6.9	.14	.225	MG/KG
CH2M HILL	PHENANTHRENE	M-SD17	0.029	J	6.9	.14	.225	MG/KG
CH2M HILL	PHENANTHRENE	M-SD18	0.13	J	6.9	.14	.225	MG/KG
CH2M HILL	PHENANTHRENE	M-SD19	0.02	J	6.9	.14	.225	MG/KG
CH2M HILL	PHENANTHRENE	M-SD20	**1.3**	=	6.9	**.14**	**.225**	MG/KG
CH2M HILL	PHENANTHRENE	M-SD21	**31**	J	6.9	**.14**	**.225**	MG/KG
CH2M HILL	POTASSIUM	M-SD01	180	J	1560	NA	NA	mg/kg
CH2M HILL	POTASSIUM	M-SD02	1150	J	1560	NA	NA	mg/kg
CH2M HILL	POTASSIUM	M-SD03	409	J	1560	NA	NA	mg/kg
CH2M HILL	POTASSIUM	M-SD04	271	J	1560	NA	NA	mg/kg
CH2M HILL	POTASSIUM	M-SD05	375	J	1560	NA	NA	mg/kg
CH2M HILL	POTASSIUM	M-SD06	900	J	1560	NA	NA	mg/kg
CH2M HILL	POTASSIUM	M-SD07	618	J	1560	NA	NA	mg/kg

Table ODP
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Screening Sites Sampling Program
Defense Depot Memphis, Tennessee

Data	Parameter[2]	StationID	Detected	Project	Background	PRG-Sed[4]	NOAA-Sed[5]	Units
CH2M HILL	POTASSIUM	M-SD08	810	J	1560	NA	NA	mg/kg
CH2M HILL	POTASSIUM	M-SD09	793	J	1560	NA	NA	mg/kg
CH2M HILL	POTASSIUM	M-SD10	404	J	1560	NA	NA	mg/kg
CH2M HILL	POTASSIUM	M-SD11	313	J	1560	NA	NA	mg/kg
CH2M HILL	POTASSIUM	M-SD12	667	J	1560	NA	NA	mg/kg
CH2M HILL	POTASSIUM	M-SD14	267	J	1560	NA	NA	mg/kg
CH2M HILL	POTASSIUM	M-SD15	106	J	1560	NA	NA	mg/kg
CH2M HILL	POTASSIUM	M-SD16	126	J	1560	NA	NA	mg/kg
CH2M HILL	POTASSIUM	M-SD17	498	J	1560	NA	NA	mg/kg
CH2M HILL	POTASSIUM	M-SD18	408	J	1560	NA	NA	mg/kg
CH2M HILL	POTASSIUM	M-SD19	76	J	1560	NA	NA	mg/kg
CH2M HILL	POTASSIUM	M-SD20	253	J	1560	NA	NA	mg/kg
CH2M HILL	POTASSIUM	M-SD21	303	J	1560	NA	NA	mg/kg
CH2M HILL	PYRENE	M-SD01	2.5	=	2.9	.29	NA	MG/KG
CH2M HILL	PYRENE	M-SD02	0.9	=	2.9	.29	NA	MG/KG
CH2M HILL	PYRENE	M-SD03	1.2	=	2.9	.29	NA	MG/KG
CH2M HILL	PYRENE	M-SD04	0.056	J	2.9	.29	NA	MG/KG
CH2M HILL	PYRENE	M-SD05	9.3	=	2.9	.29	NA	MG/KG
CH2M HILL	PYRENE	M-SD06	7.3	J	2.9	.29	NA	MG/KG
CH2M HILL	PYRENE	M-SD07	0.21	J	2.9	.29	NA	MG/KG
CH2M HILL	PYRENE	M-SD08	0.25	J	2.9	.29	NA	MG/KG
CH2M HILL	PYRENE	M-SD09	0.66	J	2.9	.29	NA	MG/KG
CH2M HILL	PYRENE	M-SD10	0.84	=	2.9	.29	NA	MG/KG
CH2M HILL	PYRENE	M-SD11	2.2	J	2.9	.29	NA	MG/KG
CH2M HILL	PYRENE	M-SD12	0.081	J	2.9	.29	NA	MG/KG
CH2M HILL	PYRENE	M-SD14	55	J	2.9	.29	NA	MG/KG
CH2M HILL	PYRENE	M-SD15	0.42	J	2.9	.29	NA	MG/KG
CH2M HILL	PYRENE	M-SD16	0.15	J	2.9	.29	NA	MG/KG
CH2M HILL	PYRENE	M-SD17	0.039	J	2.9	.29	NA	MG/KG
CH2M HILL	PYRENE	M-SD18	0.23	J	2.9	.29	NA	MG/KG
CH2M HILL	PYRENE	M-SD20	2	=	2.9	.29	NA	MG/KG
CH2M HILL	PYRENE	M-SD21	27	J	2.9	.29	NA	MG/KG

Table ODP
Summary of Detected Compounds in Sediment
Compared to Screening Levels for Site ODP
Screening Sites Sampling Program
Defense Depot Memphis, Tennessee

Data	Parameter[2]	StationID	Detected	Project	Background	PRG-Sed[4]	NOAA-Sed[5]	Units
CH2M HILL	SELENIUM	M-SD01	0.71	J	1.7	NA	NA	mg/kg
CH2M HILL	SELENIUM	M-SD02	0.79	J	1.7	NA	NA	mg/kg
CH2M HILL	SELENIUM	M-SD06	0.5	J	1.7	NA	NA	mg/kg
CH2M HILL	SELENIUM	M-SD07	0.75	J	1.7	NA	NA	mg/kg
CH2M HILL	SELENIUM	M-SD08	0.85	J	1.7	NA	NA	mg/kg
CH2M HILL	SELENIUM	M-SD09	0.98	J	1.7	NA	NA	mg/kg
CH2M HILL	SELENIUM	M-SD10	0.74	J	1.7	NA	NA	mg/kg
CH2M HILL	SELENIUM	M-SD11	0.64	J	1.7	NA	NA	mg/kg
CH2M HILL	SELENIUM	M-SD12	0.74	J	1.7	NA	NA	mg/kg
CH2M HILL	SELENIUM	M-SD14	0.87	J	1.7	NA	NA	mg/kg
CH2M HILL	SELENIUM	M-SD18	0.77	J	1.7	NA	NA	mg/kg
CH2M HILL	SELENIUM	M-SD20	0.73	J	1.7	NA	NA	mg/kg
CH2M HILL	SELENIUM	M-SD21	1.1	J	1.7	NA	NA	mg/kg
CH2M HILL	SILVER	M-SD04	9.1	=	1.8	.5	1	mg/kg
CH2M HILL	SODIUM	M-SD01	57.5	J	240	NA	NA	mg/kg
CH2M HILL	SODIUM	M-SD02	282	J	240	NA	NA	mg/kg
CH2M HILL	SODIUM	M-SD03	134	J	240	NA	NA	mg/kg
CH2M HILL	SODIUM	M-SD04	45.7	J	240	NA	NA	mg/kg
CH2M HILL	SODIUM	M-SD05	68.8	J	240	NA	NA	mg/kg
CH2M HILL	SODIUM	M-SD06	62.9	J	240	NA	NA	mg/kg
CH2M HILL	SODIUM	M-SD07	33.2	J	240	NA	NA	mg/kg
CH2M HILL	SODIUM	M-SD08	37.4	J	240	NA	NA	mg/kg
CH2M HILL	SODIUM	M-SD09	74.7	J	240	NA	NA	mg/kg
CH2M HILL	SODIUM	M-SD10	61.3	J	240	NA	NA	mg/kg
CH2M HILL	SODIUM	M-SD11	56.4	J	240	NA	NA	mg/kg
CH2M HILL	SODIUM	M-SD12	76.5	J	240	NA	NA	mg/kg
CH2M HILL	SODIUM	M-SD14	64.2	J	240	NA	NA	mg/kg
CH2M HILL	SODIUM	M-SD15	40.6	J	240	NA	NA	mg/kg
CH2M HILL	SODIUM	M-SD16	149	J	240	NA	NA	mg/kg
CH2M HILL	SODIUM	M-SD17	74	J	240	NA	NA	mg/kg
CH2M HILL	SODIUM	M-SD18	42.4	J	240	NA	NA	mg/kg
CH2M HILL	SODIUM	M-SD19	107	J	240	NA	NA	mg/kg

Table ODP
Summary of Detected Compounds in Sediment
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Screening Sites Sampling Program
Defense Depot Memphis, Tennessee

Data	Parameter[2]	StationID	Detected	Project	Background	PRG-Sed[4]	NOAA-Sed[5]	Units
CH2M HILL	SODIUM	M-SD20	87.7	J	240	NA	NA	mg/kg
CH2M HILL	SODIUM	M-SD21	63.3	J	240	NA	NA	mg/kg
CH2M HILL	TCDD Equivalent	M-SD01	5.34E-05	=	.0000054	NA	NA	MG/KG
CH2M HILL	TCDD Equivalent	M-SD02	1.65E-05	=	.0000054	NA	NA	MG/KG
CH2M HILL	TCDD Equivalent	M-SD03	9.27E-06	=	.0000054	NA	NA	MG/KG
CH2M HILL	TCDD Equivalent	M-SD04	4.42E-06	=	.0000054	NA	NA	MG/KG
CH2M HILL	TCDD Equivalent	M-SD05	2.24E-05	=	.0000054	NA	NA	MG/KG
CH2M HILL	TCDD Equivalent	M-SD06	2.21E-05	=	.0000054	NA	NA	MG/KG
CH2M HILL	TCDD Equivalent	M-SD07	5E-06	=	.0000054	NA	NA	MG/KG
CH2M HILL	TCDD Equivalent	M-SD08	5.83E-06	=	.0000054	NA	NA	MG/KG
CH2M HILL	TCDD Equivalent	M-SD09	1.07E-05	=	.0000054	NA	NA	MG/KG
CH2M HILL	TCDD Equivalent	M-SD10	1.99E-05	=	.0000054	NA	NA	MG/KG
CH2M HILL	TCDD Equivalent	M-SD11	4.91E-06	=	.0000054	NA	NA	MG/KG
CH2M HILL	TCDD Equivalent	M-SD12	2.6E-06	=	.0000054	NA	NA	MG/KG
CH2M HILL	TCDD Equivalent	M-SD14	3.28E-05	=	.0000054	NA	NA	MG/KG
CH2M HILL	TCDD Equivalent	M-SD19	2.31E-07	=	.0000054	NA	NA	MG/KG
CH2M HILL	TCDD Equivalent	M-SD20	6.35E-05	=	.0000054	NA	NA	MG/KG
CH2M HILL	TCDD Equivalent	M-SD21	3.15E-05	=	.0000054	NA	NA	MG/KG
CH2M HILL	TETRACHLORINATED DIBENZO-p-DIOXINS, (TOTAL)	M-SD09	9.8E-06	=	NA	NA	NA	MG/KG
CH2M HILL	TETRACHLORINATED DIBENZOFURANS, (TOTAL)	M-SD01	1.23E-05	=	NA	NA	NA	MG/KG
CH2M HILL	TETRACHLORINATED DIBENZOFURANS, (TOTAL)	M-SD08	1.68E-06	=	NA	NA	NA	MG/KG
CH2M HILL	TETRACHLORINATED DIBENZOFURANS, (TOTAL)	M-SD09	7.56E-05	=	NA	NA	NA	MG/KG
CH2M HILL	TETRACHLORINATED DIBENZOFURANS, (TOTAL)	M-SD10	1.24E-05	=	NA	NA	NA	MG/KG
CH2M HILL	TETRACHLORINATED DIBENZOFURANS, (TOTAL)	M-SD20	8.7E-06	=	NA	NA	NA	MG/KG
CH2M HILL	TOLUENE	M-SD07	0.004	J	.014	NA	NA	MG/KG
CH2M HILL	Total Xylenes	M-SD14	0.018	J	NA	NA	NA	MG/KG
CH2M HILL	Total Xylenes	M-SD21	0.036	J	NA	NA	NA	MG/KG
CH2M HILL	VANADIUM	M-SD01	6.9	J	30	NA	NA	mg/kg
CH2M HILL	VANADIUM	M-SD02	4.7	J	30	NA	NA	mg/kg
CH2M HILL	VANADIUM	M-SD03	7.1	J	30	NA	NA	mg/kg
CH2M HILL	VANADIUM	M-SD04	6.7	J	30	NA	NA	mg/kg
CH2M HILL	VANADIUM	M-SD05	12.9	=	30	NA	NA	mg/kg

Table ODP
Summary of Detected Compounds in Sediment
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Screening Sites Sampling Program
Defense Depot Memphis, Tennessee

Data	Parameter[2]	StationID	Detected	Project	Background	PRG-Sed[4]	NOAA-Sed[5]	Units
CH2M HILL	VANADIUM	M-SD06	27.9	=	30	NA	NA	mg/kg
CH2M HILL	VANADIUM	M-SD07	19.9	=	30	NA	NA	mg/kg
CH2M HILL	VANADIUM	M-SD08	21.8	=	30	NA	NA	mg/kg
CH2M HILL	VANADIUM	M-SD09	20.7	=	30	NA	NA	mg/kg
CH2M HILL	VANADIUM	M-SD10	12.2	=	30	NA	NA	mg/kg
CH2M HILL	VANADIUM	M-SD11	11.2	J	30	NA	NA	mg/kg
CH2M HILL	VANADIUM	M-SD12	20.6	=	30	NA	NA	mg/kg
CH2M HILL	VANADIUM	M-SD14	12.4	J	30	NA	NA	mg/kg
CH2M HILL	VANADIUM	M-SD15	5.8	J	30	NA	NA	mg/kg
CH2M HILL	VANADIUM	M-SD16	4.6	J	30	NA	NA	mg/kg
CH2M HILL	VANADIUM	M-SD17	13.1	=	30	NA	NA	mg/kg
CH2M HILL	VANADIUM	M-SD18	22.1	=	30	NA	NA	mg/kg
CH2M HILL	VANADIUM	M-SD19	2.1	J	30	NA	NA	mg/kg
CH2M HILL	VANADIUM	M-SD20	6.7	J	30	NA	NA	mg/kg
CH2M HILL	VANADIUM	M-SD21	14.2	=	30	NA	NA	mg/kg
CH2M HILL	ZINC	M-SD01	33	=	797	68	120	mg/kg
CH2M HILL	ZINC	M-SD02	66.9	=	797	68	120	mg/kg
CH2M HILL	ZINC	M-SD03	120	=	797	68	120	mg/kg
CH2M HILL	ZINC	M-SD04	1170	=	797	68	120	mg/kg
CH2M HILL	ZINC	M-SD05	69.6	=	797	68	120	mg/kg
CH2M HILL	ZINC	M-SD06	69.3	=	797	68	120	mg/kg
CH2M HILL	ZINC	M-SD07	70.5	=	797	68	120	mg/kg
CH2M HILL	ZINC	M-SD08	68.8	=	797	68	120	mg/kg
CH2M HILL	ZINC	M-SD09	217	=	797	68	120	mg/kg
CH2M HILL	ZINC	M-SD10	154	=	797	68	120	mg/kg
CH2M HILL	ZINC	M-SD11	247	=	797	68	120	mg/kg
CH2M HILL	ZINC	M-SD12	92.1	=	797	68	120	mg/kg
CH2M HILL	ZINC	M-SD14	260	=	797	68	120	mg/kg
CH2M HILL	ZINC	M-SD15	42.5	=	797	68	120	mg/kg
CH2M HILL	ZINC	M-SD16	66.9	=	797	68	120	mg/kg
CH2M HILL	ZINC	M-SD17	135	=	797	68	120	mg/kg
CH2M HILL	ZINC	M-SD18	40.3	=	797	68	120	mg/kg

Table ODP
Summary of Detected Compounds in Sediment
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Screening Sites Sampling Program
Defense Depot Memphis, Tennessee

Data	Parameter[2]	StationID	Detected	Project	Background	PRG-Sed[4]	NOAA-Sed[5]	Units
CH2M HILL	ZINC	M-SD19	17	=	797	68	120	mg/kg
CH2M HILL	ZINC	M-SD20	40.6	=	797	68	120	mg/kg
CH2M HILL	ZINC	M-SD21	288	=	797	68	120	mg/kg

Notes:

1. Detected values are obtained from the *Draft Parcel ODP Report-Screening Sites Sampling Program for Defense Depot Memphis, TN*, CH2M HILL, 1997.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum* , CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. Sediment Preliminary Remediation Goal (PRG) values are from Table 3-10 of the *Generic Remedial Investigation/Feasibility Study Work Plan* , CH2M HILL, August 1995.
5. National Oceanic and Atmospheric Administration (NOAA) values are from Table 3-10 of the *Generic Remedial Investigation/Feasibility Study Work Plan* , CH2M HILL, August 1995.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
= - indicates unqualified detection
J - indicates estimated value above the detection limit but below the reporting limit.

TAB

Railroad Tracks

Railroad Tracks

Screening Sites Sampling Program

for

Defense Distribution Depot Memphis, Tennessee

March 1998

Prepared for

U.S. Army Engineering and Support Center, Huntsville

Prepared by

CH2M HILL

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137449.RR.ZZ

Multiple Parcel Report—Railroad Tracks Screening Sites Sampling Program Defense Distribution Depot Memphis, Tennessee

The Railroad Track multiple parcel site covers Operable Units (OU)-2, OU-3, and OU-4 (shown in Figure 1). This multiple parcel is made up of areas surrounding railroad tracks where potential spills from transportation along the railroad tracks may have occurred.

The screening sites in this document have been identified by the Defense Distribution Depot Memphis, Tennessee (DDMT) through a review of existing documents, interviews with facility personnel, and knowledge of the facility's operations. Screening sites are locations at DDMT where there is a potential for materials to have been released to the environment from past operations. The following Screening site is in this parcel:

- Screening Site 70/71 – All railroad tracks

Sites where there is a confirmed presence of contaminants from past operations are addressed in the Remedial Investigation Sampling Program. Other facilities have been addressed in the Base Realignment and Closure (BRAC) Sampling Program. Results of these programs are addressed in separate reports.

The purpose of the Screening Sites Sampling Program is to identify whether past activities at each site have resulted in releases from the site that would require further investigation. The intent is not to fully delineate the extent of soil or groundwater contamination attributable to past operations, but to determine the nature of the contamination that may have been released to the environment and conduct technically based screening analyses sufficient to identify the likelihood of contamination.

The purpose of this letter report is to evaluate the results of the Screening Sites Sampling Program and sampling from previous investigations and to recommend No Further Action or further investigation at screening sites in this parcel. The remainder of this report presents the results of past investigations; Screening Sites Sampling Program strategy, procedures, and results; and recommendations for each site.

Surface soils, subsurface soils, surface water, and sediments were investigated as part of the Screening Sites Sampling Program. Surface soil samples (any sample whose lowest depth is two feet or less) were taken both as independent samples and as the upper interval of a soil boring profile. Thus, surface soil samples taken as part of a soil boring may have an "SB" designation and are initially discussed under Subsurface Soil Sampling Procedure (Section 2.2.2.2). However, the results from that upper interval are presented in the surface soils tables and discussions in Section 3.0.

Screening Site 70/71—All Railroad Tracks

1.0 Introduction

This site consists of all of the potential railcar spills throughout the Main Installation and, therefore, is not associated with any individual parcel. For this phase of the program, only surface and subsurface soil samples are collected and analyzed.

The chart below presents the location and status information for this screening site.

Parcel	Building Number	RI/FS[1] OU	Site Number	CERCLA[2] Status
Multiple	RR Tracks	4	70/71	Screening

[1]RI/FS: Remedial Investigation/Feasibility Study
[2]CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act

Screening Site 70/71 includes all railroad tracks at the Main Installation. Pesticides and herbicides have been applied to the railroad tracks throughout the DDMT for weed and pest control purposes. Historically, weed control also has been conducted through the use of a waste oil and pentachlorophenol (PCP) mix (1970s). Additionally, the wooden planks used as railroad ties have been pressure treated with PCP and other heavier hydrocarbon residues that contain polycyclic aromatic hydrocarbons (PAHs).

2.0 Study Investigation Area

2.1 Previous Investigations

According to the *Remedial Investigations at DDMT, Final Report* (Law Environmental, 1990), eight surface soil sample (SS21, SS22, SS23, SS29, SS32, SS34, SS36, and SS40) and four subsurface soil samples (STB81, STB82, STB83, and STB84) were collected at Screening Site 70/71 in 1989. Historical data from Screening Site 70/71 is summarized by media below, and significant historical data are shown on Figure 1.

2.1.1 Surface Soil

In Sample SS29, methylene chloride, toluene, and acetone were the only volatile organic compounds (VOCs) that were detected. However, all three compounds were detected at concentrations less than sample quantitation limits. Bis(2-ethylhexyl)phthalate was the only semivolatile organic compound (SVOC) detected in surface soil at the site, and as with the VOCs, it was detected at concentrations less than sample quantitation limits.

In Sample SS32, methylene chloride was the only VOC that was detected at concentrations greater than sample quantitation limits, however, it was also detected in the method blank. No SVOCs, pesticides, or polychlorinated biphenyls were detected in surface soil at the site at concentrations greater than sample quantitation limits.

Methylene chloride, acetone, and toluene (the only VOCs detected in surface soil) were detected at 11, 13, and 6 micrograms per kilogram (µg/kg), respectively in Sample SS34. The

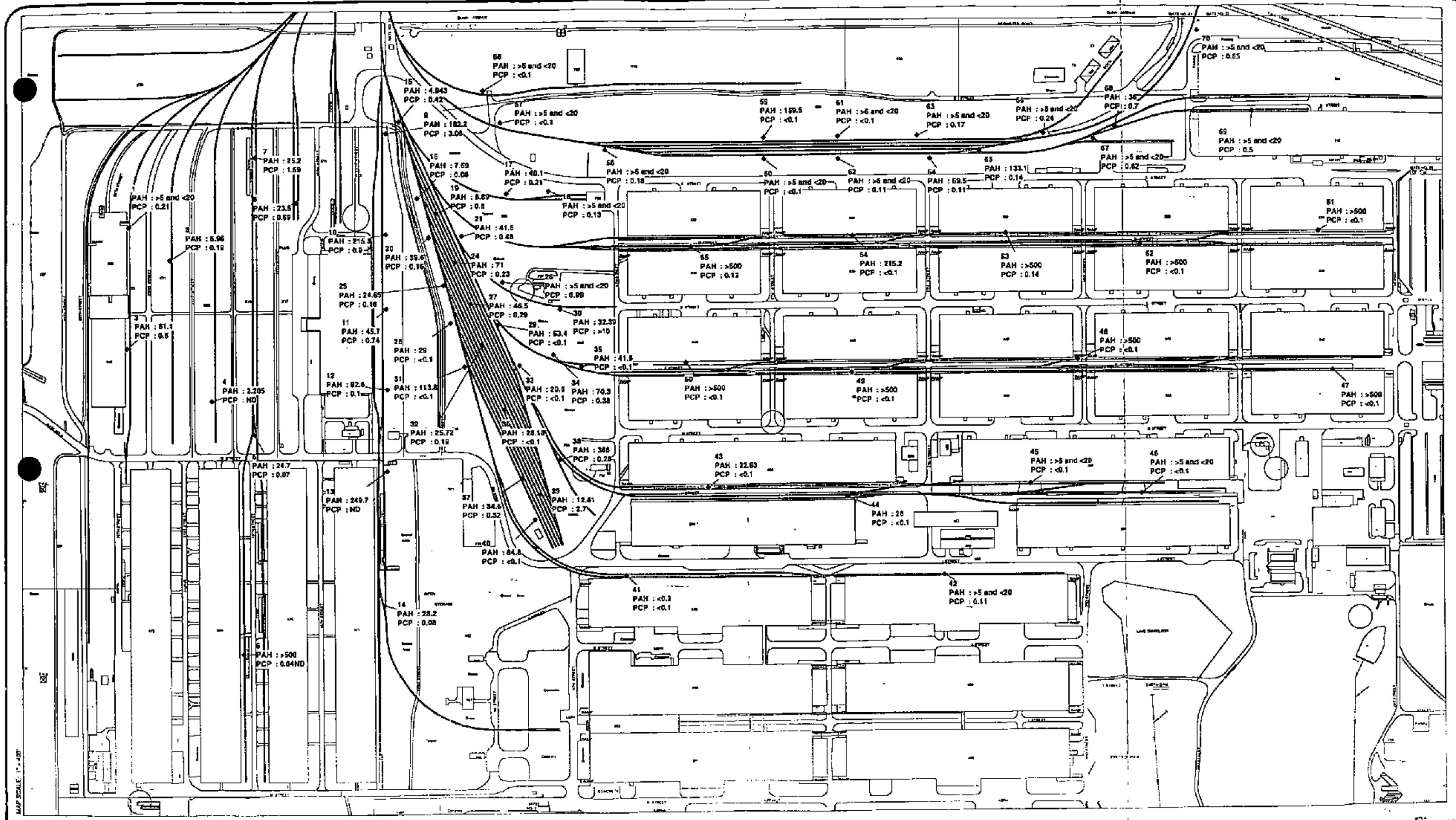

Figure 1
Site 70/71 All RailRoad Tracks
Level 1 PAH & PCP Screening Data
Defense Distribution Depot Memphis, TN

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methylene chloride and acetone concentrations are suspect, however, because they also were detected in the method blanks. No SVOCs were detected in surface soil at concentrations greater than sample quantitation limits.

Several VOCs were detected in the other five surface soil samples collected at Screening Site 70/71, however, only four were detected at concentrations greater than sample quantitation limits. These four VOCs and the highest detected concentrations are total xylenes, toluene, and acetone (detected in Sample SS40) at 9, 34, and 31 µg/kg, respectively, and 1,1,2,2-tetrachloroethane (detected in Sample SS23) at 19 µg/kg. No SVOC was detected in surface soil at the site at concentrations greater than sample quantitation limits.

Four pesticides were detected in surface soil at Screening Site 70/71 during the 1989 site work: endosulfan sulfate, dichlorodiphenyldichloroethane (DDD), dichlorodiphenyldichloroethene (DDE), and dichlorodiphenyltrichloroethane (DDT). DDE and DDT were detected at the highest concentrations; 1,100 and 5,900 µg/kg, respectively. Several inorganic compounds commonly found in soil were also detected in sample surface soil samples near railroad tracks. The concentrations of these compounds will be compared to established background concentrations and critical values in Section 3.1.

2.1.2 Subsurface Soil

Methylene chloride, 2-butanone, toluene, 1,2,-dichoroethane, and acetone were found in subsurface soil samples collected near railroad tracks in Parcel 32. However, the later three were the only VOCs detected at concentrations greater than the sample quantitation limit. Furthermore, methylene chloride was not reported without a qualifier designating that it was also present in the method blank. Bis(2-ethylhexyl)phthalate is the only SVOC detected at concentrations greater than the sample quantitation limit; it was also detected in the method blank.

2.2 Screening Site Sampling Program

2.2.1 Sampling Strategy

The sampling strategy was developed to evaluate whether releases have occurred to surface and subsurface soils. A Level 1 (screening) analysis was conducted on surface soil samples in the field for PAHs and PCPs. Subsurface soil samples were analyzed for target compound list/target analyte list (TCL/TAL) constituents in accordance with the *Screening Sites Field Sampling Plan* (CH2M HILL, 1995). The following sections present the sampling procedures and laboratory analyses performed for surface and subsurface soils.

2.2.2 Sampling Procedures

Sections 2.2.2.1 and 2.2.2.2 describe the sampling procedures and laboratory analyses performed for surface and subsurface soils.

2.2.2.1 Surface Soil Sampling Procedures

With the recommendation of the Tennessee Department of Environment and Conservation (TDEC) and the United States Environmental Protection Agency (EPA), 70 surface soil samples were collected along the railroad tracks at the DDMT. The 70 surface soil samples locations

were uniformly distributed over the railroad tracks in open storage areas and warehouses with railcar loading and unloading areas.

At each sampling location, the soil was removed from the ground using a standard stainless-steel trowel and collected directly into a sampling jar. The soil samples were analyzed in the field for PAHs and PCPs using an enzyme-linked immunosorbent assay (ELISA) immunoassay technique. All sampling tools were decontaminated before use at each sample location according to the procedures specified in the *Generic Quality Assurance Project Plan* (CH2M HILL, 1995) for the RI/FS currently being conducted at DDMT.

2.2.2.2 Subsurface Soil Sampling Procedures

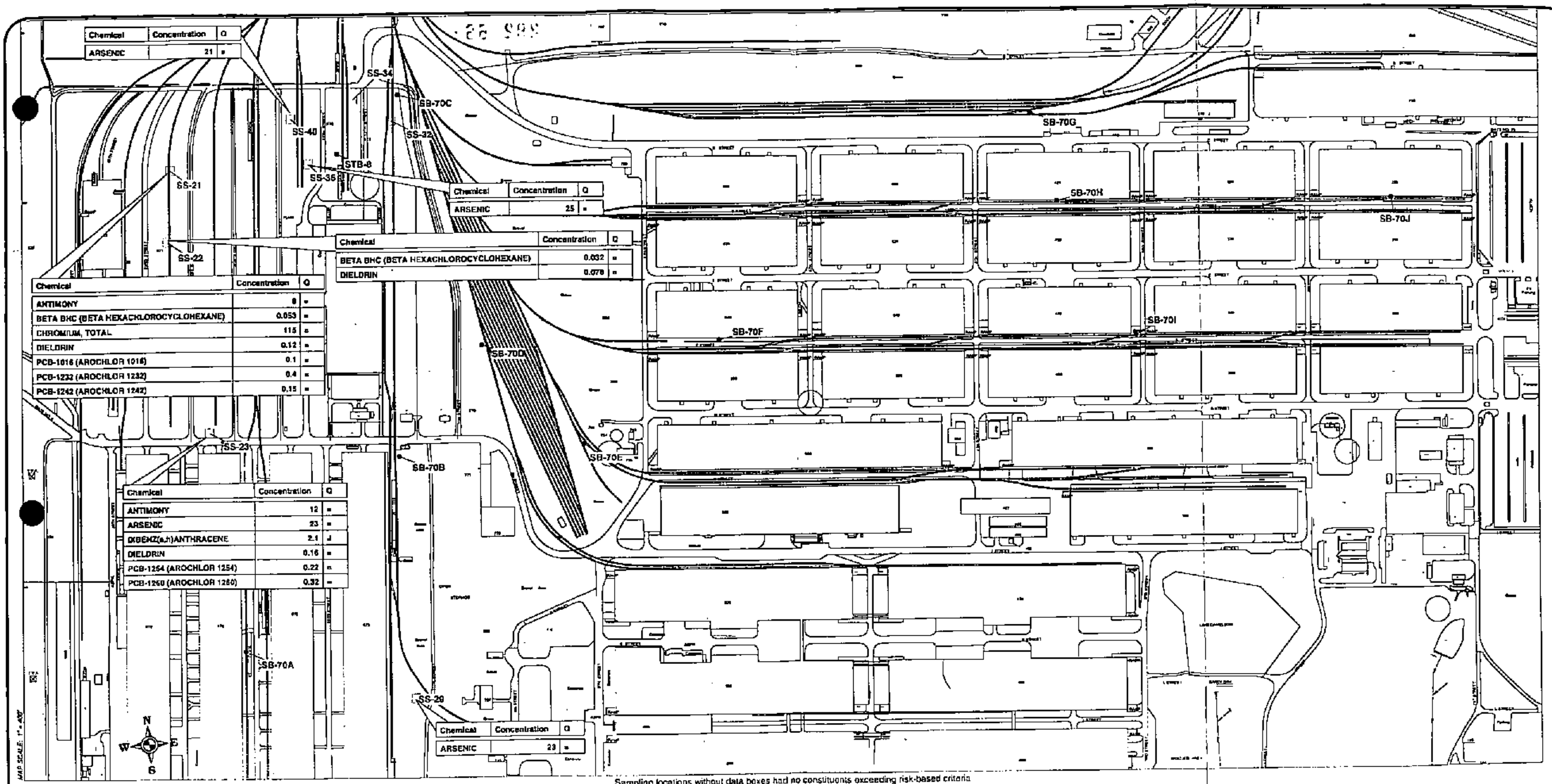
Subsurface soil samples were collected from 10 locations (SB70A, SB70B, SB70C, SB70D, SB70E, SB70F, SB70G, SB70H, SB70I, and SB70J) at this site (shown in Figure 2). At each location samples were collected at two depths: 3 to 5 feet and 8 to 10 feet. The locations of the ten borings were based on the fact that Level 1 PAH values in surface soils at these locations were greater than 100 parts per million (ppm).

The following details the sample locations:

- Sample SB70A was taken east of the loading dock on the east side of Building 970.
- Sample SB70B was taken at the railroad track just west of 11th Street and South of 6th Street.
- Sample SB70C was taken at the railroad tracks just east of 13th Street and south of D Street.
- Sample SB70D was taken approximately 400 feet north of 6th Street and 100 feet east of 10th Street.
- Sample SB70E was taken at the railroad tracks northwest of Building 756.
- Sample SB70F was taken south of Building 649 just north of E Street.
- Sample SB70G was taken at the railroad tracks approximately 600 feet west of the southwest corner of Building 319.
- Sample SB70H was taken south of Building 429.
- Sample SB70I was taken at the railroad tracks located near the southeast corner of Building 449.
- Sample SB70J was taken just south of Building 229.

Samples were collected using a 2-inch-diameter, stainless-steel push sampler. VOC soil samples were collected directly from the continuous sampler using stainless-steel spoons. Part of the VOC sample was placed into a sealable plastic bag and allowed to equilibrate. The head space in the plastic bag was measured for VOCs using a hand-held photo ionization detector (PID). The remaining soil was placed into a stainless-steel bowl, mixed, and then transferred into the appropriate sample jars.

All sampling tools were decontaminated before use at each sample location according to the procedures specified in the *Generic Quality Assurance Project Plan* (CH2M HILL, 1995).



Sampling locations without data boxes had no constituents exceeding risk-based criteria

LEGEND

- Surface Soil Sampling Location (mg/kg)
- Soil Boring Sampling Location (mg/kg)

Qualifier Definitions
- = Indicates unqualified detection
- J = Indicates estimated value above detection limit, but below reporting limit.

Figure 2
Site 70/71 All RailRoad Tracks
Constituents Exceeding Risk-Based Criteria
Defense Distribution Depot Memphis, TN

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2.2.3 Analytical Procedures

Twenty subsurface soil samples were sent to CH2M HILL's Analytical Services in Montgomery, Alabama for TCL/TAL analyses. Samples received at the laboratory were analyzed in accordance with the procedures outlined in the *Generic Quality Assurance Project Plan* (CH2M HILL, 1995).

United States Army Corps of Engineers (COE) split samples were collected from the 8- to 10-foot interval of Sample SB70C and from the 3- to 5-foot interval of Sample SB70D. These two subsurface soil samples were sent to COE's Atlanta, Georgia laboratory for analysis of TCL/TAL parameters. TDEC also collected split samples of the same two intervals in these borings for analysis of TCL/TAL parameters in TDEC's laboratory.

A data quality evaluation (DQE) was performed to assess the effect of the overall analytical process on the usability of the data. The DQE established that the detection of acetone and bis(2-ethylhexyl)phthalate can be attributed to field sampling and laboratory contamination rather than environmental conditions at the site. Also, low concentrations of dioxins and furans can be attributed to background or instrument noise and are not indicative of environmental conditions. With exception to the qualifications listed above, the DQE concluded that data can be used in the project decision-making process.

3.0 Interpretation of Sampling Results

3.1 Presentation of Results

The following sections present results of the screening sites investigation for Screening Site 70/71. Data are presented separately for surface soil and subsurface soil and compared with appropriate screening criteria in three summary tables: Tables 70-A, 70-B, and 70-C. Data from the 1997 CH2M HILL investigation are presented along with historical data from the *Remedial Investigations at DDMT, Final Report* (Law Environmental, 1990). If a value from a sampling location exceeds one of the comparison criteria, that value and the comparison criterion are shown in **bold** on the summary table.

Constituents of potential concern (COPCs) are parameters that exceed both background values and the screening criteria. Where concentrations exceed the selected background value, the concentration is compared with the observed range of background values as reviewed and established by the BRAC Cleanup Team (BCT).

Seven COPCs were identified for Screening Site 70/71: arsenic, antimony, chromium, dibenz(a,h)anthracene, PCBs, dieldrin, and beta hexachlorocyclohexane [beta BHC]).

3.1.1 Surface Soil

Results of the surface soil analyses with values above detection limits are shown in Tables 70-A and 70-B. The results presented in the tables consist of data (1990) only since CH2M HILL did not perform Level 3 analyses for surface soils. The 70 surface soil samples analyzed using the ELISA immunoassay technique were used to position the location of the subsurface borings in areas with highest PAH and PCP concentration. Only ten samples had PAH concentrations

above 100 ppm (Figure 1). The surface soils were all positioned adjacent to the railroad tracks in areas where PAH deposition from the tracks would be expected to be greatest.

3.1.1.1 BCT Screening Criteria

Table 70-A summarizes constituents for which the BCT has selected a screening criteria. Arsenic, antimony, chromium, dibenz(a,h)anthracene, and PCBs were detected in the previous investigation conducted by Law (1990) at concentrations exceeding the BCT criteria and background values.

Arsenic was detected in Samples SS29, SS23, SS36, and SS40 at respective concentrations of 23 milligrams per kilogram (mg/kg), 23 mg/kg, 25 mg/kg, and 21 mg/g, all of which slightly exceed the BCT criteria (background) value of 20 mg/kg. However, these concentrations are considered to be within the range of background values.

Antimony was detected in Sample SS21 and SS23 at 8 mg/kg and 12 mg/kg, in which both concentrations exceed the BCT criteria (background) value of 7 mg/kg.

Chromium was detected in four surface soil samples at concentrations ranging from 15 mg/kg to 115 mg/kg. The highest concentration detected, 115 mg/kg in Sample SS21, exceeds the BCT criteria value of 39 mg/kg and the background value of 24.8 mg/kg.

Dibenzo(a,h)anthracene was detected in Sample SS23 at 2.1 mg/kg (estimated), which exceeds the BCT criteria value of 0.088 mg/kg and the background value of 0.26 mg/kg.

PCBs (PCB-1016, PCB-1232, PCB-1242, PCB-1254, and PCB-1260) were detected in Samples SS21 and SS23 at concentrations ranging from 0.1 mg/kg to 0.4 mg/kg, all of which exceed the BCT criteria value of 0.083 mg/kg. A background value of 0.11 mg/kg is available for PCB-1260 for comparison. PCB-1260 was detected in Sample SS23 at 0.32 mg/kg, which exceeds the background value of 0.11 mg/kg.

3.1.1.2 Other Screening Criteria

Table 70-B compares the remaining constituents with the soil ingestion screening criteria for both residential and industrial exposure scenarios. Dieldrin was the only compound detected at concentrations exceeding screening level values.

Dieldrin was detected in Samples SS21 and SS23 at 0.12 mg/kg and 0.16 mg/kg, in which both concentrations exceed the residential soil ingestion screening criteria value of 0.04 mg/kg and the background value of 0.086 mg/kg. However, these values did not exceed the industrial risk-based concentrations (RBC) of 0.36 mg/kg. Dieldrin has been identified by the BCT as a sitewide COPC and will be evaluated on a sitewide basis.

3.1.2 Subsurface Soil

Table 70-C summarizes subsurface soil sampling data. Lead values generally exceeded the groundwater protection standard but were below the background value. One constituent, beta BHC, was detected at concentrations exceeding the groundwater protection screening level values.

The constituent beta BHC was detected in the Law (1990) Sample STB84 (at a depth of 217 to 222 feet) at a concentration of 0.019 mg/kg. This value exceeds the groundwater protection criteria value of 0.003 mg/kg. There is no background value for beta BHC for comparison.

3.2 Vertical and Lateral Extent

Surface and subsurface soil samples were collected in areas where potential railcar spills may have occurred throughout the Main Installation. In addition, surface and subsurface soils surrounding railroad tracks in the western half of the Main Installation were evaluated in a previous investigation conducted by Law (1990).

Elevated concentrations of antimony, chromium, arsenic, dieldrin, PAHs, and PCBs were detected in the surface soil samples as presented in the Law data (1990). Most of the Law (1990) surface soil samples (SS21, SS22, SS23, SS32, SS34, SS36, and SS40) were taken in the northwestern part of the Main Installation, either north of Building 835 or east of Building 925. All concentrations of PAHs and PCBs detected in the surface soils were found at these locations.

An elevated concentration of chromium and antimony was detected in Sample SS21, just west of 21st Street and northeast of Building 925. Antimony was also detected in Sample SS23, which is north of G Street just north of Building 970.

The Law (1990) surface soil Sample SS29 was taken in the southwestern part of the Main Installation, just east of Building 873, where only an elevated concentration of arsenic was detected.

Only three of the COPCs (arsenic, chromium, and beta BHC) were detected in the subsurface soils, as presented in CH2M HILL and Law data (1990). Concentrations of arsenic and chromium detected in the subsurface soils were within background value ranges.

The exceedance of beta BHC in subsurface soils was detected at a depth of 217 to 222 feet in a Law (1990) boring sample located north of Building 835.

The distribution of PAHs along the railroad tracks will be further characterized and results will be submitted in the *Main Installation Remedial Investigation Report*.

3.3 Potential Migration Pathways

The following paragraphs provide a general discussion of potential migration pathways for COPCs found at Screening Site 70/71.

Arsenic is present at several sites on the DDMT in surface soils at concentrations above screening levels. Arsenic's mobility and toxicity are tied to its complex geochemistry and its ability to readily form soluble complexes. Arsenic may also readily be adsorbed onto clays, oxides, or humic organic material and migrate as suspended soil in surface water or as a sediment. Arsenic can exist in four common oxidation states, and these control its solubility. It readily transports through aquatic environments as a dissolved salt or as a complex with an organic compound.

Chromium has been reported from surface and subsurface soils at the DDMT in concentrations greater than the screening levels. Chromium occurs in two oxidation states: +3 and +6. The trivalent form readily combines with aqueous hydroxide to form insoluble chromium hydroxide and is of little risk. The hexavalent form is soluble tends to stay in solution, unless

some activated carbon material is present for it to sorb onto. Dissolved chromium is readily adsorbed onto sediments but may be bioaccumulated through aquatic organisms.

Dieldrin is present at the DDMT in surface and subsurface soils. Since this compound is only minutely soluble in water, its most likely migration pathway at this site is via erosion as suspended soil particles in the surface water where it potentially would be available to aquatic organisms. Dieldrin in the subsurface soils should be relatively immobile and should not impact groundwater quality.

PCBs, as a group, are relatively insoluble in water; therefore, they tend to migrate primarily through physical transport such as erosion via surface water. At the DDMT, PCB-1260 has been detected at concentrations of concern in surface soils. This material is subject to migration either via wind action or surface water transport and the PCB would be present as an absorded chemical on the clay platelets comprising the soil. This material could potentially be ingested either by breathing contaminated dust or by aqueous organisms exposed to turbid water or bottom feeding of contaminated sediment.

PAHs have been found in surface soil sitewide at DDMT possibly due to railroad operations. PAHs may come from creosote seepage from railroad track cross ties, from historical railcar leaks to the surface, or from application of a PCP/used oil mixture that was historically applied for weed control along the tracks. Migration of PAH across the surface may occur with surface soil transport mechanisms including surface water runoff and wind action.

PAHs have are a mixture of heavier hydrocarbons and are similar in chemical and physical characteristics, and tend to migrate and behave in the environment in a similar manner. Generally, these compounds have low vapor pressures, and are only marginally soluble in water, and have a high affinity for soils. All of these compounds have been detected at concentrations above screening values for surface soils at the DDMT. They would be expected to migrate as adsorbed components of the soils, and would potentially be available to aquatic organisms in turbid surface water or to bottom feeders in areas with contaminated sediments. That none of these compounds was detected in sediments indicates this is not a major source of contaminant migration for these compounds at this site. These compounds do not bioaccumulate significantly due to their rapid metabolism and excretion by most aquatic organisms.

3.4 Additional Data Needs

The PAHs distribution along the railroad tracks will be further defined in the near future and will be submitted as an addendum.4.0 Interpretation of Screening Criteria Comparisons

4.1 Methodology

The Preliminary Risk Evaluation (PRE) was performed in accordance with the *Guidance on Preliminary Risk Evaluations for the Purpose of Reaching a Finding of Suitability to Lease (FOSL)* (EPA Region IV, 1994). A discussion of the PRE methodology is provided as Appendix A to this document.

4.2 Screening Site 70/71 Risk

An evaluation of human health risks associated with Screening Site 70/71 has not been performed.

5.0 Summary and Recommendations

5.1 Summary

Screening Site 70/71 consists of all of the potential railcar spills throughout the Main Installation and is not associated with any individual parcel. However, some common risks have been identified at this site just as they have been identified at other sites at the facility. Arsenic was detected at concentrations just above background levels; metals were detected at elevated concentrations; dieldrin concentrations were detected in the surface soils, and PAHs were detected at elevated concentrations.

5.2 Recommendations

A site specific human health evaluation is recommended for this site, to determine appropriate risk management actions. Other similar railroad tracks data will be used as a guidance as suggested by BCT. Depending on the results of this evaluation, the site may require no further action or could require remediation due to the presence of PAH compounds and other constituents. Possible remedial options may include removing and replacing contaminated material and contaminated soil along the tracks. Removal of tracks that are no longer needed for future facility use should be considered.

Table 70-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 70
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
LAW	ANTIMONY	SS29	6	=	7	7	Bckg	MG/KG
LAW	ARSENIC	SS29	23	=	20	20	Bckg	MG/KG
LAW	CHROMIUM, TOTAL	SS29	10	=	24.8	39	Residential RBC	MG/KG
LAW	LEAD	SS29	11	=	30	400	CERCLA	MG/KG
LAW	ANTIMONY	SS21	8	=	7	7	Bckg	MG/KG
LAW	ANTIMONY	SS23	12	=	7	7	Bckg	MG/KG
LAW	ARSENIC	SS23	23	=	20	20	Bckg	MG/KG
LAW	ARSENIC	SS36	25	=	20	20	Bckg	MG/KG
LAW	ARSENIC	SS40	21	=	20	20	Bckg	MG/KG
LAW	BENZO(a)ANTHRACENE	SS23	0.23	J	.71	0.88	Residential RBC	MG/KG
LAW	BENZO(b)FLUORANTHENE	SS21	0.5	J	.78	0.88	Residential RBC	MG/KG
LAW	BENZO(b)FLUORANTHENE	SS22	0.29	J	.78	0.88	Residential RBC	MG/KG
LAW	BENZO(b)FLUORANTHENE	SS23	0.6	J	.78	0.88	Residential RBC	MG/KG
LAW	BENZO(g,h,i)PERYLENE	SS23	2.1	J	.82	230	Residential RBC	MG/KG
LAW	CHROMIUM, TOTAL	SS21	115	=	24.8	39	Residential RBC	MG/KG
LAW	CHROMIUM, TOTAL	SS22	30	=	24.8	39	Residential RBC	MG/KG
LAW	CHROMIUM, TOTAL	SS23	34	=	24.8	39	Residential RBC	MG/KG
LAW	CHROMIUM, TOTAL	SS36	15	=	24.8	39	Residential RBC	MG/KG
LAW	CHROMIUM, TOTAL	SS40	32	=	24.8	39	Residential RBC	MG/KG
LAW	CHRYSENE	SS21	0.26	J	.94	88	Residential RBC	MG/KG
LAW	CHRYSENE	SS23	0.27	J	.94	88	Residential RBC	MG/KG
LAW	DIBENZ(a,h)ANTHRACENE	SS23	2.1	J	.26	0.088	Residential RBC	MG/KG
LAW	FLUORANTHENE	SS21	0.35	J	1.6	310	Residential RBC	MG/KG
LAW	FLUORANTHENE	SS23	0.4	J	1.6	310	Residential RBC	MG/KG
LAW	INDENO(1,2,3-c,d)PYRENE	SS23	0.23	J	.7	0.88	Residential RBC	MG/KG
LAW	LEAD	SS21	137	=	30	400	CERCLA	MG/KG
LAW	LEAD	SS22	43	=	30	400	CERCLA	MG/KG
LAW	LEAD	SS23	112	=	30	400	CERCLA	MG/KG
LAW	LEAD	SS36	21	=	30	400	CERCLA	MG/KG
LAW	LEAD	SS40	19	=	30	400	CERCLA	MG/KG
LAW	PCB-1016 (AROCHLOR 1016)	SS21	0.1	=	NA	0.083	Residential RBC	MG/KG
LAW	PCB-1232 (AROCHLOR 1232)	SS21	0.4	=	NA	0.083	Residential RBC	MG/KG

Table 70-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 70
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units
LAW	PCB-1242 (AROCHLOR 1242)	SS21	**0.15**	=	NA	**0.083**	Residential RBC	MG/KG
LAW	PCB-1254 (AROCHLOR 1254)	SS23	**0.22**	=	NA	**0.083**	Residential RBC	MG/KG
LAW	PCB-1260 (AROCHLOR 1260)	SS23	**0.32**	=	.11	**0.083**	Residential RBC	MG/KG
LAW	PYRENE	SS21	0.29	J	1.5	230	Residential RBC	MG/KG
LAW	PYRENE	SS22	0.2	J	1.5	230	Residential RBC	MG/KG
LAW	PYRENE	SS23	0.36	J	1.5	230	Residential RBC	MG/KG
LAW	ZINC	SS21	266	=	130	23000	Residential RBC	MG/KG
LAW	ZINC	SS22	75	=	130	23000	Residential RBC	MG/KG
LAW	ZINC	SS23	167	=	130	23000	Residential RBC	MG/KG
LAW	ZINC	SS36	53	=	130	23000	Residential RBC	MG/KG
LAW	ZINC	SS40	132	=	130	23000	Residential RBC	MG/KG
LAW	ARSENIC	SS34	8	=	20	20	Bckg	MG/KG
LAW	CHROMIUM, TOTAL	SS34	10	=	24.8	39	Residential RBC	MG/KG
LAW	LEAD	SS34	4	=	30	400	CERCLA	MG/KG
LAW	ZINC	SS34	6.9	=	130	23000	Residential RBC	MG/KG
LAW	ARSENIC	SS32	8	=	20	20	Bckg	MG/KG
LAW	CHROMIUM, TOTAL	SS32	10	=	24.8	39	Residential RBC	MG/KG
LAW	LEAD	SS32	4	=	30	400	CERCLA	MG/KG
LAW	ZINC	SS32	9.4	=	130	23000	Residential RBC	MG/KG

Notes:
1. Detected values are obtained from the *Remedial Investigation at DDMT Final Report*, Law Environmental, August 1990.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. Based on values selected by the BRAC Cleanup Team in the August 1997 BCT meeting minutes, Memphis, Tennessee.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
J - indicates estimated value above the detection limit but below the reporting limit.
= - indicates unqualified detection.
BCT - BRAC Cleanup Team

Table 70-A
Summary of Detected Compounds in Surface Soils
Compared to BCT Screening Levels for Site 70
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	BCT Value[4]	BCT Basis	Units

Table 70-B
Summary of Detected Compounds in Surface Soils
Compared to Non-BCT Screening Levels for Site 70
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	Risk-Based Concentrations Soil Ingestion[4]		Units
						Residential	Industrial	
LAW	ACETONE	SS29	0.005	J	NA	780	20000	MG/KG
LAW	BARIUM	SS29	18.5	=	234	550	14000	MG/KG
LAW	bis(2-ETHYLHEXYL) PHTHALATE	SS29	0.34	J	NA	46	410	MG/KG
LAW	COPPER	SS29	6	=	33	310	8200	MG/KG
LAW	MERCURY	SS29	0.03	=	.43	2.3	61	MG/KG
LAW	METHYLENE CHLORIDE	SS29	0.004	J	NA	85	760	MG/KG
LAW	NICKEL	SS29	6	=	30	160	4100	MG/KG
LAW	TOLUENE	SS29	0.001	J	.012	1600	41000	MG/KG
LAW	1,1,2,2-TETRACHLOROETHANE	SS23	0.019	=	NA	3.2	29	MG/KG
LAW	ACETONE	SS21	0.006	J	NA	780	20000	MG/KG
LAW	ACETONE	SS22	0.008	J	NA	780	20000	MG/KG
LAW	ACETONE	SS23	0.022	=	NA	780	20000	MG/KG
LAW	ACETONE	SS36	0.023	=	NA	780	20000	MG/KG
LAW	ACETONE	SS40	0.031	=	NA	780	20000	MG/KG
LAW	ALPHA ENDOSULFAN	SS23	0.016	=	NA	NA	NA	MG/KG
LAW	BARIUM	SS21	45.2	=	234	550	14000	MG/KG
LAW	BARIUM	SS22	25.9	=	234	550	14000	MG/KG
LAW	BARIUM	SS23	96.9	=	234	550	14000	MG/KG
LAW	BARIUM	SS36	89.9	=	234	550	14000	MG/KG
LAW	BARIUM	SS40	22.8	=	234	550	14000	MG/KG
LAW	BENZENE	SS23	0.004	J	NA	22	200	MG/KG
LAW	BETA BHC (BETA	SS21	0.053	=	NA	NA	NA	MG/KG
LAW	BETA BHC (BETA	SS22	0.032	=	NA	NA	NA	MG/KG
LAW	bis(2-ETHYLHEXYL) PHTHALATE	SS22	0.47	J	NA	46	410	MG/KG
LAW	bis(2-ETHYLHEXYL) PHTHALATE	SS23	0.41	J	NA	46	410	MG/KG
LAW	bis(2-ETHYLHEXYL) PHTHALATE	SS36	0.44	J	NA	46	410	MG/KG
LAW	CADMIUM	SS40	1	=	1.4	3.9	100	MG/KG
LAW	COPPER	SS21	21	=	33	310	8200	MG/KG
LAW	COPPER	SS22	10	=	33	310	8200	MG/KG
LAW	COPPER	SS23	30	=	33	310	8200	MG/KG
LAW	COPPER	SS36	16	=	33	310	8200	MG/KG
LAW	COPPER	SS40	10	=	33	310	8200	MG/KG
LAW	DDD	SS21	0.024	=	NA	2.7	24	MG/KG
LAW	DDE	SS21	0.15	=	.16	1.9	17	MG/KG

Table 70-B
Summary of Detected Compounds in Surface Soils
Compared to Non-BCT Screening Levels for Site 70
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	Risk-Based Concentrations Soil Ingestion[4]		Units
						Residential	Industrial	
LAW	DDE	SS22	0.05	=	.16	1.9	17	MG/KG
LAW	DDE	SS23	0.085	=	.16	1.9	17	MG/KG
LAW	DDT	SS21	0.25	=	.074	1.9	17	MG/KG
LAW	DDT	SS22	0.12	=	.074	1.9	17	MG/KG
LAW	DDT	SS23	0.21	=	.074	1.9	17	MG/KG
LAW	DIELDRIN	SS21	0.12	=	.086	.04	.36	MG/KG
LAW	DIELDRIN	SS22	0.078	=	.086	.04	.36	MG/KG
LAW	DIELDRIN	SS23	0.16	=	.086	.04	.36	MG/KG
LAW	ETHYLBENZENE	SS40	0.004	J	NA	780	20000	MG/KG
LAW	MERCURY	SS21	0.04	=	.43	2.3	61	MG/KG
LAW	MERCURY	SS23	0.04	=	.43	2.3	61	MG/KG
LAW	MERCURY	SS36	0.04	=	.43	2.3	61	MG/KG
LAW	METHYL ETHYL KETONE (2-BUTANONE)	SS36	0.008	J	.002	4700	100000	MG/KG
LAW	METHYLENE CHLORIDE	SS21	0.02	=	NA	85	760	MG/KG
LAW	METHYLENE CHLORIDE	SS22	0.02	=	NA	85	760	MG/KG
LAW	METHYLENE CHLORIDE	SS23	0.05	=	NA	85	760	MG/KG
LAW	METHYLENE CHLORIDE	SS36	0.013	=	NA	85	760	MG/KG
LAW	METHYLENE CHLORIDE	SS40	0.009	=	NA	85	760	MG/KG
LAW	NICKEL	SS21	4	=	30	160	4100	MG/KG
LAW	NICKEL	SS22	3	=	30	160	4100	MG/KG
LAW	NICKEL	SS23	9	=	30	160	4100	MG/KG
LAW	NICKEL	SS36	14	=	30	160	4100	MG/KG
LAW	NICKEL	SS40	4	=	30	160	4100	MG/KG
LAW	PCB, TOTAL	SS21	0.65	=	NA	NA	NA	MG/KG
LAW	PCB, TOTAL	SS23	0.55	=	NA	NA	NA	MG/KG
LAW	PENTACHLOROPHENOL	SS21	0.31	J	NA	5.3	48	MG/KG
LAW	TOLUENE	SS21	0.012	=	.012	1600	41000	MG/KG
LAW	TOLUENE	SS22	0.02	=	.012	1600	41000	MG/KG
LAW	TOLUENE	SS23	0.033	=	.012	1600	41000	MG/KG
LAW	TOLUENE	SS36	0.004	J	.012	1600	41000	MG/KG
LAW	TOLUENE	SS40	0.034	=	.012	1600	41000	MG/KG
LAW	Total Polynuclear Aromatic Hydrocarbons	SS21	1.4	=	NA	NA	NA	MG/KG
LAW	Total Polynuclear Aromatic Hydrocarbons	SS22	0.49	=	NA	NA	NA	MG/KG
LAW	Total Polynuclear Aromatic Hydrocarbons	SS23	6.06	=	NA	NA	NA	MG/KG

Table 70-B
Summary of Detected Compounds in Surface Soils
Compared to Non-BCT Screening Levels for Site 70
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Detected Value	Project Qualifier	Background Value[3]	Risk-Based Concentrations Soil Ingestion[4]		Units
						Residential	Industrial	
LAW	Total Xylenes	SS22	0.003	J	.009	NA	NA	MG/KG
LAW	Total Xylenes	SS40	0.009	=	.009	NA	NA	MG/KG
LAW	TOXAPHENE	SS23	0.37	=	NA	.58	5.2	MG/KG
LAW	TRICHLOROETHYLENE (TCE)	SS23	0.002	J	NA	58	520	MG/KG
LAW	TRICHLOROETHYLENE (TCE)	SS40	0.004	J	NA	58	520	MG/KG
LAW	ACETONE	SS34	0.013	=	NA	780	20000	MG/KG
LAW	BARIUM	SS34	12	=	234	550	14000	MG/KG
LAW	bis(2-ETHYLHEXYL) PHTHALATE	SS34	0.34	J	NA	46	410	MG/KG
LAW	COPPER	SS34	4	=	33	310	8200	MG/KG
LAW	METHYLENE CHLORIDE	SS34	0.011	=	NA	85	760	MG/KG
LAW	N-NITROSODIPHENYLAMINE	SS34	0.035	J	NA	130	1200	MG/KG
LAW	NICKEL	SS34	4	=	30	160	4100	MG/KG
LAW	TOLUENE	SS34	0.006	=	.012	1600	41000	MG/KG
LAW	ACETONE	SS32	0.007	J	NA	780	20000	MG/KG
LAW	BARIUM	SS32	16.6	=	234	550	14000	MG/KG
LAW	bis(2-ETHYLHEXYL) PHTHALATE	SS32	0.35	J	NA	46	410	MG/KG
LAW	COPPER	SS32	5	=	33	310	8200	MG/KG
LAW	METHYLENE CHLORIDE	SS32	0.006	=	NA	85	760	MG/KG
LAW	NICKEL	SS32	4	=	30	160	4100	MG/KG
LAW	TOLUENE	SS32	0.003	J	.012	1600	41000	MG/KG

Notes:
1. Detected values are obtained from the *Remedial Investigation at DDMT Final Report*, Law Environmental, August 1990.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.
3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. Risk-Based Concentrations are obtained from the *EPA Region III Risk-based Concentrations Table*, R.L. Smith, April, 1997.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
= - indicates unqualified detection
J - indicates estimated value above the detection limit but below the reporting limit.

Table 70-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 70
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	ALUMINUM	SB70A	3 to 5	6070	=	21829	NA	MG/KG
CH2M HILL	ALUMINUM	SB70A	8 to 10	11800	=	21829	NA	MG/KG
CH2M HILL	ALUMINUM	SB70B	3 to 5	11900	=	21829	NA	MG/KG
CH2M HILL	ALUMINUM	SB70B	8 to 10	17200	=	21829	NA	MG/KG
CH2M HILL	ALUMINUM	SB70C	3 to 5	15000	=	21829	NA	MG/KG
CH2M HILL	ALUMINUM	SB70C	8 to 10	10100	=	21829	NA	MG/KG
CH2M HILL	ALUMINUM	SB70D	3 to 5	13600	=	21829	NA	MG/KG
CH2M HILL	ALUMINUM	SB70D	8 to 10	20400	=	21829	NA	MG/KG
CH2M HILL	ALUMINUM	SB70E	3 to 5	12200	=	21829	NA	MG/KG
CH2M HILL	ALUMINUM	SB70E	3 to 5	14300	=	21829	NA	MG/KG
CH2M HILL	ALUMINUM	SB70E	8 to 10	12500	=	21829	NA	MG/KG
CH2M HILL	ALUMINUM	SB70F	3 to 5	13200	=	21829	NA	MG/KG
CH2M HILL	ALUMINUM	SB70F	8 to 10	9180	=	21829	NA	MG/KG
CH2M HILL	ALUMINUM	SB70G	3 to 5	12700	=	21829	NA	MG/KG
CH2M HILL	ALUMINUM	SB70G	8 to 10	8510	=	21829	NA	MG/KG
CH2M HILL	ALUMINUM	SB70H	3 to 5	9310	=	21829	NA	MG/KG
CH2M HILL	ALUMINUM	SB70H	8 to 10	13200	=	21829	NA	MG/KG
CH2M HILL	ALUMINUM	SB70I	3 to 5	12000	=	21829	NA	MG/KG
CH2M HILL	ALUMINUM	SB70I	3 to 5	10500	=	21829	NA	MG/KG
CH2M HILL	ALUMINUM	SB70I	8 to 10	18700	=	21829	NA	MG/KG
CH2M HILL	ALUMINUM	SB70J	3 to 5	9440	=	21829	NA	MG/KG
CH2M HILL	ALUMINUM	SB70J	8 to 10	9620	=	21829	NA	MG/KG
CH2M HILL	ANTIMONY	SB70E	8 to 10	0.51	J	NA	5	MG/KG
CH2M HILL	ARSENIC	SB70A	3 to 5	5.9	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB70A	8 to 10	4.5	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB70B	3 to 5	9.3	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB70B	8 to 10	14.5	=	17	29	MG/KG

Table 70-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 70
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	ARSENIC	SB70C	3 to 5	13.1	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB70C	8 to 10	9	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB70D	3 to 5	9.2	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB70D	8 to 10	14.1	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB70E	3 to 5	10.1	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB70E	3 to 5	8.9	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB70E	8 to 10	6.9	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB70F	3 to 5	13.3	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB70F	8 to 10	9.4	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB70G	3 to 5	9.8	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB70G	8 to 10	6.6	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB70H	3 to 5	5.5	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB70H	8 to 10	4.9	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB70I	3 to 5	10	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB70I	3 to 5	8	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB70I	8 to 10	9.9	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB70J	3 to 5	8.5	=	17	29	MG/KG
CH2M HILL	ARSENIC	SB70J	8 to 10	9	=	17	29	MG/KG
CH2M HILL	BARIUM	SB70A	3 to 5	63.9	=	300	1600	MG/KG
CH2M HILL	BARIUM	SB70A	8 to 10	86.8	=	300	1600	MG/KG
CH2M HILL	BARIUM	SB70B	3 to 5	124	=	300	1600	MG/KG
CH2M HILL	BARIUM	SB70B	8 to 10	204	=	300	1600	MG/KG
CH2M HILL	BARIUM	SB70C	3 to 5	191	=	300	1600	MG/KG
CH2M HILL	BARIUM	SB70C	8 to 10	135	=	300	1600	MG/KG
CH2M HILL	BARIUM	SB70D	3 to 5	129	=	300	1600	MG/KG
CH2M HILL	BARIUM	SB70D	8 to 10	117	=	300	1600	MG/KG
CH2M HILL	BARIUM	SB70E	3 to 5	121	=	300	1600	MG/KG

Table 70-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 70
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	BARIUM	SB70E	3 to 5	159	=	300	1600	MG/KG
CH2M HILL	BARIUM	SB70E	8 to 10	125	=	300	1600	MG/KG
CH2M HILL	BARIUM	SB70F	3 to 5	132	=	300	1600	MG/KG
CH2M HILL	BARIUM	SB70F	8 to 10	121	=	300	1600	MG/KG
CH2M HILL	BARIUM	SB70G	3 to 5	108	=	300	1600	MG/KG
CH2M HILL	BARIUM	SB70G	8 to 10	86.3	=	300	1600	MG/KG
CH2M HILL	BARIUM	SB70H	3 to 5	76	=	300	1600	MG/KG
CH2M HILL	BARIUM	SB70H	8 to 10	87.2	=	300	1600	MG/KG
CH2M HILL	BARIUM	SB70I	3 to 5	181	=	300	1600	MG/KG
CH2M HILL	BARIUM	SB70I	3 to 5	161	=	300	1600	MG/KG
CH2M HILL	BARIUM	SB70I	8 to 10	154	=	300	1600	MG/KG
CH2M HILL	BARIUM	SB70J	3 to 5	119	=	300	1600	MG/KG
CH2M HILL	BARIUM	SB70J	8 to 10	121	=	300	1600	MG/KG
CH2M HILL	CALCIUM	SB70A	3 to 5	2070	=	2400	NA	MG/KG
CH2M HILL	CALCIUM	SB70A	8 to 10	1510	=	2400	NA	MG/KG
CH2M HILL	CALCIUM	SB70B	3 to 5	1440	=	2400	NA	MG/KG
CH2M HILL	CALCIUM	SB70B	8 to 10	1280	=	2400	NA	MG/KG
CH2M HILL	CALCIUM	SB70C	3 to 5	1030	=	2400	NA	MG/KG
CH2M HILL	CALCIUM	SB70C	8 to 10	1770	=	2400	NA	MG/KG
CH2M HILL	CALCIUM	SB70D	3 to 5	1380	=	2400	NA	MG/KG
CH2M HILL	CALCIUM	SB70D	8 to 10	912	=	2400	NA	MG/KG
CH2M HILL	CALCIUM	SB70E	3 to 5	1410	=	2400	NA	MG/KG
CH2M HILL	CALCIUM	SB70E	3 to 5	1500	=	2400	NA	MG/KG
CH2M HILL	CALCIUM	SB70E	8 to 10	1610	=	2400	NA	MG/KG
CH2M HILL	CALCIUM	SB70F	3 to 5	1830	=	2400	NA	MG/KG
CH2M HILL	CALCIUM	SB70F	8 to 10	2750	=	2400	NA	MG/KG
CH2M HILL	CALCIUM	SB70G	3 to 5	805	=	2400	NA	MG/KG

Table 70-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 70
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	CALCIUM	SB70G	8 to 10	1720	=	2400	NA	MG/KG
CH2M HILL	CALCIUM	SB70H	3 to 5	2320	=	2400	NA	MG/KG
CH2M HILL	CALCIUM	SB70H	8 to 10	1730	=	2400	NA	MG/KG
CH2M HILL	CALCIUM	SB70I	3 to 5	1170	=	2400	NA	MG/KG
CH2M HILL	CALCIUM	SB70I	3 to 5	1370	=	2400	NA	MG/KG
CH2M HILL	CALCIUM	SB70I	8 to 10	978	=	2400	NA	MG/KG
CH2M HILL	CALCIUM	SB70J	3 to 5	1870	=	2400	NA	MG/KG
CH2M HILL	CALCIUM	SB70J	8 to 10	2020	=	2400	NA	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB70A	3 to 5	9.5	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB70A	8 to 10	16	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB70B	3 to 5	14.2	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB70B	8 to 10	18.4	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB70C	3 to 5	15.3	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB70C	8 to 10	13.2	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB70D	3 to 5	15.4	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB70D	8 to 10	22.5	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB70E	3 to 5	14.6	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB70E	3 to 5	15.4	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB70E	8 to 10	13.5	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB70F	3 to 5	14.9	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB70F	8 to 10	12.9	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB70G	3 to 5	14	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB70G	8 to 10	11.1	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB70H	3 to 5	12	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB70H	8 to 10	19.3	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB70I	3 to 5	12.9	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB70I	3 to 5	13.9	=	26	38	MG/KG

Table 70-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 70
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	CHROMIUM, TOTAL	SB70I	8 to 10	17.5	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB70J	3 to 5	12	=	26	38	MG/KG
CH2M HILL	CHROMIUM, TOTAL	SB70J	8 to 10	12.5	=	26	38	MG/KG
CH2M HILL	CHRYSENE	SB70F	8 to 10	0.047	J	NA	160	MG/KG
CH2M HILL	COBALT	SB70A	3 to 5	6.8	=	20	NA	MG/KG
CH2M HILL	COBALT	SB70A	8 to 10	6.3	=	20	NA	MG/KG
CH2M HILL	COBALT	SB70B	3 to 5	7.7	=	20	NA	MG/KG
CH2M HILL	COBALT	SB70B	8 to 10	7.6	=	20	NA	MG/KG
CH2M HILL	COBALT	SB70C	3 to 5	10.1	=	20	NA	MG/KG
CH2M HILL	COBALT	SB70C	8 to 10	7.3	=	20	NA	MG/KG
CH2M HILL	COBALT	SB70D	3 to 5	9.8	=	20	NA	MG/KG
CH2M HILL	COBALT	SB70D	8 to 10	8.8	=	20	NA	MG/KG
CH2M HILL	COBALT	SB70E	3 to 5	8.1	=	20	NA	MG/KG
CH2M HILL	COBALT	SB70E	3 to 5	7.8	=	20	NA	MG/KG
CH2M HILL	COBALT	SB70E	8 to 10	7.1	=	20	NA	MG/KG
CH2M HILL	COBALT	SB70F	3 to 5	9.9	=	20	NA	MG/KG
CH2M HILL	COBALT	SB70F	8 to 10	7.6	=	20	NA	MG/KG
CH2M HILL	COBALT	SB70G	3 to 5	9	=	20	NA	MG/KG
CH2M HILL	COBALT	SB70G	8 to 10	7.4	=	20	NA	MG/KG
CH2M HILL	COBALT	SB70H	3 to 5	6.8	=	20	NA	MG/KG
CH2M HILL	COBALT	SB70H	8 to 10	6.3	=	20	NA	MG/KG
CH2M HILL	COBALT	SB70I	3 to 5	8.2	=	20	NA	MG/KG
CH2M HILL	COBALT	SB70I	3 to 5	7.4	=	20	NA	MG/KG
CH2M HILL	COBALT	SB70I	8 to 10	9.5	=	20	NA	MG/KG
CH2M HILL	COBALT	SB70J	3 to 5	7.1	=	20	NA	MG/KG
CH2M HILL	COBALT	SB70J	8 to 10	7.6	=	20	NA	MG/KG
CH2M HILL	COPPER	SB70A	3 to 5	13.8	=	33	NA	MG/KG

Table 70-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 70
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	COPPER	SB70A	8 to 10	10.7	=	33	NA	MG/KG
CH2M HILL	COPPER	SB70B	3 to 5	16.9	=	33	NA	MG/KG
CH2M HILL	COPPER	SB70B	8 to 10	24.3	=	33	NA	MG/KG
CH2M HILL	COPPER	SB70C	3 to 5	21.6	=	33	NA	MG/KG
CH2M HILL	COPPER	SB70C	8 to 10	16.4	=	33	NA	MG/KG
CH2M HILL	COPPER	SB70D	3 to 5	17.5	=	33	NA	MG/KG
CH2M HILL	COPPER	SB70D	8 to 10	22	=	33	NA	MG/KG
CH2M HILL	COPPER	SB70E	3 to 5	16.3	=	33	NA	MG/KG
CH2M HILL	COPPER	SB70E	3 to 5	18.6	=	33	NA	MG/KG
CH2M HILL	COPPER	SB70E	8 to 10	15.1	=	33	NA	MG/KG
CH2M HILL	COPPER	SB70F	3 to 5	22	=	33	NA	MG/KG
CH2M HILL	COPPER	SB70F	8 to 10	16.6	=	33	NA	MG/KG
CH2M HILL	COPPER	SB70G	3 to 5	18.2	=	33	NA	MG/KG
CH2M HILL	COPPER	SB70G	8 to 10	14.7	=	33	NA	MG/KG
CH2M HILL	COPPER	SB70H	3 to 5	14	=	33	NA	MG/KG
CH2M HILL	COPPER	SB70H	8 to 10	11.3	=	33	NA	MG/KG
CH2M HILL	COPPER	SB70I	3 to 5	16.7	=	33	NA	MG/KG
CH2M HILL	COPPER	SB70I	3 to 5	16.7	=	33	NA	MG/KG
CH2M HILL	COPPER	SB70I	8 to 10	18.4	=	33	NA	MG/KG
CH2M HILL	COPPER	SB70J	3 to 5	16.1	=	33	NA	MG/KG
CH2M HILL	COPPER	SB70J	8 to 10	16.9	=	33	NA	MG/KG
CH2M HILL	DI-n-BUTYL PHTHALATE	SB70H	3 to 5	0.058	J	NA	2300	MG/KG
CH2M HILL	FLUORANTHENE	SB70F	8 to 10	0.072	J	.045	4300	MG/KG
CH2M HILL	IRON	SB70A	3 to 5	15000	=	38000	NA	MG/KG
CH2M HILL	IRON	SB70A	8 to 10	15000	=	38000	NA	MG/KG
CH2M HILL	IRON	SB70B	3 to 5	20300	=	38000	NA	MG/KG
CH2M HILL	IRON	SB70B	8 to 10	26900	=	38000	NA	MG/KG

Table 70-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 70
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	IRON	SB70C	3 to 5	23600	=	38000	NA	MG/KG
CH2M HILL	IRON	SB70C	8 to 10	19300	=	38000	NA	MG/KG
CH2M HILL	IRON	SB70D	3 to 5	19700	=	38000	NA	MG/KG
CH2M HILL	IRON	SB70D	8 to 10	28000	=	38000	NA	MG/KG
CH2M HILL	IRON	SB70E	3 to 5	20200	=	38000	NA	MG/KG
CH2M HILL	IRON	SB70E	3 to 5	20700	=	38000	NA	MG/KG
CH2M HILL	IRON	SB70E	8 to 10	16600	=	38000	NA	MG/KG
CH2M HILL	IRON	SB70F	3 to 5	23400	=	38000	NA	MG/KG
CH2M HILL	IRON	SB70F	8 to 10	19600	=	38000	NA	MG/KG
CH2M HILL	IRON	SB70G	3 to 5	21200	=	38000	NA	MG/KG
CH2M HILL	IRON	SB70G	8 to 10	17300	=	38000	NA	MG/KG
CH2M HILL	IRON	SB70H	3 to 5	16400	=	38000	NA	MG/KG
CH2M HILL	IRON	SB70H	8 to 10	15900	=	38000	NA	MG/KG
CH2M HILL	IRON	SB70I	3 to 5	20300	=	38000	NA	MG/KG
CH2M HILL	IRON	SB70I	3 to 5	18300	=	38000	NA	MG/KG
CH2M HILL	IRON	SB70I	8 to 10	21200	=	38000	NA	MG/KG
CH2M HILL	IRON	SB70J	3 to 5	18500	=	38000	NA	MG/KG
CH2M HILL	IRON	SB70J	8 to 10	19500	=	38000	NA	MG/KG
CH2M HILL	LEAD	SB70A	3 to 5	7.5	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB70A	8 to 10	7.5	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB70B	3 to 5	10.4	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB70B	8 to 10	15.1	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB70C	3 to 5	13.6	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB70C	8 to 10	9.5	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB70D	3 to 5	12.2	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB70D	8 to 10	15.2	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB70E	3 to 5	10	=	24	1.5	MG/KG

Table 70-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 70
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	LEAD	SB70E	3 to 5	11.2	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB70E	8 to 10	10.3	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB70F	3 to 5	13.2	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB70F	8 to 10	10.1	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB70G	3 to 5	11	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB70G	8 to 10	8	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB70H	3 to 5	7.3	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB70H	8 to 10	8.2	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB70I	3 to 5	11	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB70I	3 to 5	10.6	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB70I	8 to 10	14.4	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB70J	3 to 5	9.1	=	24	1.5	MG/KG
CH2M HILL	LEAD	SB70J	8 to 10	9.5	=	24	1.5	MG/KG
CH2M HILL	MAGNESIUM	SB70A	3 to 5	2090	=	4900	NA	MG/KG
CH2M HILL	MAGNESIUM	SB70A	8 to 10	2120	=	4900	NA	MG/KG
CH2M HILL	MAGNESIUM	SB70B	3 to 5	2580	=	4900	NA	MG/KG
CH2M HILL	MAGNESIUM	SB70B	8 to 10	3100	=	4900	NA	MG/KG
CH2M HILL	MAGNESIUM	SB70C	3 to 5	2930	=	4900	NA	MG/KG
CH2M HILL	MAGNESIUM	SB70C	8 to 10	2450	=	4900	NA	MG/KG
CH2M HILL	MAGNESIUM	SB70D	3 to 5	2610	=	4900	NA	MG/KG
CH2M HILL	MAGNESIUM	SB70D	8 to 10	3410	=	4900	NA	MG/KG
CH2M HILL	MAGNESIUM	SB70E	3 to 5	2370	=	4900	NA	MG/KG
CH2M HILL	MAGNESIUM	SB70E	3 to 5	2590	=	4900	NA	MG/KG
CH2M HILL	MAGNESIUM	SB70E	8 to 10	2240	=	4900	NA	MG/KG
CH2M HILL	MAGNESIUM	SB70F	3 to 5	2920	=	4900	NA	MG/KG
CH2M HILL	MAGNESIUM	SB70F	8 to 10	2580	=	4900	NA	MG/KG
CH2M HILL	MAGNESIUM	SB70G	3 to 5	2540	=	4900	NA	MG/KG

Table 70-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 70
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	MAGNESIUM	SB70G	8 to 10	2190	=	4900	NA	MG/KG
CH2M HILL	MAGNESIUM	SB70H	3 to 5	2310	=	4900	NA	MG/KG
CH2M HILL	MAGNESIUM	SB70H	8 to 10	2210	=	4900	NA	MG/KG
CH2M HILL	MAGNESIUM	SB70I	3 to 5	2530	=	4900	NA	MG/KG
CH2M HILL	MAGNESIUM	SB70I	3 to 5	2480	=	4900	NA	MG/KG
CH2M HILL	MAGNESIUM	SB70I	8 to 10	2440	=	4900	NA	MG/KG
CH2M HILL	MAGNESIUM	SB70J	3 to 5	2420	=	4900	NA	MG/KG
CH2M HILL	MAGNESIUM	SB70J	8 to 10	2520	=	4900	NA	MG/KG
CH2M HILL	MANGANESE	SB70A	3 to 5	637	=	1500	NA	MG/KG
CH2M HILL	MANGANESE	SB70A	8 to 10	453	=	1500	NA	MG/KG
CH2M HILL	MANGANESE	SB70B	3 to 5	625	=	1500	NA	MG/KG
CH2M HILL	MANGANESE	SB70B	8 to 10	838	=	1500	NA	MG/KG
CH2M HILL	MANGANESE	SB70C	3 to 5	1350	=	1500	NA	MG/KG
CH2M HILL	MANGANESE	SB70C	8 to 10	487	=	1500	NA	MG/KG
CH2M HILL	MANGANESE	SB70D	3 to 5	689	=	1500	NA	MG/KG
CH2M HILL	MANGANESE	SB70D	8 to 10	570	=	1500	NA	MG/KG
CH2M HILL	MANGANESE	SB70E	3 to 5	504	=	1500	NA	MG/KG
CH2M HILL	MANGANESE	SB70E	3 to 5	445	=	1500	NA	MG/KG
CH2M HILL	MANGANESE	SB70E	8 to 10	632	=	1500	NA	MG/KG
CH2M HILL	MANGANESE	SB70F	3 to 5	1110	=	1500	NA	MG/KG
CH2M HILL	MANGANESE	SB70F	8 to 10	541	=	1500	NA	MG/KG
CH2M HILL	MANGANESE	SB70G	3 to 5	594	=	1500	NA	MG/KG
CH2M HILL	MANGANESE	SB70G	8 to 10	599	=	1500	NA	MG/KG
CH2M HILL	MANGANESE	SB70H	3 to 5	523	=	1500	NA	MG/KG
CH2M HILL	MANGANESE	SB70H	8 to 10	405	=	1500	NA	MG/KG
CH2M HILL	MANGANESE	SB70I	3 to 5	684	=	1500	NA	MG/KG
CH2M HILL	MANGANESE	SB70I	3 to 5	533	=	1500	NA	MG/KG

Table 70-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 70
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	MANGANESE	SB70I	8 to 10	560	=	1500	NA	MG/KG
CH2M HILL	MANGANESE	SB70J	3 to 5	487	=	1500	NA	MG/KG
CH2M HILL	MANGANESE	SB70J	8 to 10	540	=	1500	NA	MG/KG
CH2M HILL	NICKEL	SB70A	3 to 5	16.7	=	37	130	MG/KG
CH2M HILL	NICKEL	SB70A	8 to 10	12.9	=	37	130	MG/KG
CH2M HILL	NICKEL	SB70B	3 to 5	18.3	=	37	130	MG/KG
CH2M HILL	NICKEL	SB70B	8 to 10	19.7	=	37	130	MG/KG
CH2M HILL	NICKEL	SB70C	3 to 5	22.5	=	37	130	MG/KG
CH2M HILL	NICKEL	SB70C	8 to 10	18.1	=	37	130	MG/KG
CH2M HILL	NICKEL	SB70D	3 to 5	18.5	=	37	130	MG/KG
CH2M HILL	NICKEL	SB70D	8 to 10	20.1	=	37	130	MG/KG
CH2M HILL	NICKEL	SB70E	3 to 5	18	=	37	130	MG/KG
CH2M HILL	NICKEL	SB70E	3 to 5	17.5	=	37	130	MG/KG
CH2M HILL	NICKEL	SB70E	8 to 10	16.3	=	37	130	MG/KG
CH2M HILL	NICKEL	SB70F	3 to 5	20.4	=	37	130	MG/KG
CH2M HILL	NICKEL	SB70F	8 to 10	18.4	=	37	130	MG/KG
CH2M HILL	NICKEL	SB70G	3 to 5	18	=	37	130	MG/KG
CH2M HILL	NICKEL	SB70G	8 to 10	16.1	=	37	130	MG/KG
CH2M HILL	NICKEL	SB70H	3 to 5	16.1	=	37	130	MG/KG
CH2M HILL	NICKEL	SB70H	8 to 10	13.9	=	37	130	MG/KG
CH2M HILL	NICKEL	SB70I	3 to 5	17.2	=	37	130	MG/KG
CH2M HILL	NICKEL	SB70I	3 to 5	17.9	=	37	130	MG/KG
CH2M HILL	NICKEL	SB70I	8 to 10	18.1	=	37	130	MG/KG
CH2M HILL	NICKEL	SB70J	3 to 5	16.9	=	37	130	MG/KG
CH2M HILL	NICKEL	SB70J	8 to 10	17.9	=	37	130	MG/KG
CH2M HILL	p,p'-DDE	SB70F	3 to 5	0.021	=	.0015	54	MG/KG
CH2M HILL	p,p'-DDE	SB70F	8 to 10	0.032	=	.0015	54	MG/KG

Table 70-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 70
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	p,p'-DDE	SB70I	3 to 5	0.0035	J	.0015	54	MG/KG
CH2M HILL	p,p'-DDE	SB70I	8 to 10	0.0021	J	.0015	54	MG/KG
CH2M HILL	p,p'-DDT	SB70F	3 to 5	0.081	=	.0072	32	MG/KG
CH2M HILL	p,p'-DDT	SB70F	8 to 10	0.058	=	.0072	32	MG/KG
CH2M HILL	p,p'-DDT	SB70I	3 to 5	0.0081	=	.0072	32	MG/KG
CH2M HILL	p,p'-DDT	SB70I	8 to 10	0.0034	J	.0072	32	MG/KG
CH2M HILL	POTASSIUM	SB70A	3 to 5	1550	=	1800	NA	MG/KG
CH2M HILL	POTASSIUM	SB70A	8 to 10	1600	=	1800	NA	MG/KG
CH2M HILL	POTASSIUM	SB70B	3 to 5	2460	=	1800	NA	MG/KG
CH2M HILL	POTASSIUM	SB70B	8 to 10	3280	=	1800	NA	MG/KG
CH2M HILL	POTASSIUM	SB70C	3 to 5	3070	=	1800	NA	MG/KG
CH2M HILL	POTASSIUM	SB70C	8 to 10	2380	=	1800	NA	MG/KG
CH2M HILL	POTASSIUM	SB70D	3 to 5	2730	=	1800	NA	MG/KG
CH2M HILL	POTASSIUM	SB70D	8 to 10	2810	=	1800	NA	MG/KG
CH2M HILL	POTASSIUM	SB70E	3 to 5	2530	=	1800	NA	MG/KG
CH2M HILL	POTASSIUM	SB70E	3 to 5	2650	=	1800	NA	MG/KG
CH2M HILL	POTASSIUM	SB70E	8 to 10	2300	=	1800	NA	MG/KG
CH2M HILL	POTASSIUM	SB70F	3 to 5	2780	=	1800	NA	MG/KG
CH2M HILL	POTASSIUM	SB70F	8 to 10	2410	=	1800	NA	MG/KG
CH2M HILL	POTASSIUM	SB70G	3 to 5	2790	=	1800	NA	MG/KG
CH2M HILL	POTASSIUM	SB70G	8 to 10	1870	=	1800	NA	MG/KG
CH2M HILL	POTASSIUM	SB70H	3 to 5	2180	=	1800	NA	MG/KG
CH2M HILL	POTASSIUM	SB70H	8 to 10	1880	=	1800	NA	MG/KG
CH2M HILL	POTASSIUM	SB70I	3 to 5	2280	=	1800	NA	MG/KG
CH2M HILL	POTASSIUM	SB70I	3 to 5	2460	=	1800	NA	MG/KG
CH2M HILL	POTASSIUM	SB70I	8 to 10	2750	=	1800	NA	MG/KG
CH2M HILL	POTASSIUM	SB70J	3 to 5	2340	=	1800	NA	MG/KG

Table 70-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 70
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	POTASSIUM	SB70J	8 to 10	2420	=	1800	NA	MG/KG
CH2M HILL	PYRENE	SB70F	8 to 10	0.058	J	.042	2800	MG/KG
CH2M HILL	SILVER	SB70B	8 to 10	0.16	J	.98	34	MG/KG
CH2M HILL	SILVER	SB70C	3 to 5	0.24	J	.98	34	MG/KG
CH2M HILL	SILVER	SB70C	8 to 10	0.11	J	.98	34	MG/KG
CH2M HILL	SILVER	SB70D	3 to 5	0.09	J	.98	34	MG/KG
CH2M HILL	SILVER	SB70D	8 to 10	0.25	J	.98	34	MG/KG
CH2M HILL	SILVER	SB70E	3 to 5	0.13	J	.98	34	MG/KG
CH2M HILL	SILVER	SB70E	8 to 10	0.11	J	.98	34	MG/KG
CH2M HILL	SILVER	SB70F	3 to 5	0.17	J	.98	34	MG/KG
CH2M HILL	SILVER	SB70F	8 to 10	0.16	J	.98	34	MG/KG
CH2M HILL	SILVER	SB70G	3 to 5	0.1	J	.98	34	MG/KG
CH2M HILL	SILVER	SB70G	8 to 10	0.1	J	.98	34	MG/KG
CH2M HILL	SILVER	SB70I	3 to 5	0.12	J	.98	34	MG/KG
CH2M HILL	SILVER	SB70I	3 to 5	0.15	J	.98	34	MG/KG
CH2M HILL	SILVER	SB70I	8 to 10	0.1	J	.98	34	MG/KG
CH2M HILL	SILVER	SB70J	8 to 10	0.11	J	.98	34	MG/KG
CH2M HILL	TRICHLOROETHYLENE (TCE)	SB70B	8 to 10	0.004	J	NA	.06	MG/KG
CH2M HILL	VANADIUM	SB70A	3 to 5	19.8	=	51	6000	MG/KG
CH2M HILL	VANADIUM	SB70A	8 to 10	29.4	=	51	6000	MG/KG
CH2M HILL	VANADIUM	SB70B	3 to 5	29	=	51	6000	MG/KG
CH2M HILL	VANADIUM	SB70B	8 to 10	39.6	=	51	6000	MG/KG
CH2M HILL	VANADIUM	SB70C	3 to 5	34.8	=	51	6000	MG/KG
CH2M HILL	VANADIUM	SB70C	8 to 10	25.9	=	51	6000	MG/KG
CH2M HILL	VANADIUM	SB70D	3 to 5	32	=	51	6000	MG/KG
CH2M HILL	VANADIUM	SB70D	8 to 10	40.4	=	51	6000	MG/KG
CH2M HILL	VANADIUM	SB70E	3 to 5	31.7	=	51	6000	MG/KG

Table 70-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 70
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	VANADIUM	SB70E	3 to 5	29.1	=	51	6000	MG/KG
CH2M HILL	VANADIUM	SB70E	8 to 10	27.7	=	51	6000	MG/KG
CH2M HILL	VANADIUM	SB70F	3 to 5	31.5	=	51	6000	MG/KG
CH2M HILL	VANADIUM	SB70F	8 to 10	24.9	=	51	6000	MG/KG
CH2M HILL	VANADIUM	SB70G	3 to 5	29.2	=	51	6000	MG/KG
CH2M HILL	VANADIUM	SB70G	8 to 10	24.3	=	51	6000	MG/KG
CH2M HILL	VANADIUM	SB70H	3 to 5	26.2	=	51	6000	MG/KG
CH2M HILL	VANADIUM	SB70H	8 to 10	31.8	=	51	6000	MG/KG
CH2M HILL	VANADIUM	SB70I	3 to 5	27.1	=	51	6000	MG/KG
CH2M HILL	VANADIUM	SB70I	3 to 5	24.6	=	51	6000	MG/KG
CH2M HILL	VANADIUM	SB70I	8 to 10	36.2	=	51	6000	MG/KG
CH2M HILL	VANADIUM	SB70J	3 to 5	24.9	=	51	6000	MG/KG
CH2M HILL	VANADIUM	SB70J	8 to 10	25.7	=	51	6000	MG/KG
CH2M HILL	ZINC	SB70A	3 to 5	35.3	=	110	12000	MG/KG
CH2M HILL	ZINC	SB70A	8 to 10	35.5	=	110	12000	MG/KG
CH2M HILL	ZINC	SB70B	3 to 5	60.8	=	110	12000	MG/KG
CH2M HILL	ZINC	SB70B	8 to 10	74.3	=	110	12000	MG/KG
CH2M HILL	ZINC	SB70C	3 to 5	72.5	=	110	12000	MG/KG
CH2M HILL	ZINC	SB70C	8 to 10	52.2	=	110	12000	MG/KG
CH2M HILL	ZINC	SB70D	3 to 5	59.6	=	110	12000	MG/KG
CH2M HILL	ZINC	SB70D	8 to 10	77.4	=	110	12000	MG/KG
CH2M HILL	ZINC	SB70E	3 to 5	52.8	=	110	12000	MG/KG
CH2M HILL	ZINC	SB70E	3 to 5	57.4	=	110	12000	MG/KG
CH2M HILL	ZINC	SB70E	8 to 10	51	=	110	12000	MG/KG
CH2M HILL	ZINC	SB70F	3 to 5	72.1	=	110	12000	MG/KG
CH2M HILL	ZINC	SB70F	8 to 10	53.9	=	110	12000	MG/KG
CH2M HILL	ZINC	SB70G	3 to 5	59.4	=	110	12000	MG/KG

Table 70-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 70
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
CH2M HILL	ZINC	SB70G	8 to 10	40.3	=	110	12000	MG/KG
CH2M HILL	ZINC	SB70H	3 to 5	35.8	=	110	12000	MG/KG
CH2M HILL	ZINC	SB70H	8 to 10	37.7	=	110	12000	MG/KG
CH2M HILL	ZINC	SB70I	3 to 5	54.6	=	110	12000	MG/KG
CH2M HILL	ZINC	SB70I	3 to 5	56.1	=	110	12000	MG/KG
CH2M HILL	ZINC	SB70I	8 to 10	61	=	110	12000	MG/KG
CH2M HILL	ZINC	SB70J	3 to 5	51.2	=	110	12000	MG/KG
CH2M HILL	ZINC	SB70J	8 to 10	53.2	=	110	12000	MG/KG
LAW	1,2-DICHLOROETHANE	STB-8-4	217 to 222	0.011	=	NA	.02	MG/KG
LAW	ACETONE	STB-8-1	92 to 97	0.06	=	NA	16	MG/KG
LAW	ACETONE	STB-8-2	97 to 102	0.04	=	NA	16	MG/KG
LAW	ACETONE	STB-8-3	127 to 132	0.045	=	NA	16	MG/KG
LAW	ACETONE	STB-8-4	217 to 222	0.028	=	NA	16	MG/KG
LAW	BARIUM	STB-8-1	92 to 97	3.6	=	300	1600	MG/KG
LAW	BARIUM	STB-8-2	97 to 102	26.1	=	300	1600	MG/KG
LAW	BARIUM	STB-8-3	127 to 132	2.9	=	300	1600	MG/KG
LAW	BARIUM	STB-8-4	217 to 222	14.2	=	300	1600	MG/KG
LAW	BETA BHC (BETA HEXACHLOROCYCLOHEXANE)	STB-8-4	217 to 222	0.019	=	NA	.003	MG/KG
LAW	bis(2-ETHYLHEXYL) PHTHALATE	STB-8-1	92 to 97	0.52	=	NA	3600	MG/KG
LAW	bis(2-ETHYLHEXYL) PHTHALATE	STB-8-2	97 to 102	0.25	J	NA	3600	MG/KG
LAW	bis(2-ETHYLHEXYL) PHTHALATE	STB-8-3	127 to 132	0.35	J	NA	3600	MG/KG
LAW	bis(2-ETHYLHEXYL) PHTHALATE	STB-8-4	217 to 222	0.27	J	NA	3600	MG/KG
LAW	CHROMIUM, TOTAL	STB-8-1	92 to 97	1	=	26	38	MG/KG
LAW	CHROMIUM, TOTAL	STB-8-2	97 to 102	5	=	26	38	MG/KG
LAW	CHROMIUM, TOTAL	STB-8-3	127 to 132	2	=	26	38	MG/KG
LAW	CHROMIUM, TOTAL	STB-8-4	217 to 222	6	=	26	38	MG/KG
LAW	COPPER	STB-8-1	92 to 97	3	=	33	NA	MG/KG

Table 70-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 70
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units
LAW	COPPER	STB-8-2	97 to 102	5	=	33	NA	MG/KG
LAW	COPPER	STB-8-3	127 to 132	3	=	33	NA	MG/KG
LAW	COPPER	STB-8-4	217 to 222	6	=	33	NA	MG/KG
LAW	LEAD	STB-8-2	97 to 102	6	=	24	1.5	MG/KG
LAW	LEAD	STB-8-4	217 to 222	7	=	24	1.5	MG/KG
LAW	METHYL ETHYL KETONE (2-BUTANONE)	STB-8-1	92 to 97	0.003	J	NA	NA	MG/KG
LAW	METHYL ETHYL KETONE (2-BUTANONE)	STB-8-2	97 to 102	0.002	J	NA	NA	MG/KG
LAW	METHYL ETHYL KETONE (2-BUTANONE)	STB-8-3	127 to 132	0.002	J	NA	NA	MG/KG
LAW	METHYLENE CHLORIDE	STB-8-1	92 to 97	0.01	=	NA	.02	MG/KG
LAW	METHYLENE CHLORIDE	STB-8-2	97 to 102	0.007	=	NA	.02	MG/KG
LAW	METHYLENE CHLORIDE	STB-8-3	127 to 132	0.005	J	NA	.02	MG/KG
LAW	METHYLENE CHLORIDE	STB-8-4	217 to 222	0.005	J	NA	.02	MG/KG
LAW	N-NITROSODIPHENYLAMINE	STB-8-1	92 to 97	0.085	J	NA	1	MG/KG
LAW	N-NITROSODIPHENYLAMINE	STB-8-2	97 to 102	0.053	J	NA	1	MG/KG
LAW	N-NITROSODIPHENYLAMINE	STB-8-3	127 to 132	0.039	J	NA	1	MG/KG
LAW	N-NITROSODIPHENYLAMINE	STB-8-4	217 to 222	0.098	J	NA	1	MG/KG
LAW	NICKEL	STB-8-2	97 to 102	6	=	37	130	MG/KG
LAW	NICKEL	STB-8-4	217 to 222	4	=	37	130	MG/KG
LAW	TOLUENE	STB-8-2	97 to 102	0.003	J	NA	12	MG/KG
LAW	TOLUENE	STB-8-4	217 to 222	0.002	J	NA	12	MG/KG
LAW	ZINC	STB-8-1	92 to 97	14	=	110	12000	MG/KG
LAW	ZINC	STB-8-2	97 to 102	20.5	=	110	12000	MG/KG
LAW	ZINC	STB-8-3	127 to 132	3.8	=	110	12000	MG/KG
LAW	ZINC	STB-8-4	217 to 222	11.6	=	110	12000	MG/KG

Notes:
1. Detected values are obtained from the *Remedial Investigation at DDMT Final Report,* Law Environmental, August 1990.
2. The parameter listing includes only the parameters detected within each site and not all the parameters analyzed.

Table 70-C
Summary of Detected Compounds in Subsurface Soils
Compared to RBC-GWP Screening Levels for Site 70
Screening Sites Sampling Program
Defense Distribution Depot Memphis, Tennessee

Data Source[1]	Parameter[2]	StationID	Depth (ft)	Detection Value	Project Qualifier	Background Value[3]	RBC-GWP[4]	Units

3. Background values are from Table 5-1 of the *Final Background Sampling Program Technical Memorandum*, CH2M HILL, January 1998, and as modified by the BRAC Cleanup Team and reported in Table 3-2 of the same document.
4. RBC-GWP values are obtained from the *EPA Region III Risk-based Concentrations Table*, R. L. Smith, April, 1997.

Bold text indicates detections that exceed a screening level value and the associated screening level value that was exceeded.
NA - indicates screening level values are not available for comparison.
= - indicates unqualified detection
J - indicates estimated value above the detection limit but below the reporting limit.
RBC-GWP - Risk-Based Concentrations - Groundwater Protection

TAB

Appendix A

Appendix A

Preliminary Risk Evaluation Methodology

3.0 Preliminary Risk Evaluation (PRE) Methodology

3.1 Introduction

Initial draft letter reports, which included a screening evaluation of the data collected, were prepared for all sites identified at the Defense Distribution Depot Memphis, Tennessee (DDMT). These data included samples collected as part of the Screening Site (SS), Base Realignment and Closure (BRAC), and Remedial Investigation (RI) site characterization efforts. The purpose of this evaluation was to evaluate whether sites have contamination at levels that would require further investigations for protection of human health and the environment. During the BRAC Cleanup Team (BCT) meetings, the United States Environmental Protection Agency (EPA) and Tennessee Department of Environment and Conservation (TDEC) suggested using a risk evaluation methodology from the Preliminary Risk Evaluation (PRE) guidance (EPA, 1994) to reach Findings of Suitability to Lease (FOSL) conclusions at these sites. This document presents the findings of the PRE as well as recommendations concerning whether the site can be used for industrial, residential, or other purposes while being protective of human receptors. Ecological receptors do not drive the site management decisions at this site due to the highly industrialized nature of DDMT. Ecological risk assessments were therefore not performed as part of this PRE.

3.2 PRE Methodology and Screening Criteria Selection

The PRE methodology (EPA, 1994) identifies a screening protocol to evaluate sites, which is accomplished by preparation of tables that compare the site concentrations with designated screening concentrations, generally the Region III risk-based concentration values. The tables also present a risk ratio between the maximum concentration reported and the screening values. For carcinogens, these ratios are multiplied by 10^{-6}, thus providing a risk estimate. For systemic toxicants, the risk ratios provide an estimate of the non-cancer hazard. The risks calculated for the individual chemicals are summed to estimate the aggregate risk at each sample station.

This guidance was applied to the DDMT sites as follows:

- The criteria used for PRE were selected from the EPA Region III Risk-Based Concentration (RBC) tables (EPA, 1997).
- A PRE was conducted for each sampling point at a site. The maximum sample-station-specific risk associated with a site was used in the risk evaluation. In addition, the average of the sample risks was provided for each site.
- Maps of sample-specific PRE values were prepared that provided geographical distribution of the contamination across each site as well as across the entire DDMT Main Installation. Sediments and surface water ratios were also calculated using

EPA Region IV ecological screening values. These are presented only in Appendix A, and are not included in the site discussions.

- Both industrial worker exposure-based and residential exposure-based PRE risks were calculated.

A risk ratio was not calculated (assumed to be "0") where a chemical was detected below the background concentrations (see Section 3.3.1).

There is no potable groundwater use at the site. There are no known groundwater users of the uppermost aquifer in the downgradient areas of the site. The risk ratios based on comparisons of groundwater concentrations with conservative potable water criteria are used because the screening level effort is designed to provide a conservative screening evaluation.

Because most of the DDMT facility is well developed and has been industrial for a long period of time, there are no ecologically sensitive habitats present within the Main Installation of the facility. Thus only human health protection-based evaluations were conducted for the PRE evaluation discussion in Section 4.

3.2.1 Background Criteria

The background criteria for inorganic constituents are the two-times mean values estimated in the Background Sampling Program Technical Memorandum (CH2M HILL, 1996). All of the sample results were compared with background values for the naturally occurring inorganic constituents. The background values were obtained from the corresponding media, and the detected concentrations were statistically evaluated to estimate the mean concentration.

Some of the background values included in this draft report have since been modified to account for more conservative evaluation of the background. The modified values were calculated by eliminating outliers in the data sets or removing background samples taken from the DDMT perimeter. The DDMT perimeter samples may be influenced by pesticide application, which would bias the natural background levels to higher values. The new background values have been proposed to the BCT, and the values subsequently approved by the BCT were used as the background values in this report. A PRE risk ratio value was not calculated when a chemical did not exceed the background.

According to EPA Region IV guidance, two times the mean, or upper 95 percent concentration (only for selected organic chemicals) was considered as the background concentration and used for comparison with sample-specific detected concentrations at each site and for soil and groundwater.

A chlorinated hydrocarbon pesticide, dieldrin, was detected across the site at DDMT as well as in some of the offsite background samples. A technical memorandum was prepared for the BCT review, analyzing the statistical significance of the detected dieldrin compared to the background (see Appendix B). All data from the site were divided into three sub-groups based on the type of land use and compared against the background. In accordance with this statistical evaluation, dieldrin was not a chemical of potential concern (COPC) in the railroad tracks and open storage areas of the site. It was a COPC at all other areas of the site including the Golf Course and surrounding areas, and warehouse areas. A concentration

above 0.5 milligram per kilogram (mg/kg) in the golf course area indicates an exceedance above background dieldrin levels, and a similar concentration for the warehouses area is 1.3 mg/kg, as per the statistical evaluation. As a conservative measure, 0.5 mg/kg is used as a cut-off point in this screening level effort. The site-specific discussion is included in Section 4.0.

3.2.2 Residential RBCs

Residential RBCs are the target screening criteria protective of human health under residential exposure assumptions. These values are calculated by EPA Region III to be protective against ingestion intake only. Each detected surface soil concentration was compared against these criteria. A carcinogenic and noncarcinogenic ratio was calculated in separate tables in accordance with the PRE guidance. An average risk per site and a sample representing the maximum risk at a site are presented in these tables.

The groundwater RBCs are the values selected from EPA Region III RBC tables. Data from each individual well were compared with these criteria.

3.2.3 Industrial RBCs

Industrial RBCs are the target screening values protective of industrial worker exposures. These values are calculated by EPA Region III to be protective against ingestion intake only; however, the EPA (1994) prescribes use of the Region III risk-based criteria in the PRE calculation. Detected chemicals from surface soil were compared against these criteria. Detected chemicals from each sample were also compared with these worker protection criteria for risk management decisions at sites that will continue to be used as industrial facilities. Both carcinogenic risk ratios and noncarcinogenic PRE ratios were calculated separately following PRE guidance.

A well-specific risk ratio and noncarcinogenic PRE ratio were calculated for groundwater as per the guidance. An industrial scenario was evaluated using the residential water RBC values divided by 0.25 for volatile organic compounds (VOCs), 0.5 for all other chemicals.

In summary, constituents that were detected at a site, but not exceeding the background or PRE risk ratio above 1 in a million (10^{-6}) or a ratio of 1.0 for systemic toxicants are considered unimportant or not significant.

Whenever an inorganic chemical is presenting a risk ratio above one in a million or a Hazard Index (HI) above a value of 1.0, yet the chemical is naturally occurring and the observed concentrations are close to background levels, the ratio exceedance was not considered critical for the following reasons:

- These chemicals are naturally occurring and the concentration ranges could be similar to the site concentration ranges, and a point comparison cannot account for the upper levels in the background, which can be similar in concentrations to the site
- Several of these chemicals are not very toxic and are nutritionally essential to human health
- No apparent site-related activities involving these chemicals—and/or—
- Ratios were exceeded only for the residential scenario

An additional data interpretation not strictly based on the risk ratios is used for dieldrin at the site. Dieldrin was statistically evaluated for its distribution across the site compared to the background (see Appendix B). It is considered a COPC in the Golf Course area and its surrounding parcels, and in the parcels around the warehouses, if concentrations exceed 0.5 mg/kg.

3.2.4 Data Evaluation

Inorganic chemical lead does not have an existing toxicity factor. It is regulated by the EPA based on blood lead uptake in the exposed individuals, which accounts for multiple sources for exposure (e.g., from food) in addition to the environmental media. Lead levels are considered "safe" by most regulatory agencies under residential exposure conditions at 200 to 400 mg/kg, and under industrial exposure conditions at 1,000 mg/kg. The drinking water action level for lead is 15 micrograms per liter (µg/L). Therefore because lead is not classified as either a carcinogenic or noncarcinogenic chemical, lead concentrations from DDMT are compared with these criteria and PRE ratios are included in both carcinogenic and noncarcinogenic tables.

TAB

Appendix B

Appendix B References

References

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