N62269.AR.000542
NAWC WARMINSTER
5090.3a

Sites 6 and 7

Remedial Investigation

Former Naval Air Warfare Center

Warminster, Pennsylvania

Northern Division

Naval Facilities Engineering Command

Contract No. N62472-90-D-1298

Contract Task Order 252

December 1998

TETRA TECH NUS, INC.

R-51-10-8-1

SITES 6 and 7
REMEDIAL INVESTIGATION

FORMER NAVAL AIR WARFARE CENTER
WARMINSTER, PENNSYLVANIA

Submitted to:
Northern Division
Environmental Branch, Code 14
Naval Facilities Engineering Command
10 Industrial Highway, Mall Stop #82
Lester, Pennsylvania 19113-2090

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Contract No. N62472-90-D-1298
Contract Task Order 252

December 1998

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EXECUTIVE SUMMARY

PURPOSE OF THE REMEDIAL INVESTIGATION

This document describes and summarizes the results of the investigations and removal actions performed at Sites 6 and 7 at the former Naval Air Warfare Center (NAWC) Warminster, Pennsylvania. The investigations and subsequent removal actions focused on potential risks associated with contaminated soils at Sites 6 and 7 and evaluated the sites as a potential source of the groundwater contamination identified in Area B. The purpose of this report is to provide an overview of investigations and removal actions performed at Sites 6 and 7 and summarize the estimated human health risks remaining. The Navy is conducting concurrent investigations of the groundwater at Area B, which will be presented in a separate RI report.

The investigations that were conducted meet the requirements of the Navy's Installation Restoration Program (IRP) and the requirements under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) as amended by the Superfund Amendment and Reauthorization Act of 1986 (SARA). The findings of this RI report will serve as the basis for evaluating remedial alternatives to be implemented at Sites 6 and 7. These remedial alternatives will be presented in a separate feasibility study.

BACKGROUND INFORMATION

The NAWC facility has been divided into four general areas of concern (A, B, C, and D) based on groupings of suspected disposal sites, contamination, geographic areas, common sources and receptors, and facility use characteristics. Sites 6 and 7 are located in the eastern portion of the NAWC, south of the main runway and north of the Navy enlisted housing area. This area consists of open fields and transition woodlot. The area has been designated as Area B which comprises the former disposal Sites 5 (not discussed in this report), 6, and 7 and groundwater contamination. The main groundwater contaminants have been identified as volatile organic compounds (VOCs). Site 6 was a disposal area reportedly used by the Navy for the disposal of miscellaneous industrial-type wastes and debris. Site 7 consisted of one or more disposal trenches reportedly used for the disposal of sludge from industrial wastewater treatment. These two sites are located in property that has been designated for transfer to Warminster Township for use as recreational/park land.

SCOPE OF INVESTIGATION

Numerous investigations and studies have been performed in and around Sites 6 and 7. The results of these investigations, anecdotal reports, and aerial photographic interpretation were used to scope the RIs that were conducted. These RIs included the performance of a series of geophysical surveys, soil gas studies, and test pit excavations, the placement of exploratory borings, and the collection of surface and subsurface samples.

Field investigations extended throughout the area adjacent to the south side of the main runway and the open fields south and west of the base patrol road. These investigations confirmed the lack of evidence of disposal activities to the west of the patrol road and confirmed the locations of Sites 6 and 7 to the east and north of the road. The combined findings from the review of historical aerial photographs, geophysical surveys, and subsurface investigations were confirmed by the analysis of soils and waste materials encountered between the patrol road and the south side of the main runway. These investigations confirmed the presence of a series of disposal areas, pits, and trenches. The materials encountered consisted of household trash, industrial debris, concrete slabs, construction debris, scrap metal, industrial wastes, and sludge-like materials. These findings are consistent with the background information and reported disposal practices for both Sites 6 and 7.

The initial analytical results collected from the disposal areas were evaluated and the results were used to direct early removal actions. Concurrent with these removal actions, the Navy collected and analyzed additional samples from outside these areas to assess the presence/absence of contamination. The findings of these investigations and the analytical results from surface and subsurface samples were evaluated to determine if unacceptable risks were presented by the site.

REMOVAL ACTION AT SITES 6 AND 7

Removal actions were initiated at Sites 6 and 7 in May 1997 and were completed in September 1997. Actions included the excavation and off-site disposal of about 3,698 tons of soil and debris from three discrete excavations and from the surface area. Samples from the excavated areas were collected according to Pennsylvania Department of Environmental Protection (PADEP) criteria and guidelines and were analyzed in accordance with the plan approved by the Base Realignment and Closure (BRAC) Cleanup Team (BCT). Sample results were reported to

representatives of the Environmental Protection Agency (EPA), PADEP, and the Navy (the BCT) for review and action. Areas that were found to contain contaminant levels in excess of the clean-up goals, established according to federal risk-based recreational criteria, were re-excavated and sampled until all sample results from the area indicated that no contaminants remained above the clean-up goals.

FINDINGS

Initial removal actions were successfully completed. All post-excavation verification samples indicated the absence of contaminants above the clean-up goals established by the BCT, based on EPA and PADEP risk criteria and guidance.

The results of the RI confirmed that disposal activities occurred to the west and north of the base patrol road. Sites 6 and 7 are co-located in the area south of the main runway, north of the patrol road.

Analytical results from all surface soil samples collected from this area and outside the removal areas were evaluated according to the latest EPA risk assessment protocols to determine the risks associated with the future recreational use of the land. This assessment determined that the cancer risk presented by surface soils in a recreational land use scenario was $2x10^{-6}$. Noncancer risks were determined to have a Hazard Index (HI) value of less than 1. EPA considers a cancer risk in the range of $1x10^{-4}$ to $1x10^{-6}$ to be an acceptable risk for most CERCLA projects. Noncancer risks of less than 1 on the HI are considered, by EPA, to be an indication that noncancer health effects are not likely to occur and are acceptable for most CERCLA projects. Therefore, no unacceptable risks are present on the site based on the predicted future recreational use of the site. A similar human risk assessment was performed assuming a future residential land use scenario for the property. The residential scenario resulted in an estimated lifetime cumulative cancer risk of 1×10^{-4} and a non-cancer risk (HI) of greater 1 for both the future child and adult resident.

Although risks due to exposure to subsurface soils were estimated, this pathway is not active (exposure to subsurface soils does not occur). As such, no risks from this medium are present. However, if future excavation or construction were to disturb subsurface soils at depth so that these subsurface soils were brought to the surface, exposure to these soils could potentially occur. An assessment using this risk scenario was performed using analytical results from all subsurface samples collected from outside the removal areas. This assessment determined that

the cancer risk presented by subsurface soils, considering the site as a whole, in a recreational land use scenario was $1x10^{-5}$. Noncancer risks were determined to have an HI value of 4.8 for a child and 3.3 for a youth. Similarly, cancer risks under the future residential land use scenario were estimated at $2x10^{-4}$. Noncancer risks for both the child and adult resident were determined to significantly exceed an HI of 1.

Based on a review of the data and the distribution of the major risk drivers in this assessment, three areas of potential greater risk were delineated within the Sites 6 and 7 area. The risks associated with these areas are restricted to subsurface media. The areas were designated as Zones 1, 2, and 3. An assessment, similar to the site-wide assessment, was performed using subsurface sample results from the three zones assuming that all surface soil was removed and that recreational receptors repeatedly and consistently concentrated their activities within these areas. Because the approved re-use plan designated this area for recreational uses, only this future risk scenario was developed for the detailed evaluation of these zones. Cancer risks were determined to be $4x10^{-6}$ for Zone 1, $2x10^{-5}$ for Zone 2, and $8x10^{-6}$ for Zone 3. Noncancer risks were determined to have HI values of 16 (child) and 11 (youth) for Zone 1, 45 (child) and 33 (youth) for Zone 2, and 89 (child) and 66 (youth) for Zone 3.

As indicated above, the cancer risks associated with future recreational land use for all evaluations is within the EPA target range for CERCLA projects. The noncancer risks for subsurface assessments were determined to have an HI of greater than 1. The HI value is an indication that noncancer effects may be possible given the exposure scenario assumptions. Many uncertainties exist in performing the risk assessment and in determining this HI value that should be taken into consideration when deciding the need for remedial actions at Sites 6 and 7.

The majority (greater than 90 percent) of the potential noncancer risk at the site is derived from chromium. Significant uncertainty surrounds the assumptions used to evaluate chromium risks at this site. The greatest contributor to this toxicity uncertainty is the assumption that only hexavalent chromium is present in the site wastes. Hexavalent chromium is considered to be the most toxic form of chromium. No selective analysis to determine the form of chromium present was performed at the site; however, data from sites with similar waste illustrate that the majority of chromium can reasonably be expected to be in trivalent rather than hexavalent form. A person would have to ingest 200 times more trivalent chromium than hexavalent chromium to suffer a noncancer health effect. The assumption that all chromium present at this site (measured as total chromium) is hexavalent chromium results in an overestimation of the risks presented by the site.

Although no selective analysis to determine the forms of chromium was performed at Sites 6 and 7, this type of analysis has been performed on samples collected from other NAWC sites that received similar wastes. Samples collected for the RI performed at Sites 1 and 2 and the former wastewater treatment plant impoundments were analyzed separately for hexavalent chromium. The impoundments were formerly used to store sludges produced from the treatment of wastewater, including that from the industrial pretreatment plant. These sludges were reportedly disposed at Sites 1 and 2 and are suspected, based on reported disposal practices and visual observations, to be the main source of chromium found at Sites 6 and 7. The data from these investigations (presented in the Phase III Remedial Investigation Report for Media other Than Groundwater, B & R Environmental, November 1996) indicate that almost all the chromium present in samples was trivalent chromium. A total of 78 samples collected from Sites 1 and 2 and the impoundments were analyzed for both total and hexavalent chromium. Fewer than one-half of the samples contained hexavalent chromium above the detection limit. The representative hexavalent chromium to total chromium concentration ratio for each was 0.24 percent for Site 1, 1.6 percent for the impoundments, and 1.9 percent for Site 2. The maximum ratio of hexavalent to total chromium found in any sample was 22.6 percent.

Because of the uncertainties associated with the chromium risks present at this site, hexavalent to total chromium ratios (100 percent, 22.6 percent, and 1.9 percent) were compared to aid in the decision-making process. In performing these comparison assessments, the conservative assumption was made that all surface soil was removed and that potential receptors consistently and repeatedly confined their activities to the study areas. The results of these assessments are summarized in the following table:

TOTAL CHROMIUM HI

	Assumes all Chromium is Hexavalent Chromium		**Assumes Maximum Hexavalent Chromium Ratio (22.6%)**		**Assumes Representative Concentration Ratio (1.9%)**	
	Child	**Youth**	**Child**	**Youth**	**Child**	**Youth**
Site-wide Subsurface	4.22	3.16	1.0	0.7	0.08	0.06
Zone 1	13.1	9.91	3.0	2.2	0.25	0.19
Zone 2	42.4	31.8	9.6	7.2	0.81	0.6
Zone 3	86.6	64.9	19.6	14.7	1.65	1.23

The risk assessment summarized above represents an extremely conservative estimate of the risks present at Sites 6 and 7. The risk scenario used to assess the potential risks for subsurface soils assumed that the contaminated subsurface soil would become surface soil and would be available for direct contact and ingestion throughout the site. However, the average depth of clean soil above the subsurface contamination is in excess of 4 feet. This assumption results in an overestimation of the risks posed by the subsurface soils.

The exposure scenarios used for Zones 1, 2, and 3, in addition to assuming that the subsurface material would become surface material, assumed that individuals would confine their visits and activities to each discrete area of concentrated contamination. This assumption also results in an overestimation of the risks presented by the subsurface soils for these areas.

The toxicity factors applied to the dermal contact route were based on default values for oral absorption. This assumption that dermal absorption is the same as oral absorption results in an overestimation of the total risks posed by the site. Section 4.0 of this report discusses the results of the risk assessment and these uncertainties in detail.

CONCLUSIONS

A risk evaluation of the site was performed using conservative assumptions. No unacceptable risks to future recreational receptors exposed to surface soils were found. Although significant uncertainty exists regarding the results of the subsurface risk assessment, risks above the threshold level for noncancer risks as a result of the subsurface soil contact under future recreational use were calculated. Due to the presence of buried wastes on site and the results of the risk assessment, the Navy believes that disturbance and exposure to these subsurface soils could result in unacceptable risks to future receptors.

It is recommended that remedial alternatives for addressing the potential risks presented by Sites 6 and 7 be developed and evaluated.

1.0 INTRODUCTION

This report has been prepared by Tetra Tech NUS, Incorporated (TtNUS) (note: the assets of Brown & Root Environmental were purchased on January 1, 1998 by TtNUS) for the Northern Division, Naval Facilities Engineering Command, as authorized by Contract Task Order (CTO) 252 under Contract No. N62472-90-D-1298. This work is part of the Navy's Installation Restoration Program (IRP), which is designed to identify contamination of Navy and Marine Corps facilities resulting from past operations and to institute corrective measures, as needed. In addition to meeting the objectives of the Navy's IRP, the purpose of this report is to meet the requirements of CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act of 1980), as amended by SARA (Superfund Amendments and Reauthorization Act of 1986).

1.1 PURPOSE OF REPORT

The purpose of this Sites 6 and 7 remedial investigation (RI) report is to present a summary of the investigations and actions taken by the Navy at Sites 6 and 7 within Area B of the former Naval Air Warfare Center (NAWC), Warminster, Pennsylvania, to evaluate the nature and extent of contamination, and to present a baseline risk assessment. The Navy has completed initial removal actions at Site 6. The evaluation presented in this report will be used by the Navy to determine if additional remedial action is necessary. The scope of this report is limited to evaluating the sites as a source for the volatile organic compound (VOC) groundwater contamination identified in Area B and to evaluate the potential risks, if any, associated with the surface soil and subsurface materials present. Groundwater is being addressed through other investigations and reports. This report presents a summary of the findings and an evaluation of the results from a series of investigations completed at the site.

Completed studies used to identify source areas and to define the scope of this report include the Environmental Photographic Interpretation Center (EPIC) Report [United States Environmental Protection Agency (EPA), 1994], Remedial Investigation Report for OU-1 [Halliburton NUS Corporation (HNUS), 1993], Phase II RI Report (HNUS, 1992), Phase III RI Work Plan (HNUS, 1995), data collected during the Phase III RI efforts conducted by Brown & Root (B&R) Environmental including geophysical, soil gas, and surface and subsurface sampling, Site 6 Removal Evaluation Report [B&R Environmental, 1996], Letter Report Preliminary Data and Risk Evaluation Site 6 [B&R Environmental, 1997], Verification Sampling and Analysis Plan for Site 6

Removal Action [B&R Environmental, 1996], Addendum No. 1 to the Work Plan for Various Source Removal Sites at NAWC [Foster Wheeler Environmental Corporation (FW), 1997], and the Close-Out Report, Site 6 Removal Action NAWC Warminster (FW, 1997).

1.2 ORGANIZATION OF REPORT

This report is organized into four major sections. Section 1.0 contains an introduction and presents the purpose of the report and summarizes the background and history of waste disposal activities at Sites 6 and 7. Section 2.0 presents a summary of the completed investigations and provides a discussion of completed removal actions. This section also discusses the residual risks associated with the removal areas. Section 3.0 presents physical characteristics of the study area. Section 4.0 summarizes of the nature and extent of the contamination outside of the removal areas. Section 5.0 provides the discussion and evaluation of the human health risks presented by the soil and subsurface material present at the site.

1.3 SITE BACKGROUND AND HISTORY

The former NAWC Warminster is located in Warminster Township, Bucks County, Pennsylvania. The facility lies in a populated suburban area surrounded by private homes, various commercial/ industrial activities, and a golf course. Figure 1-1 shows the general facility location. The entire base is approximately 820 acres. Activities on the base ceased operation in the fall of 1996, but the facility is maintained by the Navy. The facility consists of various buildings and building complexes connected by paved roads, the runway and ramp area, mowed fields, and small wooded areas.

The facility has been divided into four general areas of concern based on groupings of suspected disposal sites, contamination, geographical areas, common sources and receptors, and facility use characteristics. These areas are referred to as A, B, C, and D. (Figure 1-2 presents these areas.) The areas of concern addressed in this report, Sites 6 and 7, are located in Area B.

Sites 6 and 7 are generally located in the central portion of Area B (see Figure 1-3). This area was designated as an area of concern because of the reported presence of three disposal sites in this area (Sites 5, 6, and 7) and because of the presence of VOC contamination in the groundwater. In addition to the Site 5, 6, and 7 depicted in Figure 1-3, three other discrete areas (south of the patrol road) were investigated while looking for Site 7. These sites, labeled 7? on Figure 1-3, were found to be generally free from contaminants, but are included in this report to

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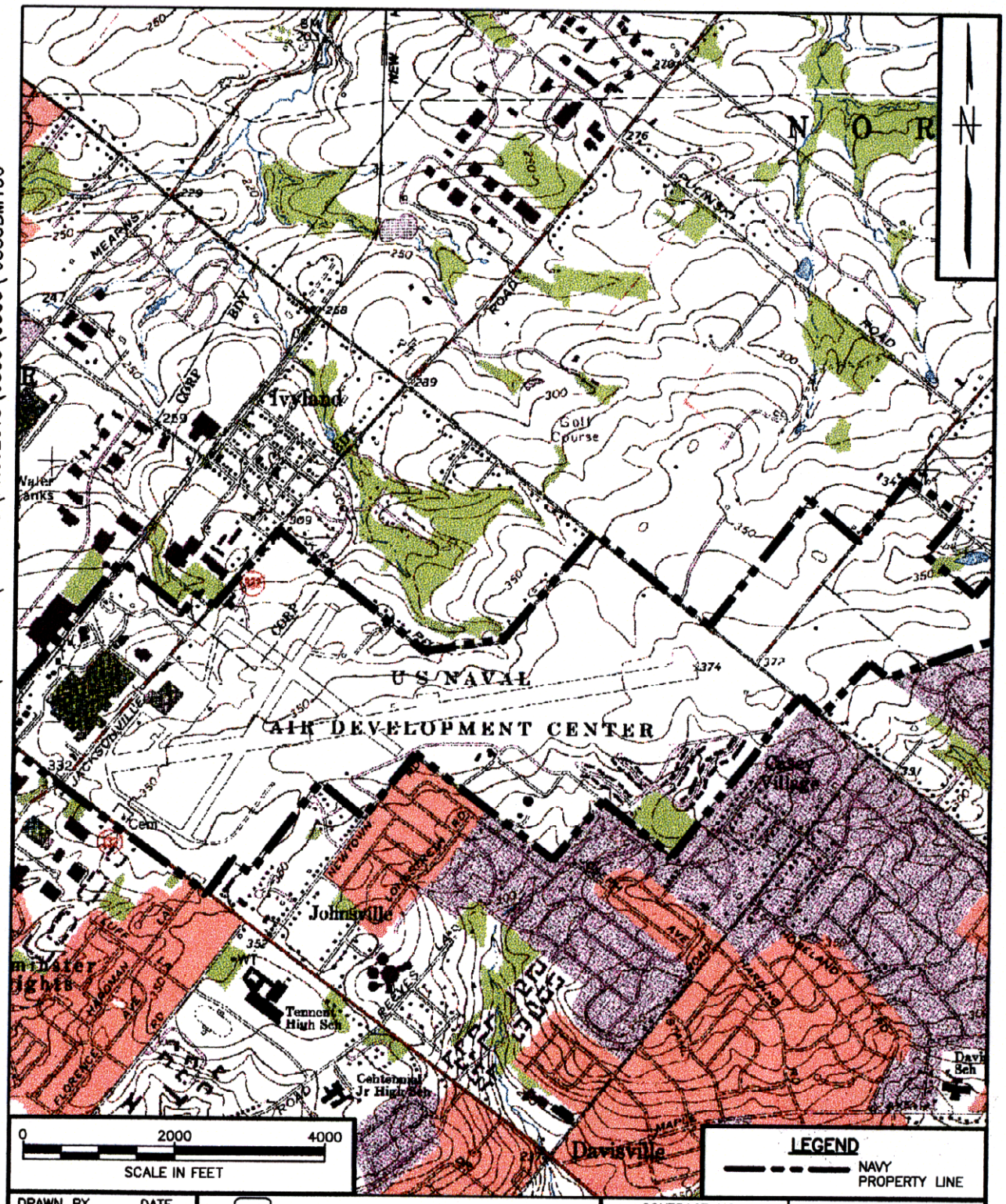

DRAWN BY A.S.M. DATE 11/24/1998	Tetra Tech NUS Inc.	CONTRACT NO. N62472-90-D-1298	OWNER NO. CTO 0252
CHECKED BY DATE	SITE LOCATION MAP	APPROVED BY DATE	
COST/SCHED-AREA	FORMER NAWC WARMINSTER	APPROVED BY DATE	
SCALE 1 in.=2000 ft.	WARMINSTER, PENNSYLVANIA	DRAWING NO. FIGURE 1-1	REV. 0

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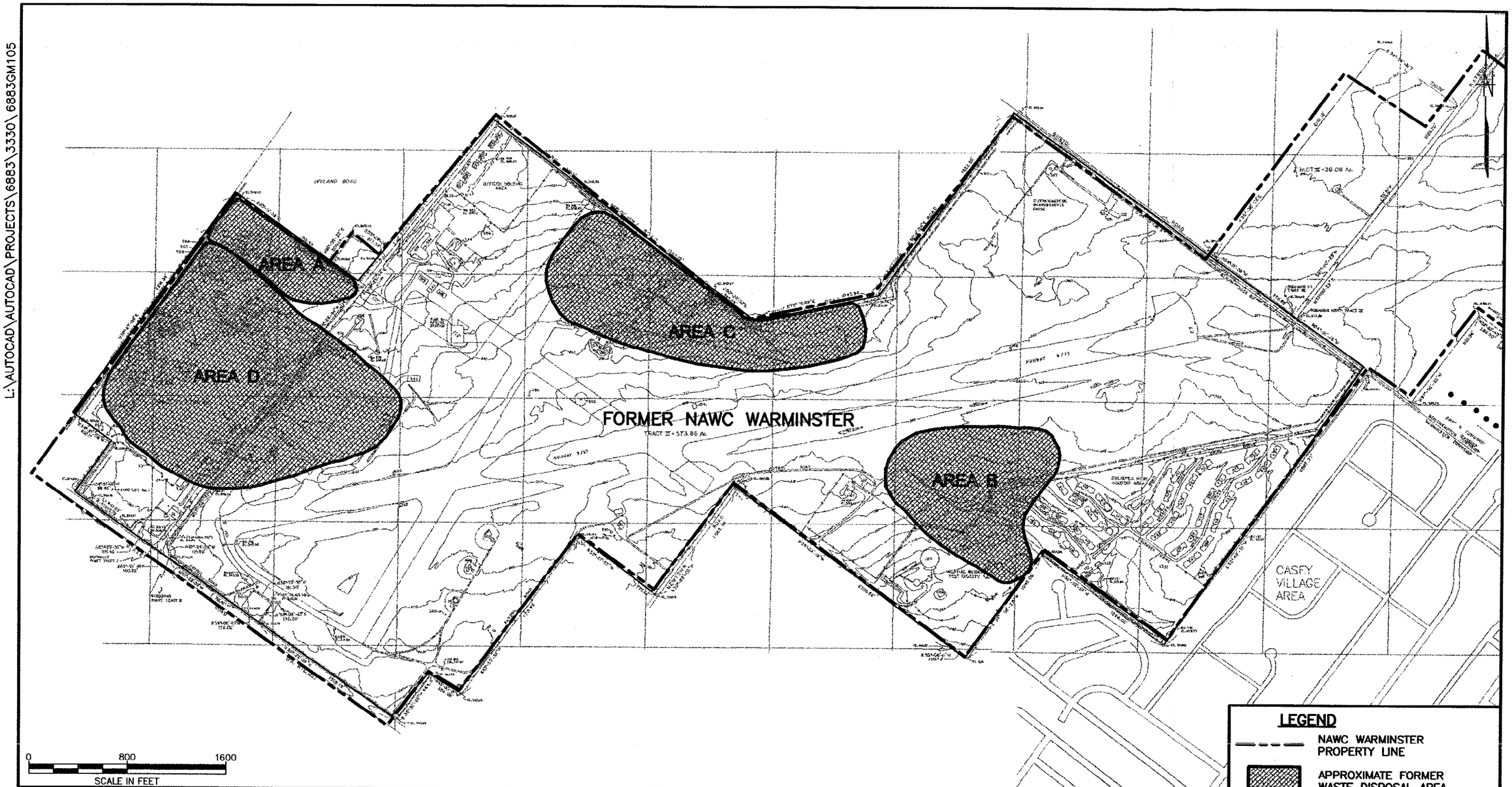

NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

DRAWN BY A.S.M. DATE 11/23/1998
CHECKED BY DATE
COST/SCHED-AREA
SCALE 1 in. = 800 ft.

Tetra Tech NUS, Inc.

APPROXIMATE LOCATION OF AREAS OF CONCERN
FORMER NAWC, WARMINSTER
WARMINSTER, PENNSYLVANIA

CONTRACT NO. N62472-90-D-1298
OWNER NO. CTO 0252
APPROVED BY DATE
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DRAWING NO. FIGURE 1-2
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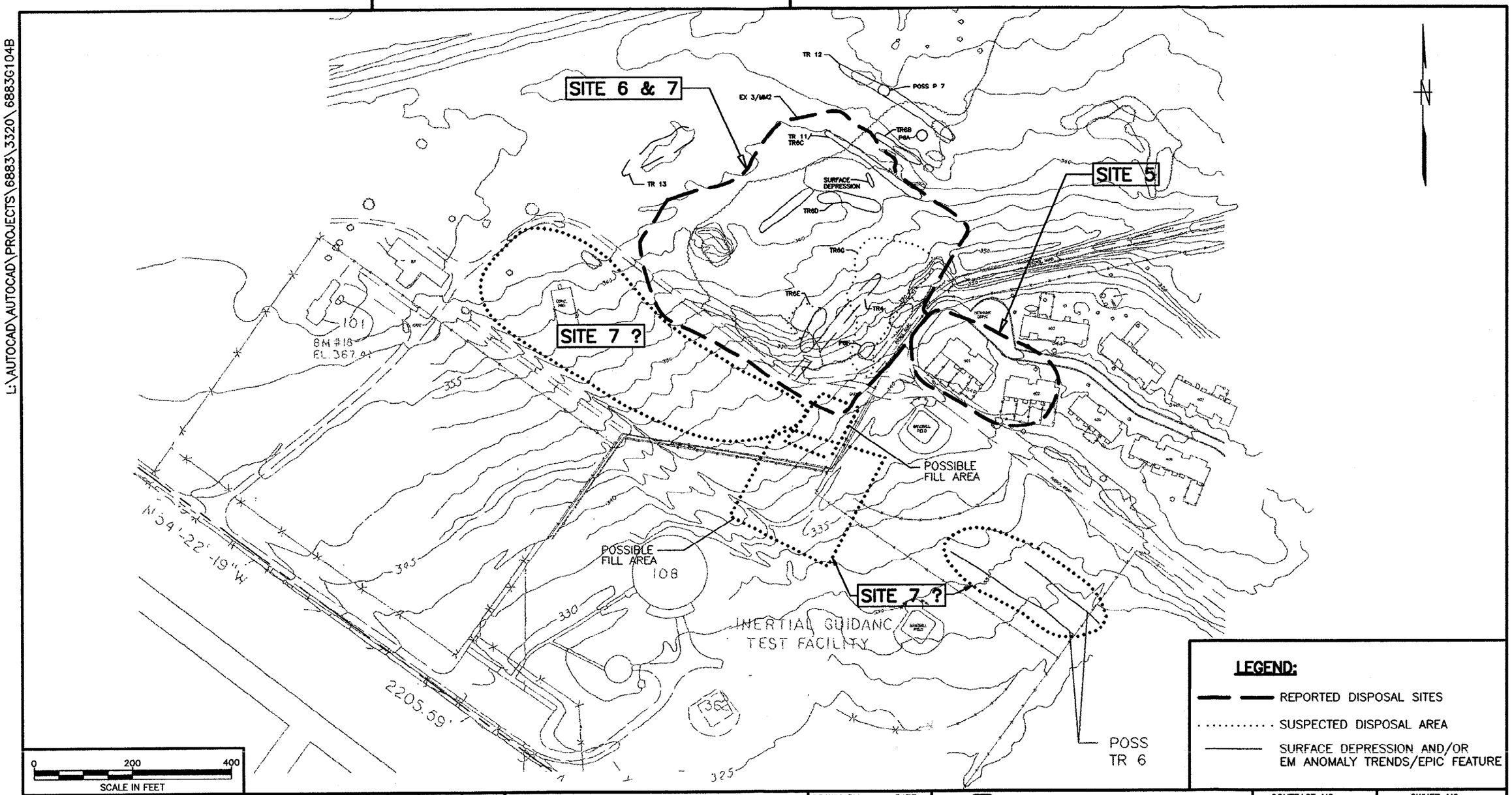

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DRAWN BY A.S.M. DATE 11/23/1998
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SCALE 1 in. = 200 in.

Tetra Tech NUS, Inc.

AREA B – SITES 5, 6 and 7, AND SUSPECTED SITE 7
FORMER NAWC, WARMINSTER
WARMINSTER, PENNSYLVANIA

CONTRACT NO. N62472-90-D-1298
OWNER NO. STO 0252
APPROVED BY DATE
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REV. 0

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document the findings. Site 5 is located on Navy property southeast of Sites 6/7 on property that will not be transferred by the Navy. Site 5 was not investigated under this RI. Separate investigations for this site are being pursued by the Navy, and the findings will be presented under a separate report.

Investigations of groundwater in Area B have identified low levels of VOC contamination. The Navy issued an interim Record of Decision (ROD) for Operable Unit 1 (OU-1), which includes Area B groundwater, in 1993. Additional groundwater investigations and an Area-B-specific groundwater RI are ongoing. The results of that RI will be presented under a separate report. A summary of the groundwater results as they relate to Sites 6/7 as potential sources of groundwater contamination only are presented in this RI report.

Area B is part of a parcel of land that is scheduled for transfer from the Navy to Warminster Township. The land is to be used by the township for parks and recreation. The approved land reuse plan confirms this long-term use of the land after transfer.

The eastern portion of the NAWC facility, including Area B, was purchased by the Navy in 1951. Before the Navy purchase, the land was reported to consist of open fields used for farming [Basewide Environmental Baseline Survey, EA Engineering, Science, and Technology, Incorporated, 1995 (EA Engineering)]. Shortly after purchase of the land, the main runway was extended and the existing concrete aprons around Hangar 4 were replaced. No other major construction occurred in the area until the early 1970s, when construction began on Navy housing units located southeast of Sites 6 and 7.

Site 6 was reportedly used for disposal activities from 1960 until 1980. The site reportedly received unknown quantities of waste paint, solvents, oil, flammable wastes, grease trap waste and demolition debris. These materials were reportedly disposed in pits excavated by backhoe and through general dumping and backfilling throughout the area. Appendix A contains copies of the Navy Notification of Hazardous Waste Sites (1981) and the 1980 Navy Activity Disposal Site Fact Form, which was the basis for the notification form. Aerial photographic interpretation, geophysical and soil gas studies, exploratory borings, test pits, and sampling and analysis have identified a series of disposal areas within Site 6. These disposal areas consist of apparent pits and trenches, as well as areas of general dumping and backfilling.

Site 7 reportedly consisted of two disposal trenches that were used from 1950 to 1955 to receive sludges from the wastewater treatment plant. The trenches were reportedly 100 feet long by 12

feet wide and 8 feet deep. The estimated potential capacity of each trench is 356 cubic yards. The trenches were reportedly backfilled with fill after each dumping episode. Upon site closure in 1955, the trenches were covered with 2 feet of soil, regraded, and reseeded.

As indicated above, the runway was extended and the apron around the main hanger (Building 4) was replaced in the mid 1950s. Historical aerial photography and anecdotal information indicate that the construction rubble and demolished concrete apron were disposed on the Site 6 and 7 area. This activity was reported to occur after or concurrent to reported trenching and sludge disposal activities at Site 7.

Site 6, which reportedly consists of pits used for waste disposal, was reported as being located approximately 900 feet from the of Chief Staff Officers Quarters, 400 feet from the enlisted family quarters, and 1,000 feet from the Inertial Navigation Facility. Site 7 was reported as being located about 500 feet from the enlisted family housing, 500 to 700 feet from the Inertial Navigation Facility, and 800 feet from the Chief Staff Officer's quarters. Figure 1-4 shows these features and the location of Sites 6 and Site 7.

Historical aerial photography, geophysical surveys, field observation, and test pits have confirmed the presence of concrete demolition debris and what appears to be portions of the hanger apron in the southeast of the area labeled Sites 6 and 7 on Figure 1-3. Test pits advanced in this area revealed strata that are consistent with the reported disposal and use patterns reported for Site 7. In general, test pits revealed the presence of a soil cover overlying construction/concrete rubble, overlying a vegetated soil cover underlain by evidence of a trench that is about 11 feet wide. The material encountered in the trench varied in color and consistency but appeared to be "sludge-like." This waste was encountered at about 8 feet below the current grade. Section 2.0 provides a discussion of these investigations, and test pit logs are presented in Appendix E. It is believed, based on these findings, that Sites 6 and 7 are colocated north of the present patrol road (see Figure 1-3). Investigations of other surrounding areas, west and southwest of Sites 6 and 7 (shown on Figure 1-3 as 7?) have failed to reveal evidence of disposal activities (Phase I, II, and III RI reports). The results of investigations of the surrounding areas (investigated while searching for the reported Site 7 area) are summarized in this report to help complete the overview of investigation performed in the general area.

It is concluded, judging from the type of disposal methods encountered and type of waste identified, as well as the areal extent of the investigations, that the investigations completed

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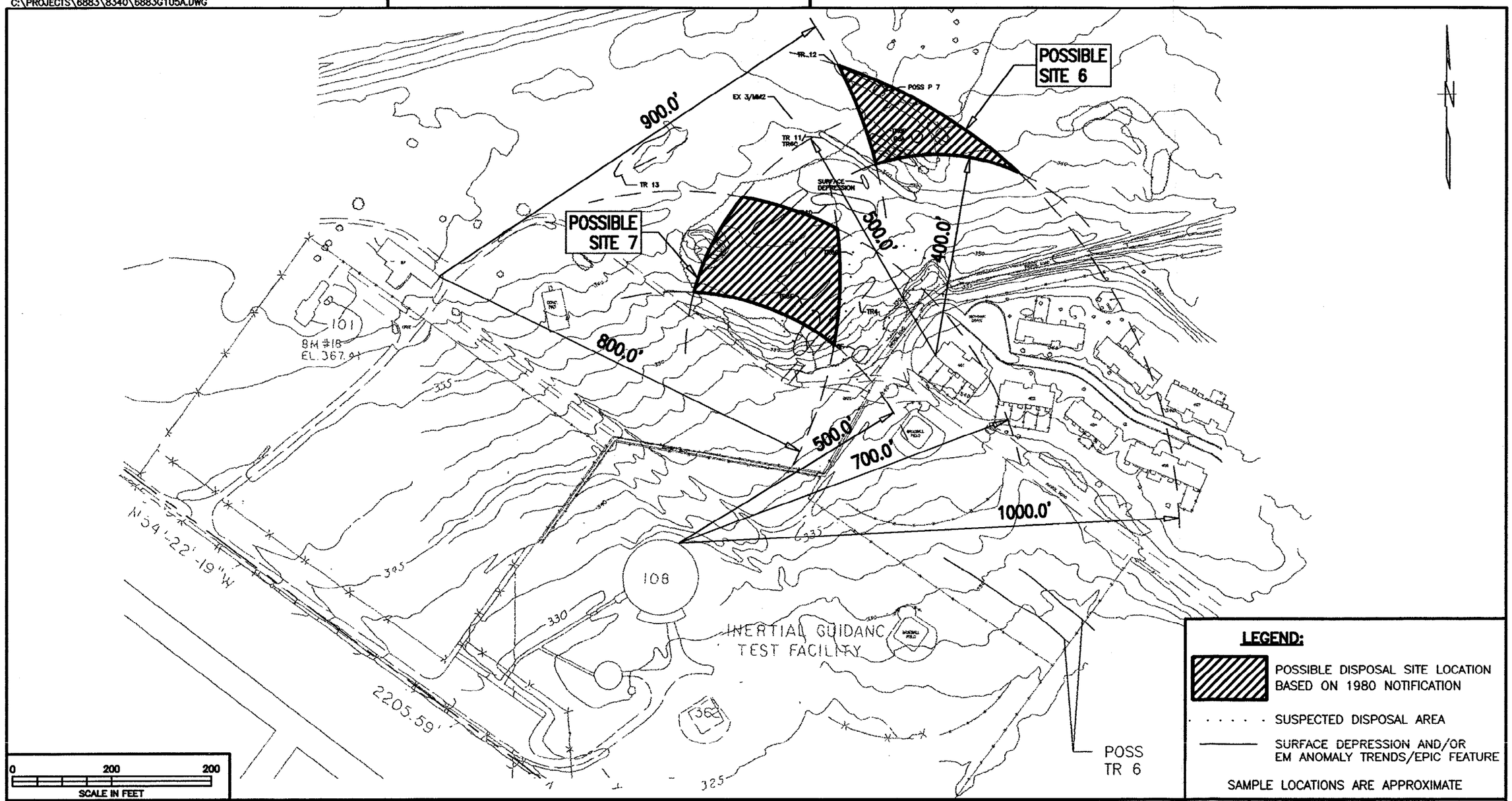

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DRAWN BY A.S.M. DATE 12/2/97
CHECKED BY DATE
COST/SCHED-AREA
SCALE AS NOTED

Tetra Tech NUS, Inc.

AREA B : POSSIBLE CO-LOCATION SITES 6 AND 7
NAWC, WARMINSTER

CONTRACT NO. 6883
OWNER NO.
APPROVED BY DATE
APPROVED BY DATE
DRAWING NO. FIGURE 1-4
REV. 0

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have included what was originally reported as Site 7 (see Appendix A). Apparently, the Site 7 location was mis-labeled when information was transferred from the original 1980 Navy document to the 1981 Notification of Hazardous Waste Sites, and Site 7 actually exists north of the patrol road. Previous investigations have been unable to confirm the location or existence of Site 7 disposal trenches or sludge in the suspected Site 7 areas (7? On Figure 1-3). Therefore, it is concluded that both reported Site 6 and reported Site 7 are located together in the area labeled Sites 6 and 7 on Figure 1-3.

2.0 SUMMARY OF INVESTIGATIONS

The areas of concern, Sites 6 and 7, have been investigated and sampled numerous times. Phase I RI activities (SMC Martin, 1991), consisting of cursory soil gas, geophysical, and test pit investigations, were conducted in 1991. Phase II RI activities, limited to the placement and sampling of four soil borings, were conducted in 1992 (HNUS, 1992). Phase III RI investigations consisted of aerial photograph interpretation, extensive geophysical and soil gas surveys, and wide-spread surface soil sampling (B&R Environmental letter reports, May and July 1995) were completed in 1995. Subsequent investigations have included additional geophysical surveys to expand the areas of study, the collection of additional surface soil samples, the advancement of exploratory borings, the excavation of numerous test pits, and the collection of subsurface samples from the borings and test pits. These investigations have been summarized in draft and interim reports released in 1996 and 1997 B&R Environmental Site 6 Removal Evaluation Report, August 1996; Final Supplemental Field Sampling Plus Site 6, January 1997; Supplemental Geophysical Survey Results for Site 6, February 1997; Letter Report Preliminary Data and Risk Evaluation Site 6, March 1997]. Subsequent to these latest investigations, the Navy, with EPA and state concurrence, performed a limited removal action within Sites 6 and 7. The removal action consisted of the excavation and off-site disposal of soils and material from three areas.

Since no waste materials were detected during previous work in the southeast area of the area designated as Sites 6 and 7, a limited subsurface investigation was conducted in that area during the Phase III RI. Two test pits in the vicinity of TR6 (Test Pit Nos. 3 and 4) and two test pits (Test Pit Nos. 1 and 2) in the vicinity of the possible fill area were excavated (Figure 2-1). These test pits were located to correspond to surface soil locations where trichloroethane (TCE) had been found previously. Two samples per pit were taken for analysis.

In general, the results from the 1996 and 1997 investigations confirmed the use of the Sites 6 and 7 area for disposal activities. The northern and eastern portions of Sites 6 and 7 were, in general, found to contain specific pits and trenches that appeared to contain a variety of waste materials and contaminants similar to those reportedly for Site 6. The southern portion of Sites 6 and 7 appeared to contain trenches and a large volume of concrete and construction debris, consistent with the reported disposal of the old runway aprons and other construction debris in Site 7. In addition, evidence of other trash and general commercial/industrial waste was noted. Sludge-like materials were also apparent in the southern portion of Sites 6 and 7. Detailed presentations of

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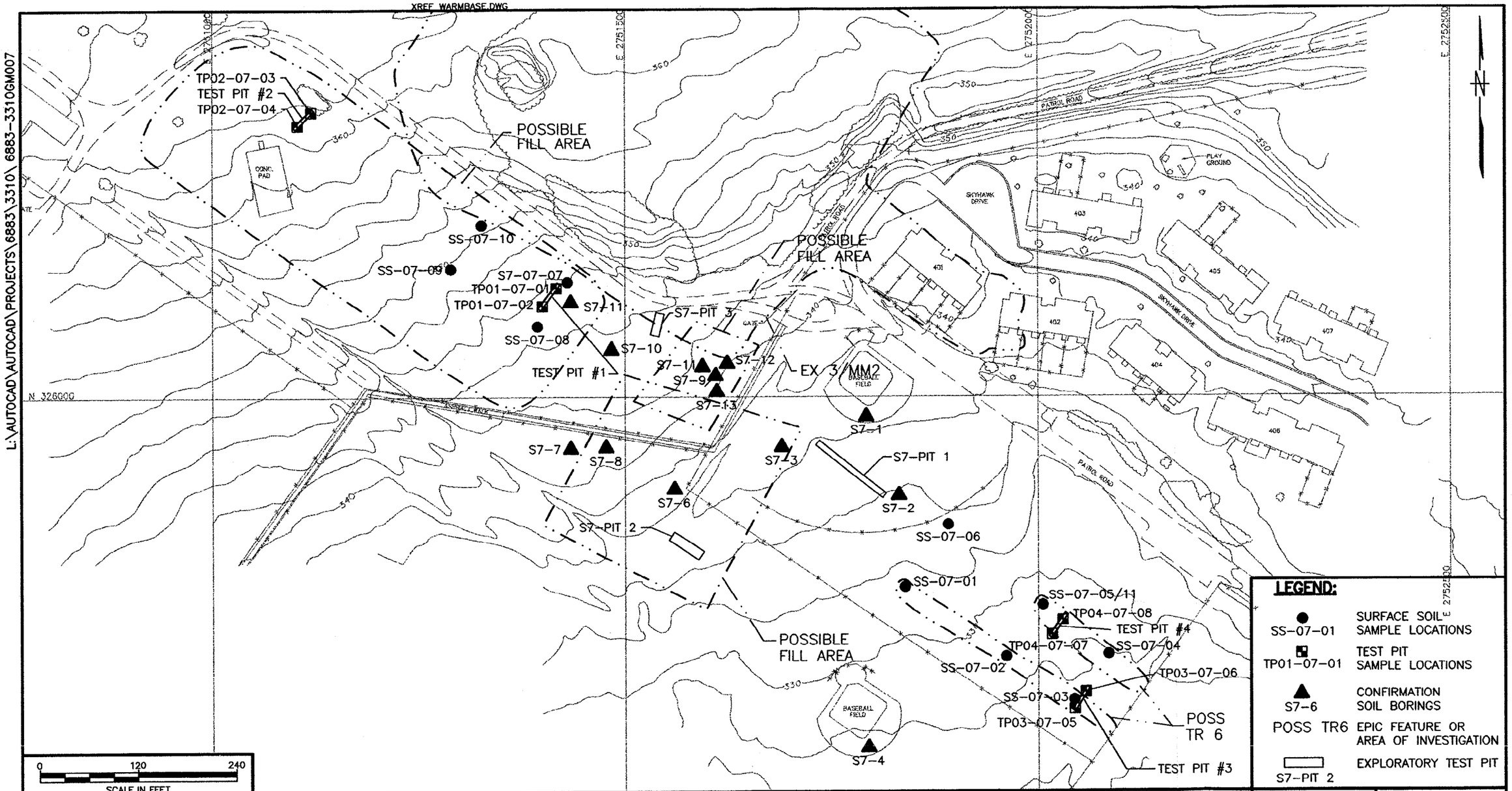

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DRAWN BY A.S.M. DATE 12/3/1998
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COST/SCHED-AREA
SCALE 1 in. = 120 ft.

Tetra Tech NUS, Inc.

TEST PIT AND SURFACE SOIL SAMPLE LOCATION MAP
AREA B – SUSPECTED SITE 7
FORMER NAWC
WARMINSTER, PENNSYLVANIA

CONTRACT NO. N62472-90-D-1298
OWNER NO. CTO 0252
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the excavation findings are presented in the Draft Site 6 Removal Evaluation report (B&R Environmental 1996) and the Letter Report, Preliminary Data and Risk Evaluation for Site 6 (B&R Environmental, 1997). Copies of the test pit and soil boring logs are presented in Appendix E.

As a result of the findings and data collected during the 1996 investigation, the Navy initiated limited removal actions.

2.1 GEOPHYSICAL SURVEY

2.1.1 Suspected Site 7 Area

An electromagnetic (EM) conductivity survey was performed at suspected Site 7 during the Phase III RI. The survey grid in the TR6 area of suspected Site 7 consisted of two parallel base line profiles along the axes of the TR6 locations as indicated by the Navy's survey points and six profile lines separated by 50-foot intervals crossing perpendicular to the base lines (Figure 2-2). Coverage to and beyond the southeastern ends of the trenches was not possible because these survey points fell outside the base perimeter fence.

The geophysical survey grid in the western area of suspected Site 7 consisted of a group of 12 parallel, northeast-southwest-trending profile lines and a group of six northwest-southeast-trending profile lines laid out perpendicular to and crossing one another to form a rectilinear grid. Parallel profile lines in each group were regularly spaced 50 feet apart from one another to create a grid of uniform coverage.

The findings of the suspected Site 7 EM survey are presented in Section 5.5.2.1 of the Phase III RI report.

The Phase I RI EM survey over suspected Site 7 (south of the patrol road) delineated two anomalies. The first was near the case patrol road, and the second was in the northern baseball field. These areas are marked on Figure 2-2. These anomalies were less than 3 umho/m above background levels. No indications of buried metal were found during the survey. The anomaly within the baseball field was probably caused by the bedrock pinnacle, subsequently discovered during the excavation of a test pit.

The Phase III RI EM survey at suspected Site 7 had a closer station spacing along profile lines and a rectilinear grid layout of greater coverage in both the western and TR6 areas of suspected

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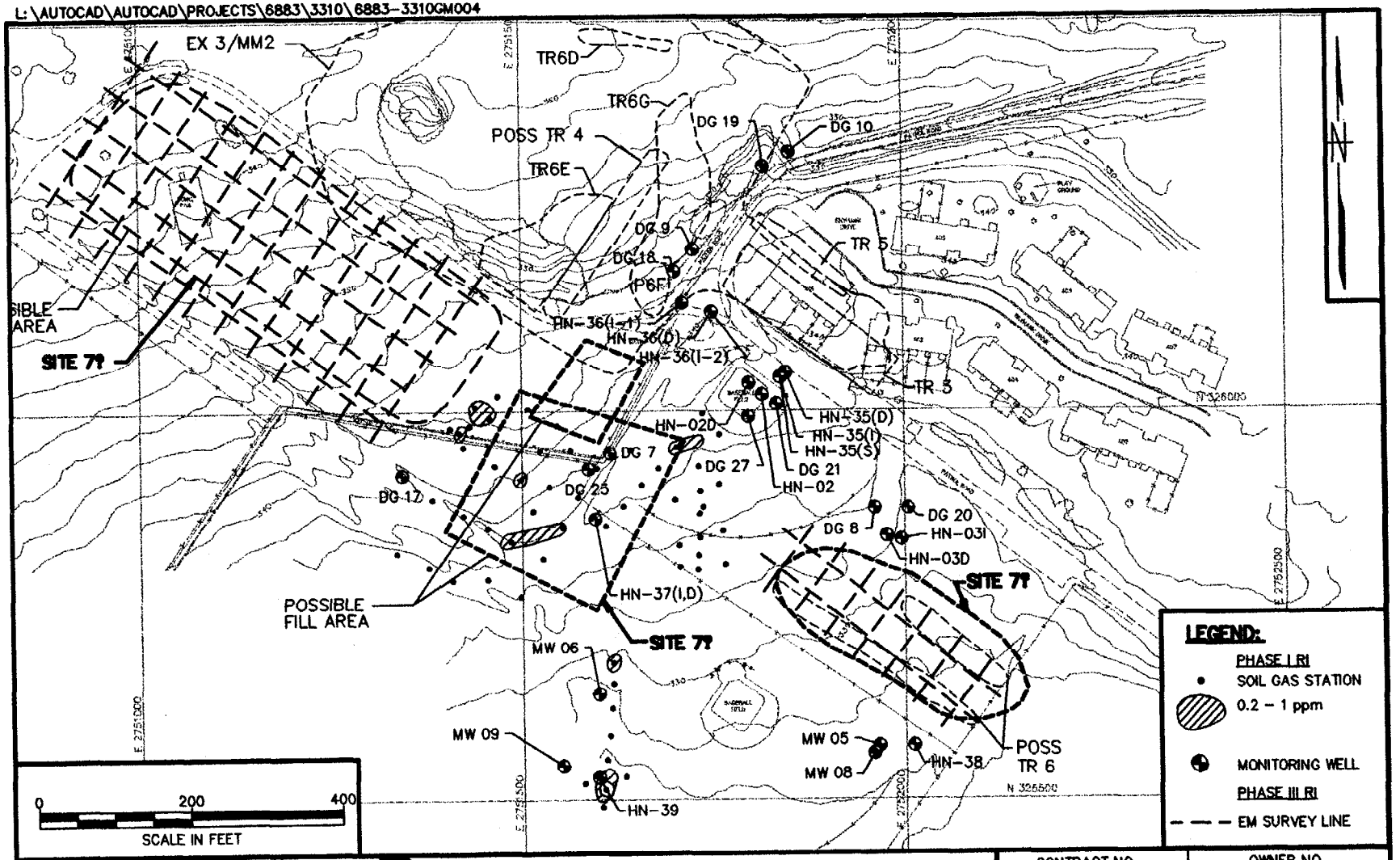

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COST/SCHED-AREA		FORMER NAWC WARMINSTER	APPROVED BY / DATE
SCALE 1 in. = 200 ft.		WARMINSTER, PENNSYLVANIA	DRAWING NO. FIGURE 2-2 / REV. 0

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Site 7. Several conductivity anomalies were identified in each area; however, all can be attributed to culture sources of interference. These sources include fences, an old building foundation, a small clean-fill debris pile, and various underground utilities. Conductivity anomalies that could be attributed to either TR6 or a fill area north of the internal guidance facility were not observed. Appendix B of the Phase III RI report provides more information on the suspected Site 7 EM survey.

2.1.2 Sites 6 and 7 Area

During the Phase I RI, the EM survey at Sites 6 and 7 identified two areas with anomalous readings. The larger area was approximately 450 by 750 feet in size and was bordered by Patrol Road to the south and the west. In the southwestern portion of this area, cement, brick, and other building materials were found on the ground surface or protruding through the soil. The second anomalous area, which appeared to be a trench, was approximately 30 by 150 feet in size and was located just northeast of the large anomalous area.

Phase III RI EM conductivity investigation was performed in the vicinity of Sites 6 and 7 to check for buried wastes and materials. Both in-phase and quadrature-phase data were collected at each data point. Several EM anomalies were identified in the Sites 6 and 7 area, along with one general area of moderate to low anomalies. These anomalies included TR12, TR11, probable TR6B, possible TR6C, possible TR6D, probable Pit P7 (P7), possible TR6E, possible TR6G, probable Pit 6A (P6A), TR13, and probable Pit 6F (P6F). TR6C may be an extension of TR11. The geophysical results were inconclusive regarding the specific location of TR4 in the southernmost section of Sites 6 and 7, although some anomalies (i.e., TR6E, TR6G, and P6F) were found in this general area. Figure 2-3 shows these features.

Probable Trench TR 11 and Possible Trench TR6C

Surface features throughout the TR11 area indicate that all or most of the area has been excavated, filled, regraded, or otherwise disturbed. These features include uneven surfaces sometimes containing linear patterns of lower or higher ground; mounds of soil and rock; graded soil berms and drainage swales; and surface piles or exposures of concrete, asphalt, and other construction debris.

Several EM anomalies probably related to suspected trenches or pits and buried waste or construction debris were identified in the TR11 area. The location of TR11 (as staked from EPIC

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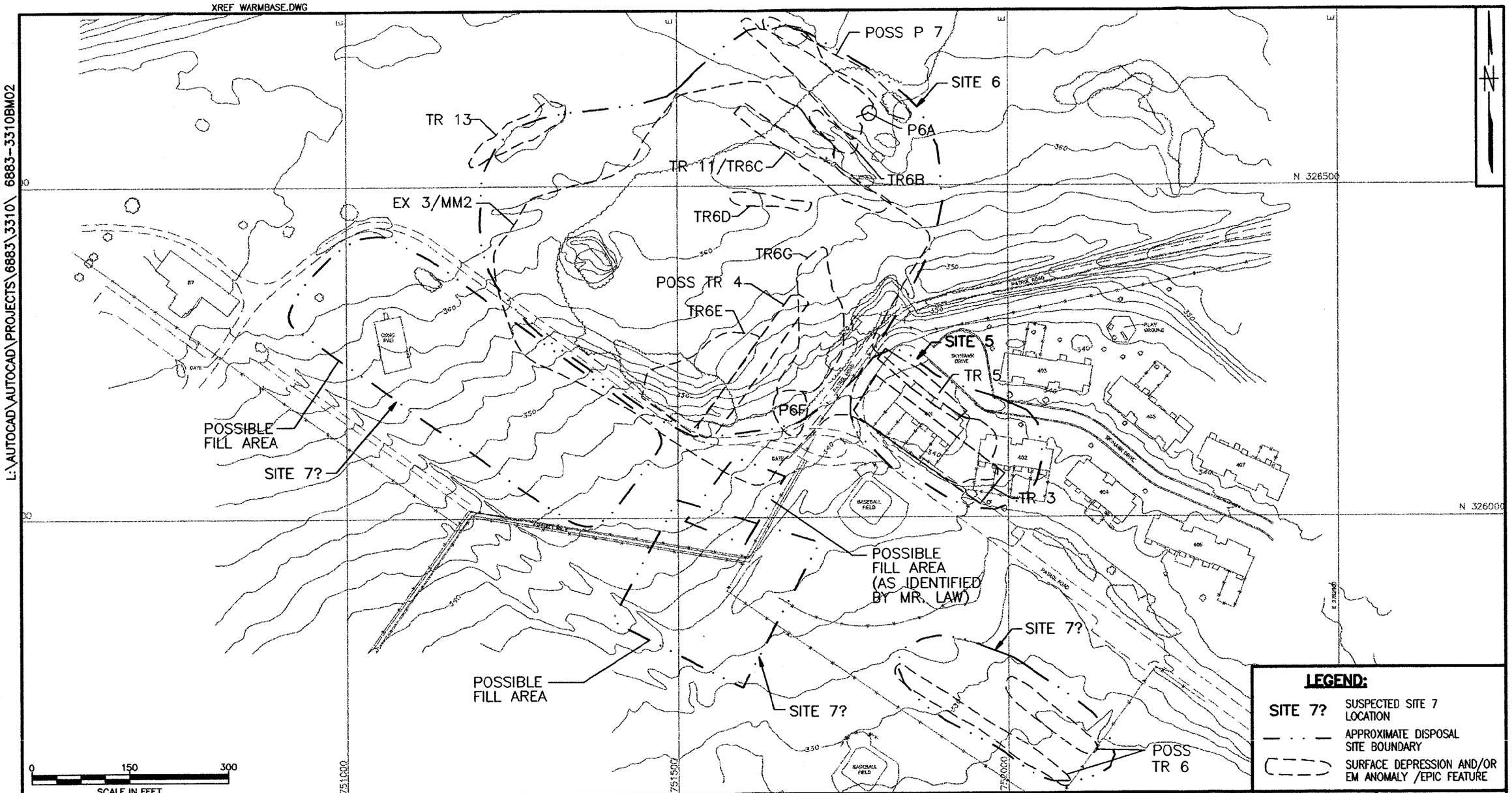

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Tetra Tech NUS, Inc.

INTERPRETED GEOPHYSICAL ANOMALY AREAS
AREA B – SITES 6 AND 7
FORMER NAWC WARMINSTER
WARMINSTER, PENNSYLVANIA

CONTRACT NO. N62472-90-D-1298
OWNER NO. CTO 0252
APPROVED BY DATE
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grid coordinates) is indicated only by a well-defined surface depression. The lack of significant EM anomalies in this area indicates that this trench has little buried metal content and that the fill material has little contrast with the surrounding soils.

A linear pattern of conductivity and in-phase anomalies extends to the east of TR11. No significant surface features were observed corresponding to this anomaly. This feature is designated as possible Trench TR6C. The southeastern end of TR6C was not clearly delineated by additional data points; this feature may extend to, and beyond, this edge of the survey area. However, several small to moderate in-phase and conductivity data anomalies occur in this area and may be related to an increased amount of buried construction debris. The buried debris is exposed at several locations throughout this portion of Sites 6 and 7. The approximate length of the TR11/TR6C anomaly is 240 feet.

Probable Trench TR 12 and Probable Pit P7

A linear pattern of surface depressions and conductivity and in-phase anomalies occurs near and parallel to TR12. The surface depressions and anomalies occur approximately 25 to 40 feet northeast of the staked location of TR12 and extend about 40 to 50 feet farther southeast. The staked location of P7 occurs within the area of surface depressions and EM anomalies associated with TR12. The approximate length of the TR12/P7 anomaly is 260 feet.

Possible Trench TR13

No specific EM anomalies related to suspected trenches or buried wastes were observed in the TR13 area. A smooth, steady increase in terrain conductivity is observed from south to north within the northern half of the survey area. This trend is interpreted to represent natural geologic conditions. No significant trends or anomalies were observed in the in-phase data. The ponded water and saturated surface soils observed in parts of the survey area appear to have little or no effect on the EM data.

Probable Pit P6A

A pit-like surface depression, 3 to 4 feet deep, and corresponding conductivity and in-phase anomalies occurred between TR12 and TR11. Exposed concrete and metal debris were observed in the bottom of this depression. This feature is designated as P6A. The location of P6A is confirmed by a surface depression and an EM anomaly. EM data indicate that this

probable pit does not extend significantly beyond the area of the observed surface depression. The estimated dimensions of P6A are 20 feet by 25 feet.

Probable Trench TR6B

A surface depression was found between P6A and TR11/TR6C. This feature was designated as probable TR6B. The eastern half of this depression is well defined, 3 to 5 feet deep, and has exposed waste including a 55-gallon steel drum in the bottom. In the western half, the surface depression is poorly defined and there is no significant EM anomaly. Either the trench is not present here or the material within it has no significant metal content and has little conductivity contrast with the surrounding soils. The approximate length of the TR6B anomaly is 100 feet.

Possible Trench TR6D

This apparent anomaly is located near the center of Sites 6 and 7. The strike of this anomaly is roughly northeast to southwest, slightly different from the other observed linear anomalies. No significant surface features were observed corresponding to this anomaly. This feature was designated as possible trench TR6D and appears to extend beyond the survey grid to the west. The eastern end appears to be clearly defined. The EM anomaly associated with TR6D is well defined and indicates that significant amounts of metal occur throughout this feature. Much smaller EM anomalies were observed corresponding to the location of two small surface depressions and one small soil mound west of the TR6D anomaly. The estimated length of the TR6D anomaly is 120 feet.

Possible Trench TR6E

A linear anomaly occurs near the southern portion of Sites 6 and 7 near the patrol road Patrol Road in the vicinity of TR4. This feature has been designated as possible TR6E. The linear nature of this feature suggests that material filling a trench is one possible source of the anomaly; however, such an anomaly could also result from a linear trend of higher metal content within buried construction debris. The location of TR6E corresponds closely to an area of several small surface depressions, further indicating that subsurface conditions here differ from surrounding areas. The approximate length of the TR6E anomaly is 170 feet.

Probable Pit P6F

A strong in-phase anomaly was observed upgradient of Wells DG-18 and DG-9 near the patrol road in the southern part of Sites 6 and 7. This feature has been designated as probable Pit P6F. The area is about 70 by 70 feet in size. A portion of P6F lies within an area of significant amounts of exposed construction debris. This anomaly does not correspond with an EPIC feature. Terrain conductivity data for this anomaly were inconclusive.

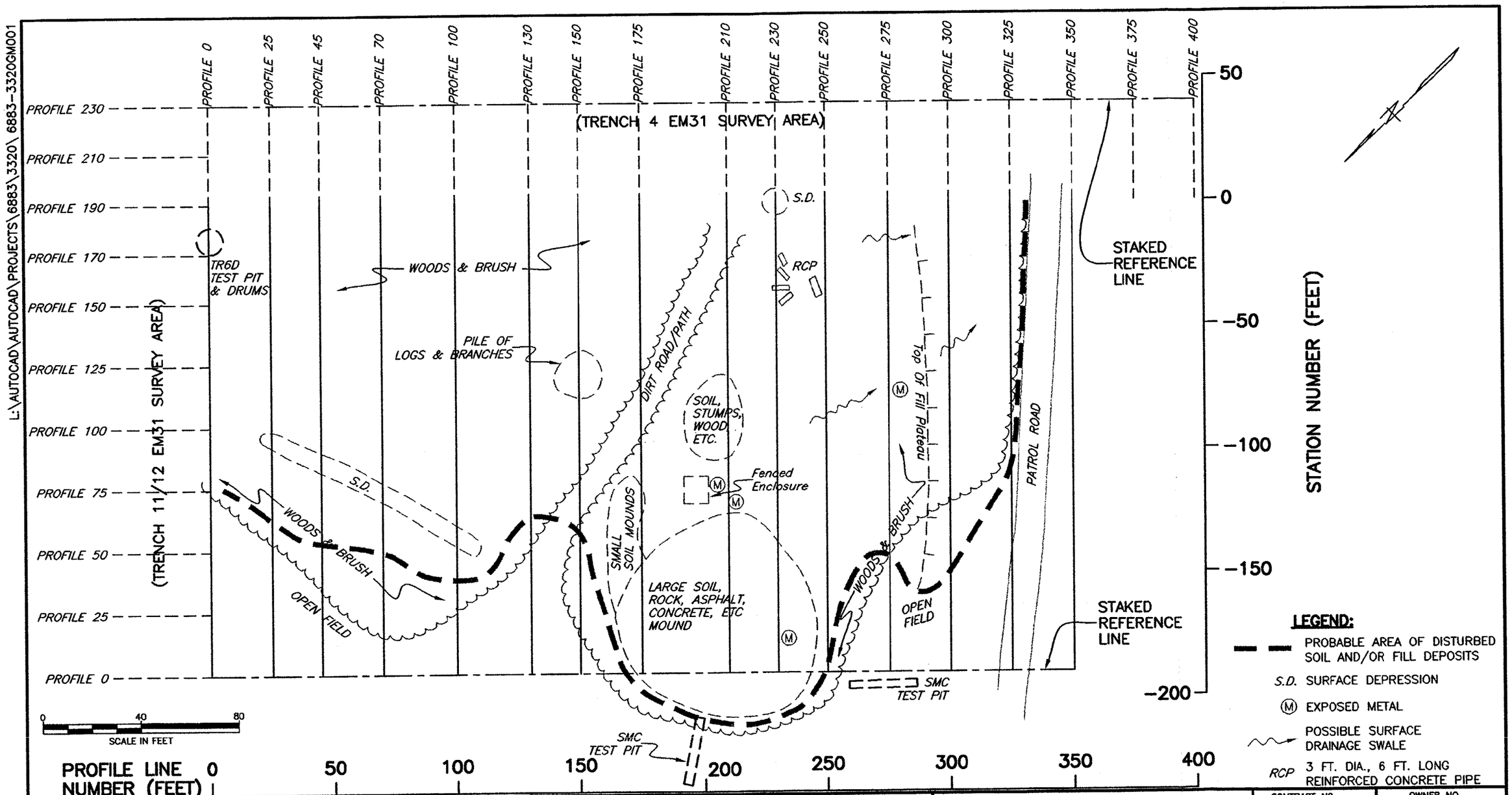
Possible Trench TR6G

Several EM anomalies were observed in the TR4 area and may be related to deposits of construction debris or to subsurface utilities. Construction debris, composed primarily of concrete, steel-reinforced concrete, rock, brick, and cement block fragments, and some metal objects are exposed throughout this area. Similar debris is exposed at some areas of the surface and in animal burrows along the eastern, sloping edge at Sites 6 and 7. The remaining anomalies may be related to suspected trenches or pits and buried waste or to buried construction debris.

A supplemental geophysical survey was performed in January 1997 as part of a field investigation to characterize areas previously identified by RI efforts or from inspection of aerial photos. Figure 2-4 shows the features at Sites 6 and 7 studied.

Supplemental EM findings included the following:

- No new evidence of significant buried metal was encountered.
- EM data generally confirmed that the interpreted Sites 6 and 7 extent had been defined.
- The large tree-covered mound in the western portion of the Sites 6 and 7 study area contains rock and construction debris, confirming previous conclusions.
- The shallow surface depression in the northeastern corner of the Sites 6 and 7 are appears to be a former trench, but data indicate that no significant amount of metals exists in the former trench.



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Tetra Tech NUS, Inc.

EM SURVEY RESULTS
SUPPLEMENTAL GEOPHYSICAL SURVEY – SITES 6 AND 7
FORMER NAWC, WARMINSTER
WARMINSTER, PENNSYLVANIA

CONTRACT NO. N62472-90-D-1298
OWNER NO. CTO 0252
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Additional geophysical survey data conclusions and interpretation are provided in two letter reports prepared for the Navy by B&R Environmental. These letter reports are dated May 25, 1995 and April 19, 1995.

2.2 Soil Gas Surveys

During the Phase I RI, limited soil gas investigations were conducted. Total organic vapor readings using a field instrument were measured at up to 52 ppm. No compounds were identified. None of the 12 soil gas samples where VOCs were detected were located in Suspected Site 7 (south of the patrol road).

No soil gas samples were obtained during Phase II RI investigations.

A soil gas survey was conducted at each area of concern during the Phase III RI. The survey objective was to measure the concentrations of VOCs in soil gas around suspected source locations. Elevated VOC levels in soil gas could indicate soil and/or groundwater contaminated with VOCs. Information obtained from the soil gas survey was combined with data from the EM survey to better locate subsurface soil borings and test pits.

Where possible, soil gas survey lines were laid out perpendicular and/or parallel to the orientation of the linear features within each survey area and generally matched the profile lines used during the EM survey. The Phase III EM survey results, the EPIC aerial photograph analysis, and the findings from previous investigations (e.g., Phase I RI, Phase II RI) were used to focus the soil gas survey on the most likely suspected source locations. Survey line spacing varied from 10 to 50 feet based on the size of the suspected source to be investigated and on the presence of obstructions. Based on evaluation of the initially sampled points, additional soil gas locations were sampled using a refined sampling grid. The soil gas survey areas and results were presented in the July 26,1995 Phase III letter report (Proposed Subsurface Soil Investigation for Area B, B&R Environmental, 1995). Summary and interpretation of the results are also presented in the October 1995 Sampling and Analysis Plan (SAP).

Soil gas sampling was performed using the hollow-probe method (Geoprobe). The probe and probe tip were driven into the ground to a specified depth using an electric hammer drill (Bosch hammer) or a power auger. The actual depth was specific to the suspected source being investigated but ranged between 3 and 12 feet. The hollow probe was lifted to retract the probe adapter and expose the lowest 2 to 4 inches of soil at the bottom of the hole. Polyethylene (PE) tubing with a threaded

end piece was tightened to the expendable point adapter at the bottom and connected at the surface to silicon tubing attached to a peristaltic pump. The peristaltic pump was used to purge the assembly before sampling and to extract soil gas from the interstitial soil pore space. A Tedlar bag was connected to the sampling pump, filled with soil vapor, and sealed until analysis. The hollow probe and adapter assembly were removed and decontaminated between samples following standard protocol. A fresh length of PE tubing was used for each hole.

Soil gas analysis was performed in the on-base field trailer using a Hewlett Packard GC equipped with a 30-meter, 0.25 mm inner diameter (ID) capillary column that was coupled to a photoionization detector (PID) in-series with an electron capture detector (ECD). The GC was optimized for rapid (less than 7.5 minutes per run) analysis for acetone, 2-butanone, benzene, toluene, ethylbenzene, total xylenes, styrene, tetrachloroethene (PCE), trichloroethane (TCE), 1,1,1-trichloroethene, carbon tetrachloride, chloroform, 1,1-dichloroethene, 1,2-dichloroethene, 1,2-dichloroethane, and 1,1-dichloroethane.

Calibration standards were diluted from certified methanolic standards into water using 40 ml VOC vials, leaving a 10-ml headspace. 400-liter vapor aliquots were injected after heating standards to 70 degrees Centigrade for 5 minutes and shaking for 30 seconds. An initial three-point calibration was performed and the practical quantitation limit (PQL) for each compound was established as one-half of the lowest concentration standard. The method achieved PQLs in the range of 0.03 to 0.3 ug/l for trichlorinated and tetrachlorinated compounds, followed by PQLs between 2 and 6 ug/l for compounds with carbon double bonds or aromatic rings, and PQLs between 15 and 50 ug/l for dichlorinated alkanes, acetone, and 2-butanone.

A continuing calibration standard was analyzed at the beginning of each day and repeated after every 15 injections. Subsequent continuing calibrations were assessed to verify stable system response; if response decreased by -60 percent or increased by +100 percent for more than one compound, then new calibration factors were required for all compounds. In the event of calibration error caused by systematic problems (e.g., syringe or detector malfunction), corrective action was taken and followed by a new standard injection and calibration factor update.

Analytical quality control procedures were followed for field blanks, field duplicates, syringe blanks, holding times, and decontamination. Duplicate samples and Tedlar bag blanks were collected at a frequency of one per 20 soil vapor samples. Syringe blanks were run for every 20 injections and after highly contaminated samples. High-level samples were followed by syringe cleaning and bake-out. Tedlar bags were flushed with three volumes of air between each use and were discarded

if leaks were found. Syringe performance (plunger resistance, methanol dispensing, and injection spike size) was monitored to ensure the absence of leaks or blockage.

Syringes were repaired/replaced at the first symptom of malfunction. Analyses were required to be performed within 8 hours of sample collection.

Results were reported in units of aqueous ug/l, equivalent to the corresponding calibrated headspace concentration. For compounds quantifiable on both detectors, the detector with lower detection limits was consistently reported, except when sample levels were above the linear range. A screening-level data validation was performed via electronic linking of sample and associated blank data files, after which results were incorporated into a database.

Figure 2-5 depicts the soil gas sampling locations that exhibited anomalous results when compared to other data points. The mapped locations show those sampling locations where multiple compounds or single compound concentrations above the range found in other sampling points were detected. In addition, all the positive results for benzene have been shown on Figure 2-5.

2.3 SURFACE SOILS

A total of 33 surface soil samples were collected at Site 6 (see Figure 2-6). Twenty surface soil samples were collected during the Phase II RI. These samples were collected at the surface of suspected disposal areas. Thirteen additional surface soil samples were collected during the February/March 1997 supplemental field investigations. These samples were collected to augment existing surface soil data and to ensure adequate characterization of the area. The samples, in general, were analyzed for Target Compound List (TCL) VOCs, semivolatile organic compounds (SVOCs), pesticide/polychlorinated biphenyls (PCBs), and Target Analytes List (TAL) inorganics. Appendix B contains the analytical results for all samples, and Sections 4 and 5 evaluate these results.

During the Phase III RI, 10 surface soil samples (and one duplicate sample) were taken in the vicinity of suspected Site 7 (Figure 2-6). All samples were analyzed for TCL volatile organics, TCL semivolatile organics, TCL pesticides, PCBs, and TAL metals. The surface soil samples for suspected Site 7 were collected near TR6 and a possible disposal area northwest of the TR6 samples.

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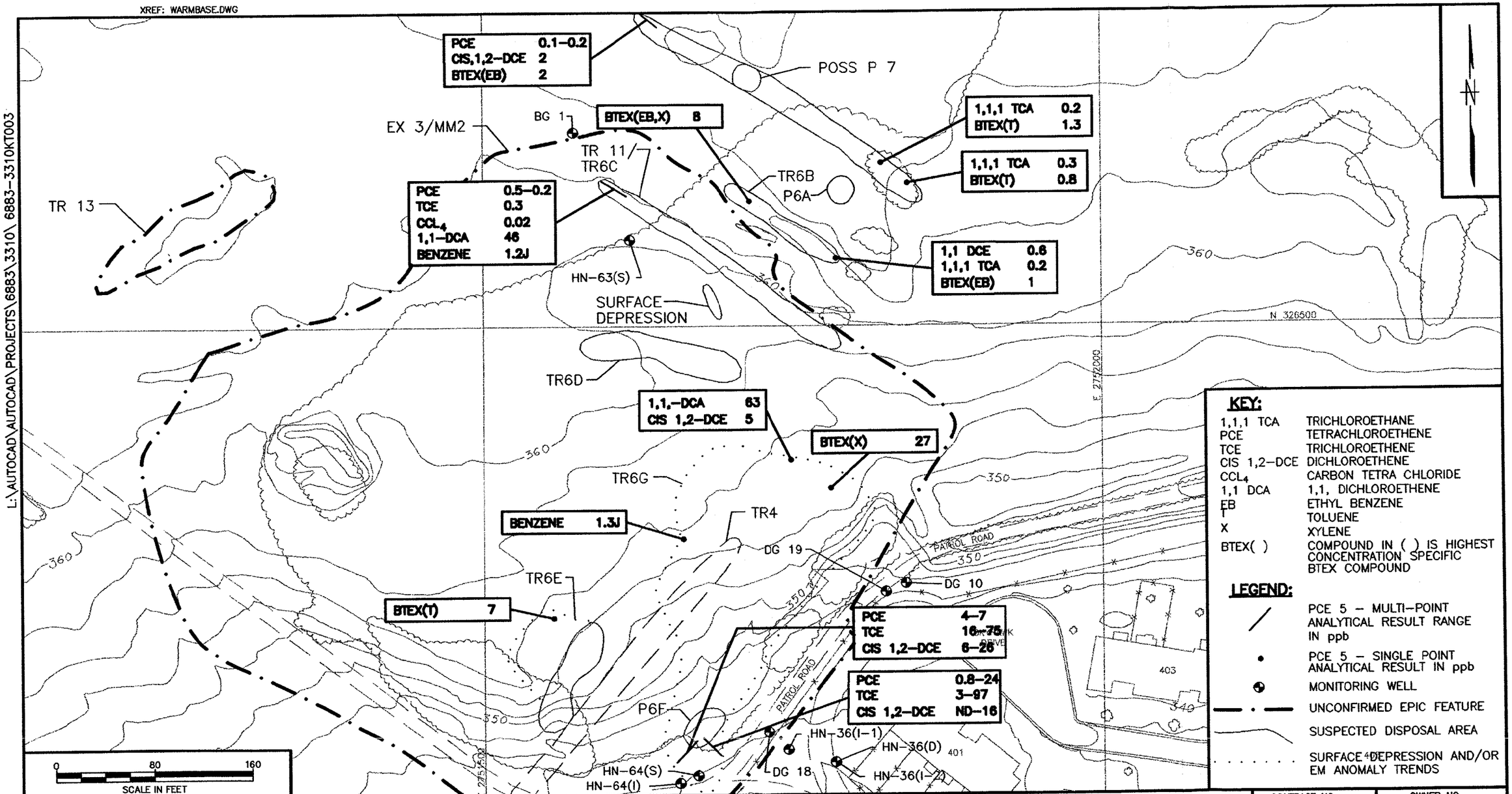

NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

DRAWN BY A.S.M. DATE 12/3/1998
CHECKED BY DATE
COST/SCHED–AREA
SCALE 1 in. = 80 ft.

Tetra Tech NUS, Inc.

PHASE III R.I. SOIL GAS RESULTS
AREA B – SITES 6 AND 7
FORMER NAWC
WARMINSTER, PENNSYLVANIA

CONTRACT NO. N62472–90–D–1298
OWNER NO. CTO 0252
APPROVED BY DATE
APPROVED BY DATE
DRAWING NO. FIGURE 2–5
REV. 0

FORM CADD NO. L:\ACAD14\BLOCKS\BORDERS\TTNUS_BH3.DWG

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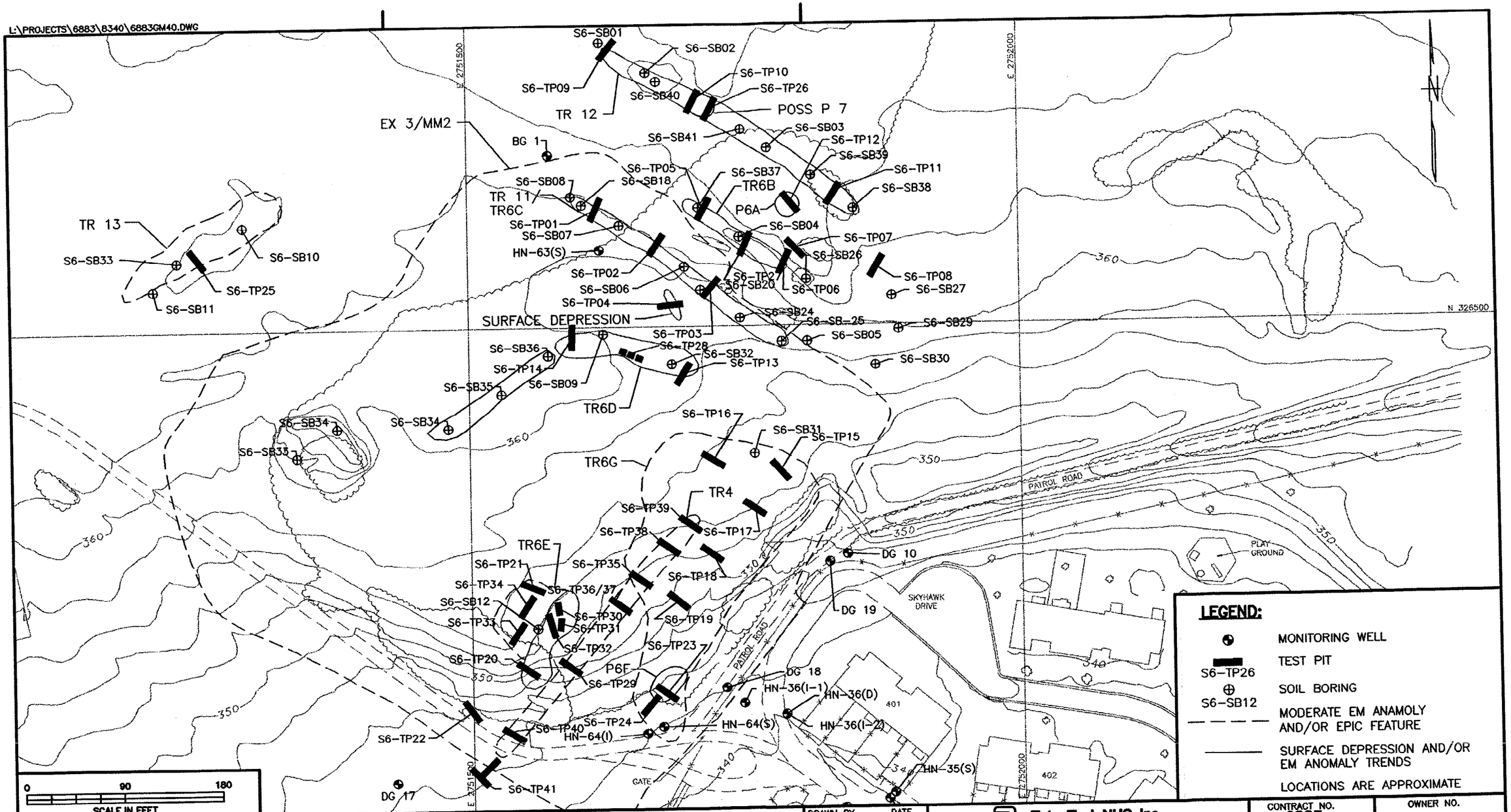

NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

DRAWN BY A.S.M. DATE 12/2/97
CHECKED BY DATE
COST/SCHED-AREA
SCALE AS NOTED

Tetra Tech NUS, Inc.

TEST PIT AND BORING LOCATION MAP
AREA B-SITES 6 AND 7
NAWC, WARMINSTER

CONTRACT NO. 6883
OWNER NO.
APPROVED BY DATE
APPROVED BY DATE
DRAWING NO. FIGURE 2-6
REV. 0

FORM CADD NO. SOUTH_BHUGN - REV 0 - 02/11/97

2.4 SUBSURFACE INVESTIGATIONS

Subsurface investigations have included soil boring, test pit, and sampling investigations. Geophysical surveys were used to investigate possible disposal areas identified in aerial photographs and to help define other suspected features. Soil borings were used to examine subsurface profiles and to obtain depth-specific samples. Test pits were excavated to confirm disposal locations, to investigate areas of suspected activities, to examine the site content, and to allow for sampling of specific horizons, depths, and target material.

Six test pits were excavated near the perimeter of the suspected disposal area during the Phase I RI. These test pits confirmed the presence of buried debris, trash, rubble, construction debris, and an empty paint drum. No samples were collected during this investigation.

The Phase II RI consisted of collecting samples from four borings. These borings were advanced in the western portion of the site. Samples were analyzed for full TCL organic and TAL inorganic analyses. No significant findings were reported from these borings.

Additional soil borings and extensive test pit investigations were performed following more extensive geophysical surveys. Test pits and soil borings were advanced during an initial removal investigation conducted in April 1996 and were supplemented with additional excavations in January/February 1997. Twenty-six test pits and 13 borings were advanced during the 1996 investigation. In general, the test pits averaged 20 feet in length and 4 feet in width and were excavated to bedrock or below evidence of disposal activities. Soil borings were advanced to approximately 10 feet or to bedrock. Test pit and boring locations were selected to confirm and define the extent of suspected disposal areas and to investigate specific geophysical survey findings. In addition, some test pits and borings were placed at regular intervals across a specific feature to investigate its content. A total of 38 subsurface samples were collected for a variety of TCL organic and TAL inorganic analytical parameters during this investigation.

The 1996 investigation was supplemented with additional geophysical studies and test pit and soil boring investigations in January/February 1997. The purpose of these investigations was to further define and investigate specific features, as well as to provide general coverage and data from the entire site. An additional 15 test pits and 23 soil borings were advanced, logged, and sampled during the 1997 field investigation. A total of 70 additional samples, collected from various depth and waste disposal horizons, were collected during this investigation and analyzed

for a variety of TCL organic and TAL inorganic analyses, as defined in the sampling and analysis plan.

Figure 2-6 shows the locations of the test pits and soil borings performed during these investigations, with the exception of the Phase I RI test pits. No samples were collected from these test pits, which were excavated at the perimeter of the suspected disposal area.

2.5 REMOVAL ACTIONS

Upon completion of the 1996 investigation, the Navy decided to take immediate removal actions at three "hot spots" within Sites 6 and 7. These three areas, where contamination levels consistently exceeded screening levels, were referred to as pit P6A, a portion of feature TR6E, and pit P6F (see Figure 2-5). Feature P6F contained the only significant levels of VOCs found anywhere on site.

Removal actions were performed in all three areas in accordance with the April 28, 1997 work plan (Foster Wheeler, 1997). Samples were collected from each area for the purpose of waste characterization. Excavation and removal continued until all post-excavation samples confirmed the absence of target compounds in excess of clean-up goals established by the BCT.

Clean-up goals, sample collection requirements, and analytical were defined in the Draft Verification Sampling Plan (B&R Environmental, August 1996). The final clean-up goals, as specified by the BCT, were based on the planned recreational re-use of the land. The established risk-based clean-up goals ensured that no single compound in any single sample contributed to cumulative risk greater than 1E-06 for carcinogens of a cumulative HI of 1 for noncarcinogens.

Samples were collected from the floor and side wall areas of all three excavations. Sampling points were selected according to the criteria established in the sampling and analysis plan and PADEP soil clean-up guidelines. Actual sampling locations were field approved by EPA oversight contractors. Analytical results were reported to the BCT in a series of letter reports as they became available. When contaminant levels exceeded the clean-up goal, additional excavation and sampling occurred until all sample results revealed levels below the clean-up criteria. Analytical parameters for samples collected after re-excavation were limited to those compounds that exceeded criteria in earlier samples. A complete set of all analytical data collected during the removal action is presented in Appendix C.

Approximately 3,698 tons of material were excavated and removed from the areas shown on Figure 2-7. Of this, approximately 3,649 were disposed as nonhazardous waste. The remaining 49 tons were disposed as hazardous material due to the presence of PCBs. The Close-out Report (Foster Wheeler, 1997) presents details regarding the removal actions.

As indicated above removal excavations continued until all post-excavation sample analytical results were below the clean-up levels. Table 2-1 presents the analytical results from all final removal verification samples by excavation area and compares them to clean-up levels. As can be seen by reviewing these results, all clean-up criteria were met.

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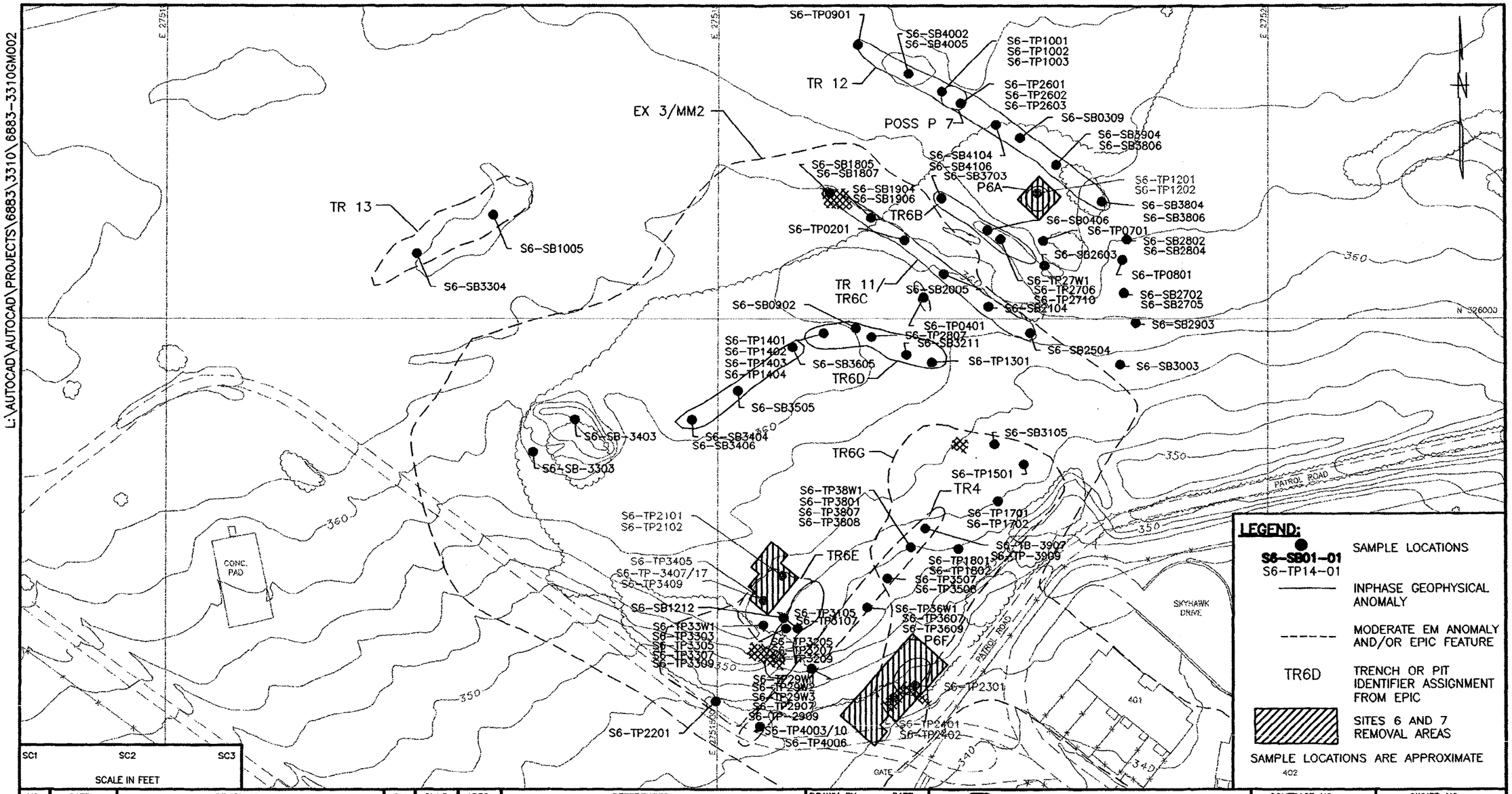

NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

DRAWN BY A.S.M. DATE 12/11/1998
CHECKED BY DATE
COST/SCHED-AREA
SCALE 1 in. = 90 ft.

Tetra Tech NUS, Inc.

APPROXIMATE REMOVAL AREAS
REMEDIAL INVESTIGATION
AREA B -SITES 6 AND 7
FORMER NAWC WARMINSTER
WARMINSTER, PENNSYLVANIA

CONTRACT NO. N62472-90-D-1298
OWNER NO. CTO 0252
APPROVED BY DATE
APPROVED BY DATE
DRAWING NO. **FIGURE 2-7**
REV. 0

FORM CADD NO. L:\ACAD14\BLOCKS\BORDERS\TtNUS_BH3.DWG

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TABLE 2-1

COMPARISON OF SUBSURFACE SOIL VERIFICATION SAMPLE DATA TO Risk-Based Concentrations - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	W-P6A-01		W-P6A-02		W-P6A-03		W-P6A-05		W-P6A-06		W-P6A-07		W-P6A-09		SELECTED ARARS
LOCATION:	Side wall		Side wall		Side wall		Side wall		Side wall		Floor		Floor		Risk-Based Concentrations for Recreational Exposure to Soil
DATA SOURCE:	Pit P6A		Pit P6A		Pit P6A		Pit P6A		Pit P6A		Pit P6A		Pit P6A		
SAMPLE DATE:	05/19/97		05/19/97		05/19/97		05/19/97		05/19/97		05/19/97		05/19/97		
INORGANICS	mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg
aluminum	15600		20000		17100		16900		19200		21100		28500		1390000
antimony	2.6	UR	2.4	UR	2.5	UR	2.5	U	3.7	K	3	K	2.6	U	50.5
arsenic	3.6	K	4	K	4.7	K	8.4		8.4		3.5	K	2.5	K	8.40
barium	92.6		51.6		56.5		96.1		46.9		68.7		81.5		8840
beryllium	0.74		2		1.2		1.1		0.65		1.9		1.5		2.90
cadmium	7.8	L	0.41	UL	0.42	UL	0.42	UL	0.44	UL	0.42	UL	0.62	L	63.1
calcium	5300	J	1400	J	1380	J	1380	J	791	J	1110	J	335	J	-
chromium	1460	E J	71.1	J	56.4	J	28.2	J	26.2	J	24.8	J	26.1	J	631
cobalt	17.4	J	10.7	J	11.3	J	9	J	8.5	J	22.2	J	26.3	J	7570
copper	85.4	L	16.9	L	13.8	L	11	L	15.5	L	9.2	L	39.1	L	5050
iron	50800	E J	38400	E J	23800	J	17300	J	26300	J	35100	J	15500	J	37900
lead	41.8	J	14.1	J	14.8	J	15.8	J	10.3	J	19.3	J	6.6	J	-
magnesium	1610	J	2460	J	2450	J	1830	J	2480	J	2880	J	1970	J	-
manganese	542	J	387	J	320	J	656	J	217	J	1050	J	351	J	2900
mercury	0.91		0.05		0.04	U	0.1		0.04	U	0.04	U	0.04	U	37.9
nickel	17.1		18.4		14.7		13.1		14.9		16.5		11.7		2520
potassium	749		1590		1350		709		1090		2100		637		-
silver	45.5	J	1.2	J	2	J	0.59	J	0.72	J	0.61	J	0.4	J	631
sodium	75.8	J	67.5	J	69.2	J	64.7	J	64.7	B	86.6	J	85.6	J	-
thallium	1	J	0.43	UL	0.46	J	0.44	UL	0.64	J	0.44	UL	0.48	UL	10.1
vanadium	27.1		28.4		27.3		29.7		42.5		25.1		27.5		884
zinc	78	J	35.7	J	30.6	J	41.8	J	34.7	J	28.3	J	10.7	J	37900
SEMIVOLATILES	ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg
benz(a)anthracene	51	J	390	U	4.9	J	7.2	J	0.84	UJ	0.8	UJ	0.87	UJ	17200
benzo(a)pyrene	420	U	390	U	6.1	J	6.8	J	0.84	UJ	0.8	UJ	0.87	UJ	1700
benzo(b)fluoranthene	77	J	390	U	7.9		11		0.84	U	0.8	U	0.87	U	17200
benzo(g,h,i)perylene	420	U	390	U	7.7		9.5		2.1	U	2	U	2.2	U	-
benzo(k)fluoranthene	420	U	390	U	3.4	J	4.2	J	0.84	UJ	0.8	UJ	0.87	UJ	172000

TABLE 2-1

COMPARISON OF SUBSURFACE SOIL VERIFICATION SAMPLE DATA TO Risk-Based Concentrations - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	W-P6A-01		W-P6A-02		W-P6A-03		W-P6A-05		W-P6A-06		W-P6A-07		W-P6A-09		SELECTED ARARS
LOCATION:	Side wall		Side wall		Side wall		Side wall		Side wall		Floor		Floor		Risk-Based Concentrations for Recreational Exposure to Soil
DATA SOURCE:	Pit P6A		Pit P6A		Pit P6A		Pit P6A		Pit P6A		Pit P6A		Pit P6A		
SAMPLE DATE:	05/19/97		05/19/97		05/19/97		05/19/97		05/19/97		05/19/97		05/19/97		
SEMIVOLATILES	ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg
bis(2-ethylhexyl)phthalate	250	J	390	U	n/a		n/a		n/a		n/a		n/a		899000
chrysene	73	J	390	U	6	U	9.9		6.2	U	6	U	6.5	U	1720000
dibenz(a,h)anthracene	420	U	390	U	1.2	UJ	4.6	J	1.2	UJ	1.2	UJ	1.3	UJ	1700
fluoranthene	70	J	390	U	9.5		18		8.4	U	8	U	8.7	U	5050000
indeno(1,2,3-cd)pyrene	420	U	390	U	6.2		10		2.1	U	2	U	2.2	U	17200
pyrene	420	U	390	U	14		23		8.4	U	8	U	8.7	U	3790000
PESTICIDES/PCBS	ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg
4,4'-DDD	2.9	J	2	U	n/a		n/a		n/a		n/a		n/a		52400
Aroclor-1260	42	U	39	U	40	U	40	U	70		40	U	43	U	6300
dieldrin	2.5		2	U	n/a		n/a		n/a		n/a		n/a		800
endrin ketone	2.8		2	U	n/a		n/a		n/a		n/a		n/a		37900

TABLE 2-1

COMPARISON OF SUBSURFACE SOIL VERIFICATION SAMPLE DATA TO Risk-Based Concentrations - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	W-P6A-11	W-P6A-12	W-TR6E-01	W-TR6E-02	W-TR6E-03	W-TR6E-04	W-TR6E-04-DUP	SELECTED ARARS
LOCATION:	Floor	Side wall	Side wall	Side wall	Side wall	Floor	Floor	Risk-Based Concentrations for Recreational Exposure to Soil
DATA SOURCE:	Pit P6A	Pit P6A	Trench TR6E	Trench TR6E	Trench TR6E	Trench TR6E	Trench TR6E	
SAMPLE DATE:	06/10/97	06/24/97	05/20/97	05/20/97	05/20/97	05/20/97	05/20/97	
INORGANICS	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**
aluminum	n/a	n/a	13700	9030	15200	16500	14900	1390000
arsenic	n/a	n/a	6.8	3.7	5.7	5.5	5.7	8.40
barium	n/a	n/a	86.9	38	66.1	69.6	71	8840
beryllium	n/a	n/a	0.67	0.53	0.77	0.34	0.42	2.90
cadmium	n/a	n/a	0.45 UL	0.42 UL	0.51 L	0.41 UL	0.41 UL	63.1
calcium	n/a	n/a	2760 J	1140 J	1720 J	1110 J	956 J	-
chromium	n/a	n/a	21 J	17.3 J	22.1 J	26.5 J	23.9 J	631
cobalt	n/a	n/a	7.7 K	6.4 K	9.3 K	3.1 K	3.2 K	7570
copper	n/a	n/a	32.6 L	14.9 L	18.7 L	12.7 L	11.1 L	5050
iron	n/a	n/a	22200 J	15600 J	18600 J	14800 J	16100 J	37900
lead	n/a	119 K	88.4 J	11.3 J	53.9 J	9.3 J	9.2 J	-
magnesium	n/a	n/a	2100 J	1560 J	2230 J	1900 J	1790 J	-
manganese	n/a	n/a	419 J	181 J	502 J	191 J	187 J	2900
mercury	n/a	n/a	0.09	0.13	0.04	0.04 U	0.04 U	37.9
nickel	n/a	n/a	12	7.8	11.4	7.8	7.9	2520
potassium	n/a	n/a	936	627	1020	816	777	-
selenium	n/a	n/a	0.47 K	0.37 K	0.33 K	0.42 K	0.52 K	631
silver	n/a	n/a	0.75	0.51	0.46	0.8	0.7	631
sodium	n/a	n/a	95.7 J	98.3 J	104 J	84 J	96.9 J	-
thallium	n/a	n/a	0.47 UL	0.44 UL	0.43 UL	0.46 L	0.44 UL	10.1
vanadium	n/a	n/a	30	23.9	31.3	30.4	34.6	884
zinc	n/a	n/a	187 J	26.9 J	49.3 J	26 J	25.2 J	37900
SEMIVOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
benz(a)anthracene	4.5	n/a	92 J	330	11	390 U	390 U	17200
benzo(a)pyrene	5.5	n/a	100 J	390 J	12 J	390 U	390 U	1700
benzo(b)fluoranthene	5.2	n/a	110 J	370	12	390 U	390 U	17200
benzo(g,h,i)perylene	5	n/a	420 U	320	11	390 U	390 U	-
benzo(k)fluoranthene	2.4	n/a	83 J	200 J	6.8 J	390 U	390 U	172000

TABLE 2-1

COMPARISON OF SUBSURFACE SOIL VERIFICATION SAMPLE DATA TO Risk-Based Concentrations - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	W-P6A-11		W-P6A-12	W-TR6E-01		W-TR6E-02		W-TR6E-03		W-TR6E-04		W-TR6E-04-DUP		SELECTED ARARS
LOCATION:	Floor		Side wall	Side wall		Side wall		Side wall		Floor		Floor		Risk-Based Concentrations for Recreational Exposure to Soil
DATA SOURCE:	Pit P6A		Pit P6A	Trench TR6E		Trench TR6E		Trench TR6E		Trench TR6E		Trench TR6E		
SAMPLE DATE:	06/10/97		06/24/97	05/20/97		05/20/97		05/20/97		05/20/97		05/20/97		
SEMIVOLATILES	**ug/kg**		**ug/kg**	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**
chrysene	7.9	U	n/a	120	J	120	U	15		390	U	390	U	1720000
dibenz(a,h)anthracene	1.6	U	n/a	420	U	260		2.1		390	U	390	U	1700
fluoranthene	11	U	n/a	220	J	690		28		390	U	390	U	5050000
fluorene	13		n/a	420	U	160	U	7.8	U	390	U	390	U	5050000
indeno(1,2,3-cd)pyrene	4.1		n/a	420	U	300		13		390	U	390	U	17200
phenanthrene	27	U	n/a	99	J	400	U	20	U	390	U	390	U	-
pyrene	11	U	n/a	140	J	710		35		390	U	390	U	3790000
VOLATILES	**ug/kg**		**ug/kg**	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**
acetone	n/a		n/a	130	UJ	n/a		n/a		100	J	120		1260000
PESTICIDES/PCBS	**ug/kg**		**ug/kg**	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**
4,4'-DDE	n/a		n/a	5.8		n/a		n/a		2	U	2	U	37000
4,4'-DDT	n/a		n/a	7.4		n/a		n/a		2	U	2	U	37000
Aroclor-1254	n/a		n/a	42	U	860		39	U	39	U	39	U	2500
Aroclor-1260	n/a		n/a	42	U	78	U	39	U	74		39	U	6300

TABLE 2-1

COMPARISON OF SUBSURFACE SOIL VERIFICATION SAMPLE DATA TO Risk-Based Concentrations - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	W-TR6E-05		W-TR6E-06		W-TR6E-07		W-TR6E-10		W-TR6E-13		W-TR6E-16		W-TR6E-16-DUP		SELECTED ARARS
LOCATION:	Side wall		Floor		Floor		Side wall		Side wall		Side wall		Side wall		Risk-Based Concentrations for Recreational Exposure to Soil
DATA SOURCE:	Trench TR6E		Trench TR6E		Trench TR6E		Trench TR6E		Trench TR6E		Trench TR6E		Trench TR6E		
SAMPLE DATE:	05/20/97		05/20/97		05/20/97		05/20/97		06/10/97		07/10/97		07/10/97		
INORGANICS	**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**
aluminum	10400		14200		11100		10400		14600	J	n/a		n/a		1390000
antimony	2.4	UL	2.7	UL	2.4	UL	2.6	UL	1.1	L	n/a		n/a		50.5
arsenic	3.4		5.8		5.8		2.2	K	6.4		n/a		n/a		8.40
barium	36.1		102		73.2		29.7		82.3	J	n/a		n/a		8840
beryllium	0.51		0.97		0.41		0.5		0.98	L	n/a		n/a		2.90
cadmium	0.41	UL	0.47	UL	0.49	L	0.44	UL	0.33	J	n/a		n/a		63.1
calcium	1460	J	652	J	1350	J	894	J	1410	J	n/a		n/a		-
chromium	16.3	J	16.8	J	67.9	J	17.5	J	19.7	J	n/a		n/a		631
cobalt	7.2	K	6		3.5	K	7.2	K	8.3	J	n/a		n/a		7570
copper	17.8	L	8.3	L	23.9	L	18.1	L	15.3		n/a		n/a		5050
iron	14700	J	12500	J	15900	J	17500	J	15600		n/a		n/a		37900
lead	11.8	J	17.9	J	42.8	J	7.7	J	21.9	L	n/a		n/a		-
magnesium	1590	J	1630	J	1700	J	1670	J	2100	J	n/a		n/a		-
manganese	306	J	684	J	121	J	191	J	428		n/a		n/a		2900
mercury	0.04	U	0.04	U	2		0.04	U	0.07		n/a		n/a		37.9
nickel	8.6		12		8.7		8		12.7	L	n/a		n/a		2520
potassium	838		585		522		576		1180		n/a		n/a		-
selenium	0.3	U	0.55	K	0.81	K	0.33	U	0.54	J	n/a		n/a		631
silver	0.43		0.4	U	2.9		0.45		0.43	B	n/a		n/a		631
sodium	104	J	128	J	85.3	J	142	J	149	J	n/a		n/a		-
vanadium	23.7		25.4		26.9		25.2		29.8	J	n/a		n/a		884
zinc	27.3	J	54.5	J	67.9	J	41.6	J	48.1	L	n/a		n/a		37900
SEMIVOLATILES	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**
acenaphthene	390	U	890	U	160	U	84	U	400	UJ	500		650		7570000
anthracene	100	U	230	U	40	U	21	U	100	UJ	61		91		37900000
benz(a)anthracene	69		8.9	U	63	J	1		92	J	290		460		17200
benzo(a)pyrene	3.9	U	11	J	1.6	U	1.3	J	120	J	350		600		1700
benzo(b)fluoranthene	95		14		87	J	1.8		94	J	350		600		17200

TABLE 2-1

COMPARISON OF SUBSURFACE SOIL VERIFICATION SAMPLE DATA TO Risk-Based Concentrations - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	W-TR6E-05		W-TR6E-06		W-TR6E-07		W-TR6E-10		W-TR6E-13		W-TR6E-16		W-TR6E-16-DUP	SELECTED ARARS
LOCATION:	Side wall		Floor		Floor		Side wall		Side wall		Side wall		Side wall	Risk-Based Concentrations for Recreational Exposure to Soil
DATA SOURCE:	Trench TR6E		Trench TR6E		Trench TR6E		Trench TR6E		Trench TR6E		Trench TR6E		Trench TR6E	
SAMPLE DATE:	05/20/97		05/20/97		05/20/97		05/20/97		06/10/97		07/10/97		07/10/97	
SEMIVOLATILES	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	**ug/kg**
benzo(g,h,i)perylene	74		23	U	68	J	2.1	U	77	J	230		400	-
benzo(k)fluoranthene	3.9	U	8.9	U	4.8	J	0.84	U	51	J	160		300	172000
chrysene	80		1200		330	J	7		130	J	210		370	1720000
dibenz(a,h)anthracene	25		13	U	45	J	1.3	U	16	J	310		580	1700
fluoranthene	120		89	U	130	J	8.4	U	140	J	470		810	5050000
fluorene	39	U	89	U	310	J	8.4	U	40	UJ	52		89	5050000
indeno(1,2,3-cd)pyrene	10	U	23	U	74	J	2.1	U	78	J	240		370	17200
phenanthrene	100	U	230	U	44	J	21	U	100	UJ	160		260	-
pyrene	120		89	U	120	J	8.4	U	180	J	410		700	3790000
PESTICIDES/PCBS	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	**ug/kg**
Aroclor-1254	39	U	44	U	110		41	U	40	U	480		1000	2500

TABLE 2-1

COMPARISON OF SUBSURFACE SOIL VERIFICATION SAMPLE DATA TO Risk-Based Concentrations - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	W-TR6E-17	W-TR6E-19	W-TR6E-23	W-TR6E-24	W-TR6E-25	---	---	SELECTED ARARS
LOCATION:	Floor	Side wall	Side wall	Side wall	Side wall	---	---	Risk-Based Concentrations for Recreational Exposure to Soil
DATA SOURCE:	Trench TR6E	Trench TR6E	Trench TR6E	Trench TR6E	Trench TR6E			
SAMPLE DATE:	07/10/97	07/23/97	08/04/97	08/14/97	08/14/97			
SEMIVOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**			**ug/kg**
anthracene	1.5	n/a	n/a	n/a	n/a			37900000
benz(a)anthracene	9.6	n/a	n/a	n/a	n/a			17200
benzo(a)pyrene	14	n/a	n/a	n/a	n/a			1700
benzo(b)fluoranthene	16	n/a	n/a	n/a	n/a			17200
benzo(g,h,i)perylene	18	n/a	n/a	n/a	n/a			-
benzo(k)fluoranthene	7.4	n/a	n/a	n/a	n/a			172000
chrysene	8.5	n/a	n/a	n/a	n/a			1720000
dibenz(a,h)anthracene	14	n/a	n/a	n/a	n/a			1700
fluoranthene	18	n/a	n/a	n/a	n/a			5050000
fluorene	2.3 J	n/a	n/a	n/a	n/a			5050000
indeno(1,2,3-cd)pyrene	13	n/a	n/a	n/a	n/a			17200
naphthalene	13	n/a	n/a	n/a	n/a			5050000
phenanthrene	7	n/a	n/a	n/a	n/a			-
pyrene	16	n/a	n/a	n/a	n/a			3790000
PESTICIDES/PCBS	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**			**ug/kg**
Aroclor-1248	47 U	38 U	190 U	65	250 J			6300
Aroclor-1254	43	38 U	1200 J	74	380			2500
Aroclor-1260	93 U	38 U	190 U	84 J	290 J			6300

NOTES:

E -- Result exceeds the recreational risk-based concentration (RBC) benchmark.
J -- Value is considered estimated due to exceedance of technical quality control criteria or because result is less than the Contract Required Quantitation Limit (CRQL).
U -- Value is a non-detected result as reported by the laboratory.
UJ -- Non-detected result is considered estimated due to exceedance of technical quality control criteria.
UL -- Non-detected result is considered biased low due to exceedance of technical quality control criteria.
UR -- Non-detected result is considered unusable due to exceedance of technical quality control criteria.
L -- Positive result is considered biased low due to exceedance of technical quality control criteria.
K -- Positive result is considered biased high due to exceedance of technical quality control criteria.
B -- Positive result is considered to be an artifact of blank contamination, and should not be considered present.
R -- Positive result is considered unusable due to exceedance of technical quality control criteria.

3.0 PHYSICAL CHARACTERISTICS OF THE STUDY AREA

Several environmental studies concerned with the NAWC Warminster sites and/or surrounding areas have been completed over the last 12 years. A number of these studies, including JRB Associates (1981 and 1983), Sloto and Davis (1983), Satterthwaite (1984), Earth Technology Corporation (1985), and Halliburton NUS (1994 and 1995), and Sloto, Conger, and Grazul (1998) have provided information on local surface features, soils, meteorology, surface water hydrology, demography and land use, and hydrogeology.

The following descriptions of the physical characteristics of NAWC Warminster in general and Area B in detail have been prepared on the basis of published information, reports of previous site studies, and information obtained and interpreted during the course of the RI. Section 3.0 provides information related to both general and local physical characteristics.

3.1 METEOROLOGY

The climate of the area is humid continental and is modified by the Atlantic Ocean. Temperatures average 76°F (24.4°C) in July and 32°F (0°C) in January. The average daily temperature for the NAWC area is 53.8°F (11.8°C). Precipitation averages 42.5 inches per year (106.25 cm per year), and snowfall averages 22 inches per year (55 cm per year). The distribution of precipitation is fairly even throughout the year. The relative humidity for the site averages 70 percent. The mean wind speed for this area is 9.6 miles per hour (mph) with a prevailing direction from the west-southwest (NAWC Warminster Emergency Response Plan, 1990).

3.2 REGIONAL LAND USE

NAWC Warminster is located in the township of Warminster, Bucks County, Pennsylvania. The facility can be found on the United States Geological Service (U.S.G.S.) Hatboro 7.5-minute topographic quadrangle map, a portion of which is reproduced as Figure 1-1. The total area of NAWC Warminster is approximately 820 acres. The facility lies in a populated suburban area surrounded by private homes, various commercial/industrial activities, and a golf course. On-site areas include various buildings and other complexes connected by paved roads, the runway and ramp area, mowed fields, and a small wooded area. Sites 6 and 7 consist of open fields and woodlots bordered by the runway to the north and Navy enlisted housing and open fields to the south.

3.3 SURFACE WATER HYDROLOGY AND TOPOGRAPHY

NAWC Warminster is situated on an upland area divided between two local drainage basins, the Little Neshaminy Creek Basin on the north and the Pennypack Creek Basin on the south. The northern 65 percent of the facility (including Areas A, C, and most of Area D) drains toward the north through several swales and storm sewers into two small, unnamed tributaries of Little Neshaminy Creek. One stream, which drains Area C, begins in Munro Park north of the NAWC Warminster boundary and flows north under Jacksonville Road, through Ivyland, and under Bristol Road. A smaller tributary, which drains Area A, begins near Jacksonville Road on the northwestern side of the base. Between the base boundary and Bristol Road, these tributaries flow through developed areas with numerous small manufacturing plants, apartment complexes, restaurants, and single-family residences, to Little Neshaminy Creek, approximately 2.5 miles from NAWC Warminster. Near the base boundary, the streams are 2 feet wide and 2 to 3 inches deep with sand and gravel bottoms.

The southern 35 percent of the facility drains toward the south into tributaries of Pennypack Creek. Area B drains into the Southampton Creek Basin, which in turn discharges into the Pennypack Creek Basin. All of the drainage basins surrounding NAWC Warminster lie within the regional drainage basin of the Delaware River. Several of the tributaries of little Neshaminy and Southampton Creeks originate at, or near, the outfall points of culverts adjacent to the facility boundary. Various studies conducted on the base have revealed that no areas within NAWC Warminster are included in the 100-year or 500-year flood plains.

NAWC Warminster is located on a topographic high. The crest of a local hilltop trends east-west within the facility and is roughly coincident with the location of the main runway. Surface topography across the northern two-thirds of the base slopes away from the main runway to the north. Surface topography across the southern half of the base slopes away from the runway to the south. Slopes range from nearly level to eight percent and average from three to five percent. Surface elevations range from a high of approximately 380 feet mean sea level near the eastern end of the main runway to a low of approximately 300 feet along the northern edge of Area A, west of Jacksonville Road.

Stormwater that collects near Area B is piped underground (via Outfall No. 10) from the south-central NAWC Warminster property boundary to a point approximately 500 feet to the south, where it flows through a residential area in a concrete channel. The channel flows through the residential subdivision for approximately 1,000 feet and travels through a road culvert before

flowing into a natural streambed. This stream flows through a shaded 250 feet reach before entered a small and shallow off-base pond, which overflows into a second small pond, which in turn flows into Southampton Creek (Figure 54). At this location, the creek is less than 4 feet wide and 6 inches deep with a rocky substrate; there are mowed and maintained lawns at this point to the water's edge. The base flow rate is 98 gallons per minute (gpm), as measured in an are where the creek contained within a cement culvert. Southampton Creek south under County Line Road, the Pennsylvania Turnpike, and Byberry Road to Pennypack Creek.

A second drainage channel exists near Building 108, located west of Sites 5 and 6. This channel collects water from the vicinity of Building 108. The channel discharges through Outfall No.11 before it is discharged through the same residential neighborhood described above.

A wetlands and stream biota assessment was conducted as part of the Phase III RI. In general, Southampton Creek and associated wetlands were observed to be fairly healthy and provide good habitat within the urbanized area. Specific findings are presented and discussed in the Phase III RI.

3.4 SOILS

Soil thicknesses observed during the RIs at this area were between 4 and 14 feet. The soil thicknesses are generally uniform across the sites, with only local areas of variation. The United States Department of Agriculture Soil Conservation Service (SCS) has mapped the soils at Area B as Doylestown silt loam with slow permeability, Lawrenceville silt loam with moderately slow permeability, and the Duncannon silt loam with moderate permeability. In general, these soil types are associated to the weathered shale and sandstone, vary in color from browns and grays to yellows and reddish browns, and contain varying amounts of loamy soils but consist primarily of clays. As indicated in Sections 1.0 and 2.0 the study area has undergone periodic excavation and may be more suitable classified as Urban soils.

3.5 GEOLOGY AND HYDROGEOLOGY

The geology within Area B consists of a thin veneer of residual soils overlying the sedimentary bedrock of the Stockton Formation. The soils primarily consist of silt and clay with minor amounts of sand to an average depth of about 10 feet below ground surface. The transition from soils to weathered bedrock to competent bedrock occurs gradually over a distance of about 5 to 10 feet due to the effects of weathering on the bedrock surface.

The bedrock within Area B consists of alternating sequences of fine- and coarse-grained, gently dipping rock units. Lithologic units vary in thickness from less than a foot to a maximum observed thickness of about 60 feet. The fine-grained units consist primarily of reddish-brown siltstones and shales. The coarse-grained units consist primarily of fine- to coarse-grained arkosic sandstones that range in color from reddish to brown to gray-green. Well-defined, gradational fining-upward sequences were encountered in some areas; in other areas, fairly sharp transitions between sandstones and mudstones were identified.

Individual rock units vary both in thickness and in areal extent, with some lithologies extending for significant distances across Area B and others pinching out within relatively short distances. Thicker beds typically extend laterally for greater distances than the thinner beds, which tend to be localized in areal extent. Finer grained beds tend to be more laterally extensive than coarser-grained beds, although coalescing sandstone beds may form laterally (and vertically) extensive packages of coarse-grained rock units, which is typical for sedimentary units deposited in an alluvial fan environment.

Bedding within the Stockton Formation strikes approximately north 71 degrees east and dips approximately 5 to 8 degrees to the northwest. The dip of the rock units is approximately opposite the overall topographic slope of the ground surface within Area B. Bedrock fractures were encountered at varying depths within the Area B boreholes. Based on geophysical and boring log information, the fractures included both bedding-plane fractures and cross-cutting fractures. Fractures were observed within both the coarser- and finer-grained units; the fractures in the sandstone typically yielded greater quantities of water.

Groundwater within Area B is primarily encountered within the bedrock of the Stockton Formation. The overlying residual soils contain minor amounts of water in some places, but the saturated thickness is generally limited to a few feet or less. The majority of the groundwater within the bedrock primarily moves through interconnected networks of fractures that, on a local scale, represent discrete flow zones but are regionally part of a complex, hydraulically interconnected groundwater flow system. The primary porosity also contributes some (but significantly less) groundwater to the wells, especially in the coarser-grained units.

In general, the groundwater flow directions within the bedrock beneath Area B mimic the ground surface topography and are controlled by the topography and locations of streams in the area.

The overall direction of groundwater flow across Area B is to the south (opposite the dip of the bedrock), although local variations to this flow pattern do exist (B&R Environmental, 1996b).

Based on the vertical distribution of hydraulic head within Area B (as measured in clusters of wells completed at different depths), the overall vertical groundwater flow gradient is downward. Hydraulic heads within the shallow bedrock wells are generally higher than the heads in the deeper wells, with a few exceptions. This pattern of vertical flow indicates that the source of water to the deeper groundwater flow zones within the bedrock primarily is leakage from overlying flow zones.

3.6 GROUNDWATER USE

Residents near Area B rely on groundwater sources (both public and private) for their water supply. Most of the domestic wells immediately southeast of Area B were decommissioned when public water connections were made in the Casey Village area as part of other actions taken by the Navy at the facility. The nearest active well is about 2,000 feet southeast of Area B along Davisville Road.

The nearest municipal water-supply well is owned by Northampton, Bucks County Municipal Authority (NBCMA). This well (NBCMA Well No.1) is a least 1 mile east of Area B. Well No.1 is an 8-inch diameter well, and it is 590 feet deep.

The largest concentration of off-base domestic wells is in the Flying Heels neighborhood, approximately 3,000 feet southwest of Site 5 within Area B. The Navy is conducting long-term groundwater monitoring in the vicinity of Area B to ensure off-base wells are not adversely impacted by suspected sources at the former NAWC Warminster.

4.0 NATURE AND EXTENT

As indicated in Section 2.5, removal actions were limited to three hot spots within Sites 6 and 7. Because removal actions continued in these areas until it was confirmed through sample analysis that any residual risk associated with chemical contamination was within EPA and state acceptance criteria, no further evaluation of the nature and extent of contamination within these areas will be performed.

The following discussion presents a summary of the distribution and concentration of contaminants outside the removal areas. The data from the Sites 6/7 disposal area are presented separately from the data collected in the other areas investigated south and southeast of the disposal areas. A complete data summary of all surface and subsurface sample data is presented in Appendix B.

4.1 SURFACE SOIL

A total of 29 surface soil samples were collected from within Sites 6/7 but outside the three removal areas. Samples were analyzed according to EPA-approved Contract Laboratory Program (CLP) protocol. All samples, duplicates, and blanks were analyzed for TCL VOCs, SVOCs, and pesticide/PCBs and TAL metals, with the exception of the last 13 samples collected (SS-06-100 through SS-06-113), which were not analyzed for pesticides. Analytical results from previous samples indicated that pesticides were not a contaminant of concern.

TCE and PCE were the main groundwater contaminants of concern previously identified in Area B. Nine of the 29 samples collected outside the removal areas contained trace levels of TCE. All detections were estimated concentrations at levels below the detection limit. Concentrations ranged from 1 µg/kg to 4 µg/kg. PCE was not detected in any of the surface soil samples. See Appendix B for a presentation of all analytical results.

Sample results, after validation, were tabulated and reviewed against background concentrations and risk-based criteria to help determine the nature and extent of the contamination present at Sites 6 and 7. Background concentrations were established by using the analytical results from approximately 33 samples collected from designated areas during the performance of investigations at the base area the last several years (see Phase III RI report, B&R Environmental, 1996). All surface and subsurface background samples were pooled together and used as background for any site-specific surface or subsurface data set. The occurrence and

distribution of positive analytical results in background samples are summarized in Table 4-1, along with site-related surface soil sample results. Positive site-related analytical results were also compared against risk-based concentrations (RBCs) established by EPA to be protective of future land use. As indicated earlier, Sites 6 and 7 are located in an area of the base that has been designated for recreational uses. Section 5.0 provides details regarding the selection and calculation of RBCs and a detailed analysis of the potential risks associated with contaminant levels.

Arsenic was the most wide-spread contaminant identified at levels above background and recreational RBCs. The highest site-related sample result was 15.1 mg/kg, identified at sample point SS-100 (see Figure 4-1). Ten other samples contained arsenic contamination in excess of recreational RBCs. These ranged in concentration from 9 mg/kg to 14.8 mg/kg. Figure 4-1 shows the location and concentration of arsenic found in excess of recreational RBCs. No discernible pattern or potential isolated area of contamination is suggested by these data. Background arsenic concentrations ranged from 0.28 mg/kg to 12.1 mg/kg. Although site-related data are slightly elevated above these levels, the range of detections is similar, 4.6 mg/kg to 15.1 mg/kg, and the majority of the positive detections are within the background range.

Few other contaminants were identified above the recreational RBCs or background concentrations. Chromium was identified in samples SS-100 and SS-112 at 2,760 mg/kg and 2,050 mg/kg, respectively. Sample SS-100 also contained the only thallium concentration (15.1 mg/kg) in excess of recreational criteria. Sample SS-112 contained the only organic contaminant, benzo(a)pyrene, present at concentrations above RBCs. Benzo(a)pyrene was present in the sample at 11,000 µg/kg. The only other contaminant found in excess of recreational RBCs was manganese. This was present at 3,040 mg/kg at sample point SS-06-19. Background concentrations for this element ranged from 30.9 mg/kg to 2,010 mg/kg.

Ten surface soil samples were collected from investigation areas south and southeast of Sites 6/7 (see Figure 4-2). These samples were collected during the Phase III RI before the location of Site 7 was identified through the supplemental investigations described in Section 2.0. Appendix B presents the results for the organic and inorganic analyses of these samples.

Trace to low levels of TCE were found in all but one of these samples. Concentrations ranged from an estimated concentration of 3 ug/kgJ to 34 ug/kg. The highest concentration was identified in sample SS-07-03. This sample, which also contained estimated concentrations of PCE at 2

TABLE 4-1
OCCURRENCE AND DISTRIBUTION OF ORGANICS AND INORGANICS IN SITEWIDE SUBSURFACE SOILS, SITES 6 AND 7
NAWC WARMINSTER, PENNSYLVANIA

	Background Data					Site-Related Data					
Substance	Freq. of Detection	Range of Positive Detection Min.	Range of Positive Detection Max.	Mean of All Data	Sampling Round and Location of Maximum	Freq. of Detection	Range of Positive Detection Min.	Range of Positive Detection Max.	Mean of All Data	Sampling Round and Location of Maximum	Representative Concentration
aluminum	31/31	4780	18100	13400	BG-12	86/86	1970	251000	15000	S6-TP-COMP	15600
antimony	1/22	13.6	13.6	3.75	BG-16	22/86	2.6	164	7.26	S6-TP08-01	7.16
arsenic	27/31	0.28	12.1	3.88	BG-11	83/86	0.86	80.7	10.9	S6-TP02-01	12.6
barium	27/29	34.1	225	61.6	BG-28	83/86	12.6	922	113	S6-TP02-01	130
beryllium	27/31	0.31	1.7	0.806	BG-31	81/86	0.23	4.6	0.898	S6-SB-4005	0.99
cadmium	0/31	-			NA	31/85	0.41	152	13.2	S6-TP-29-07	23.5
calcium	25/29	240	1910	664	BG-24	83/86	340	145000	17200	S6-TP-33-W1	27400
chromium	31/31	7.9	35.3	19.4	BG-12	85/86	4.4	46800	1650	S6-TP-29-W3	2280
cobalt	27/30	1.6	22.1	8.9	BG-31	83/86	1.8	146	16.7	S6-TP-29-W3	18.3
copper	29/31	3.6	30.6	11.8	BG-29	83/86	2.9	14300	330	S6-TP-COMP	230
iron	31/31	6980	410500	33100	BG-30	86/86	4130	264000	46800	S6-TP-35-07	51000
lead	31/31	1.6	96.5	11.7	BG-13	85/86	3.1	39300	595	S6-TP02-01	130
magnesium	27/31	518	4960	1980	BG-24	84/86	456	77000	3930	S6-TP-33-W1	3650
manganese	31/31	30.9	2010	424	BG-28	86/86	65	1320	517	S6-SB-1805	592
mercury	1/28	0.37	0.37	0.0436	BG-23	32/86	0.06	5.6	0.624	S6-SB-2104	0.818
nickel	20/27	4.1	21.7	10.5	BG-31	86/86	2.9	345	25.8	S6-TP02-01	27.1
potassium	27/29	89.1	3050	706	BG-24	80/86	138	8740	722	S6-TP-29-W3	808
selenium	0/20	-			NA	4/86	0.83	5	2.17	S6-TP02-01	2.84
silver	0/17	-			NA	62/86	0.63	368	45.8	S6-TP-36-09	111
sodium	5/20	55.2	86.7	102	BG-25	73/85	44.6	740	117	S6-TP02-01	130
thallium	3/31	0.37	0.42	0.378	BG-31	40/86	3.7	89.1	10.9	S6-SB-3804	19.6
vanadium	31/31	15.4	45	29.7	BG-12	82/86	6.3	73	26.2	S6-SB12-02	40.8
zinc	27/29	9	60	27.7	BG-13	83/86	9.1	78600	1150	S6-TP-29-W3	370
4,4'-DDE	1/21	820	820	41	BG-12	1/11	3.725	3.725	2.27	S6-TP14-02	2.61
4,4'-DDT	1/21	1440	1440	70.5	BG-12	2/11	4.8	10.2	3.11	S6-TP14-02	4.42
alpha-chlordane	0/21	-			NA	1/11	8.4	8.4	1.7	S6-TP02-01	2.46
Aroclor-1242	0/21	-			NA	1/72	21	21	37.2	S6-TP18-02	21

TABLE 4-1

OCCURRENCE AND DISTRIBUTION OF ORGANICS AND INORGANICS IN SITEWIDE SUBSURFACE SOILD, SITES 6 AND 7
NAWC WARMINSTER, PENNSYLVANIA
PAGE 2 OF 3

	Background Data				Site-Related Data				
Substance	Freq. of Detection	Range of Positive Detection Min. - Max.	Mean of All Data	Sampling Round and Location of Maximum	Freq. of Detection	Range of Positive Detection Min. - Max.	Mean of All Data	Sampling Round and Location of Maximum	Representative Concentration
Aroclor-1248	0/21	-		NA	2/73	75 - 710	47.1	S6-TP-36-09	44.6
Aroclor-1254	1/21	51 - 51	38.6	BG-13	25/72	7.2 - 4200	180	S6-TP-29-W3	146
Aroclor-1260	0/21	-		NA	27/73	9 - 5100	221	S6-TP-29-W3	190
dieldrin	0/21	-		NA	1/10	6.1 - 6.1	2.41	S6-TP02-01	3.05
gamma-chlordane	0/21	-		NA	1/11	9.2 - 9.2	1.77	S6-TP02-01	2.6
methoxychlor	0/21	-		NA	1/11	14 - 14	11.2	S6-TP14-02	12.4
1,2,4-trimethylbenzene	0/0	-			1/62	170 - 170	6.62	S6-TP-29-W3	5.07
1,3,5-trimethylbenzene	0/0	-			1/62	120 - 120	5.81	S6-TP-29-W3	4.89
1,3-dichlorobenzene	0/11	-		NA	1/72	8 - 8	31.7	S6-TP-38-W1	8
2,4-dimethylphenol	0/11	-		NA	1/72	1100 - 1100	234	S6-TP-29-W3	243
2-methylnaphthalene	0/11	-		NA	1/72	50 - 50	237	S6-TP18-02	50
4-methylphenol	0/11	-		NA	1/72	6300 - 6300	307	S6-TP-29-W3	276
acenaphthene	0/11	-		NA	2/72	45 - 49	235	S6-SB-4002	49
acenaphthylene	0/11	-		NA	3/72	48 - 89	233	S6-SB-4104	89
anthracene	0/11	-		NA	5/72	79 - 340	239	S6-SB-4104	250
benz(a)anthracene	0/11	-		NA	25/72	33 - 1500	245	S6-SB-4002	282
benzo(a)pyrene	0/11	-		NA	25/72	42 - 2800	268	S6-SB-4002	291
benzo(b)fluoranthene	1/11	58 - 58	185	BG-13	16/72	82 - 4100	336	S6-SB-4002	340
benzo(g,h,i)perylene	0/11	-		NA	16/72	43 - 330	222	S6-TP-33-W1	245
benzo(k)fluoranthene	1/11	46 - 46	184	BG-13	13/72	87 - 1600	282	S6-SB-4002	300
bis(2-ethylhexyl)phthalate	1/11	50 - 50	154	BG-16	17/55	39 - 5400	372	S6-SB-3904	395
butylbenzylphthalate	0/11	-		NA	3/72	55 - 70	231	S6-SB-3804	70
chrysene	1/11	51 - 51	185	BG-13	27/72	33 - 1600	237	S6-SB-4002	271
di-n-butylphthalate	0/11	-		NA	13/72	29 - 16000	413	S6-TP-29-W3	295
dibenz(a,h)anthracene	0/11	-		NA	4/72	63 - 220	234	S6-SB-4002	220
fluoranthene	1/11	92 - 92	188	BG-13	29/72	35 - 1800	263	S6-SB-4002	298
fluorene	0/11	-		NA	1/72	50 - 50	237	S6-TP-33-W1	50

TABLE 4-1
OCCURRENCE AND DISTRIBUTION OF ORGANICS AND INORGANICS IN SITEWIDE SUBSURFACE SOILD, SITES 6 AND 7
NAWC WARMINSTER, PENNSYLVANIA

	Background Data					Site-Related Data				
Substance	Freq. of Detection	Range of Positive Detection Min.	Range of Positive Detection Max.	Mean of All Data	Sampling Round and Location of Maximum	Freq. of Detection	Range of Positive Detection Min.	Range of Positive Detection Max.	Mean of All Data	Sampling Round and Location of Maximum	Representative Concentration
indeno(1,2,3-cd)pyrene	0/11	-			NA	14/72	46	1200	239	S6-SB-4002	259
phenanthrene	1/11	51	51	185	BG-13	17/72	43	620	225	S6-TP-33-W1	254
phenol	0/11	-			NA	1/72	5300	5300	291	S6-TP-29-W3	270
pyrene	1/11	100	100	189	BG-13	28/72	35	2000	303	S6-SB-4002	339
2-butanone	0/20	-			NA	3/85	18	52	32.5	S6-TP-36-09	38.2
acetone	4/19	8	12	46	BG-24	17/84	22	330	39.6	S6-TP-36-09	70.9
carbon disulfide	0/20	-			NA	2/85	2	3	4.73	S6-TP-36-09	3
ethylbenzene	0/20	-			NA	1/85	36	36	4.96	S6-TP-29-W3	5.07
n-butylbenzene	0/0	-				1/62	1	1	4.2	S6-TP-31-05	1
p-isopropyltoluene	0/0	-				1/62	3	3	4.23	S6-SB-1807	3
sec-butylbenzene	0/0	-				1/62	0.9	0.9	4.2	S6-SB-1807	0.9
tetrachloroethene	0/20	-			NA	2/85	4	28	4.58	S6-SB-1805	4.81
toluene	3/20	2	2	42.7	BG-17	3/85	1	3	4.72	S6-TP-36-09	3
trichloroethene	0/20	-			NA	1/85	56	56	5.19	S6-TP-29-W3	5.19
xylene (total)	0/20	-			NA	3/85	2	620	11.8	S6-TP-29-W3	6.14

Notes:

Units are mg/kg for inorganics, ug/kg for organics.
Number of sample results excludes rejected data or blank-qualified data. Duplicates are consolidated into one result.
Mean of all data includes positive detections and non-detected results. Detection limits are divided by two.
The determination of representative concentrations is based on comparison of maximum to the 95 % UCL, which is presented in a separate table.
Frequency of detection refers to number of times compound was detected among all samples versus total number of samples.
Number of samples may vary based on the number of usable results.

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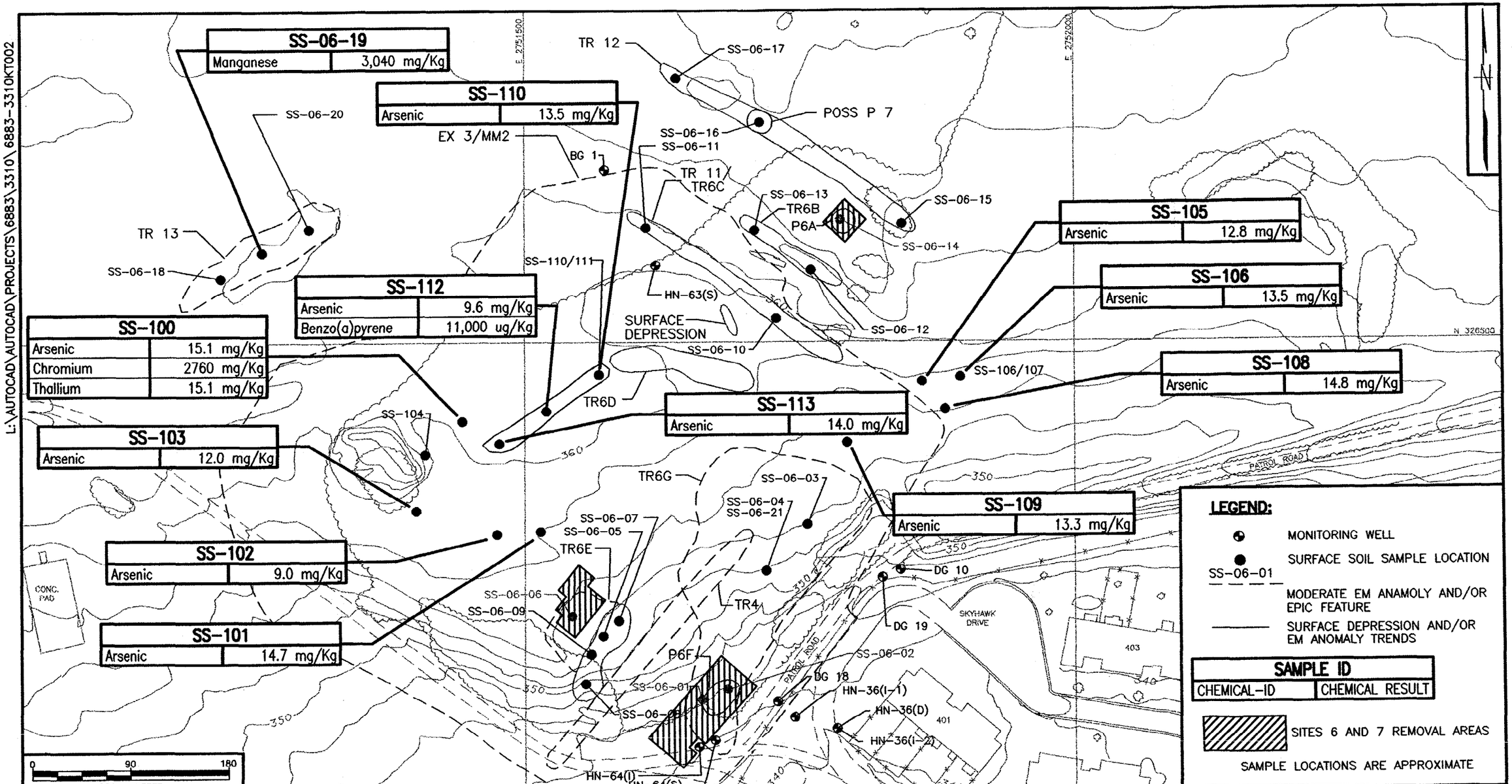

NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

DRAWN BY A.S.M. DATE 12/2/1998
CHECKED BY DATE
COST/SCHED-AREA
SCALE 1 in. = 90 ft.

Tetra Tech NUS, Inc.

SURFACE SOIL SAMPLE ANALYTICAL RESULTS EXCEEDING RECREATIONAL RBC'S AREA B - SITES 6 & 7
FORMER NAWC WARMINSTER
WARMINSTER, PENNSYLVANIA

CONTRACT NO. N62462-90-D-1298
OWNER NO. CTO 0252
APPROVED BY DATE
APPROVED BY DATE
DRAWING NO. FIGURE 4-1
REV. 0

FORM CADD NO. L:\ACAD14\BLOCKS\BORDERS\TtNUS_BH3.DWG

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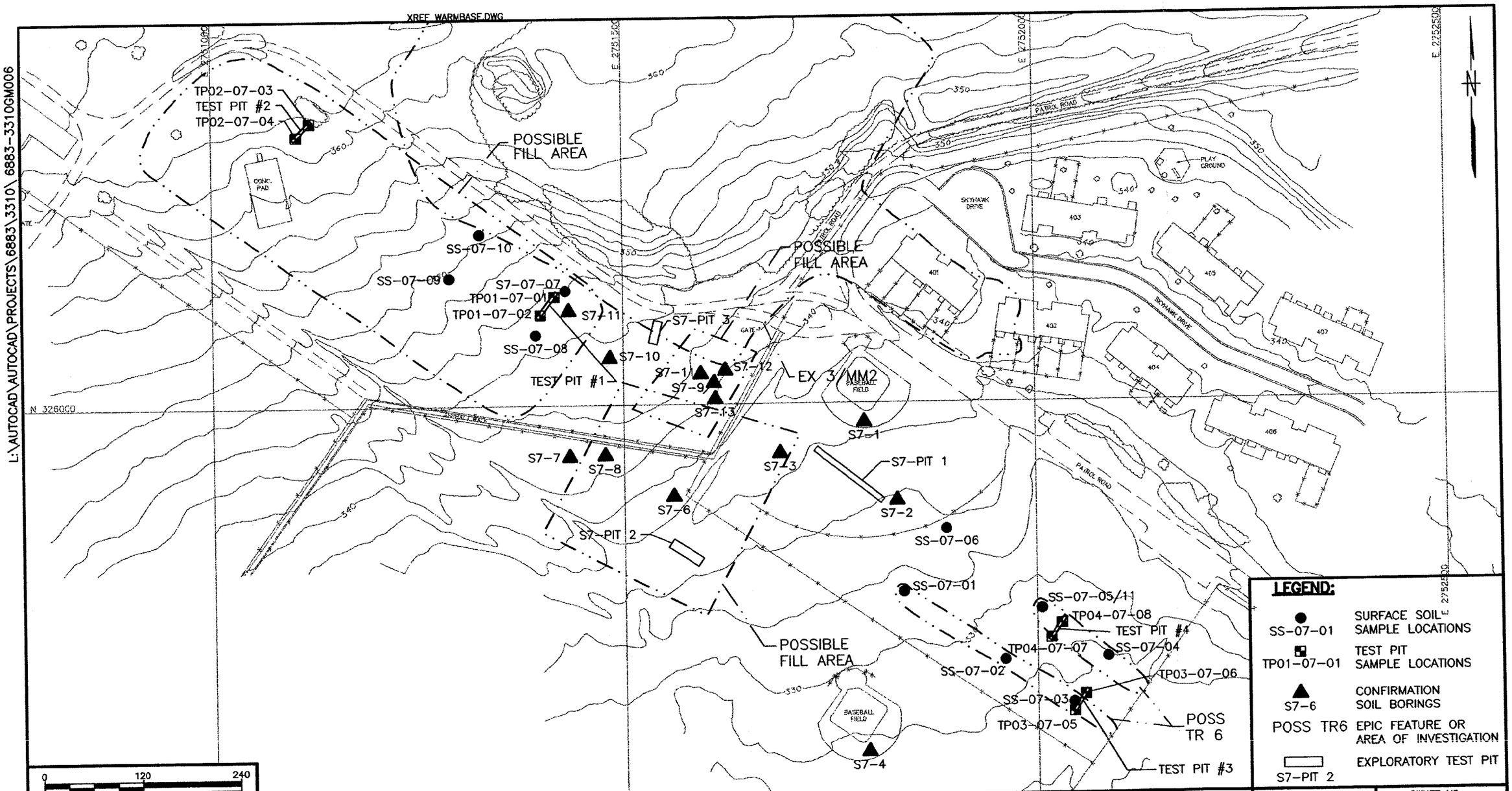


NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

DRAWN BY A.S.M. DATE 12/3/1998
CHECKED BY DATE
COST/SCHED-AREA
SCALE 1 in. = 120 ft.

Tetra Tech NUS, Inc.

TEST PIT AND SURFACE SOIL SAMPLE LOCATION MAP
AREA B – SUSPECTED SITE 7
FORMER NAWC
WARMINSTER, PENNSYLVANIA

CONTRACT NO. N62472-90-D-1298
OWNER NO. CTO 0252
APPROVED BY DATE
APPROVED BY DATE
DRAWING NO. FIGURE 4-2
REV. 0

FORM CADD NO. L:\ACAD14\BLOCKS\BORDERS\TtNUS_BH3.DWG

ug/kgJ and toluene at 1 ug/kgJ, was located at the eastern end of EPIC Feature TR6. A test pit (see subsurface soils Section 4.2) was excavated in this area and no subsurface contamination was identified.

Tables 4-2 and 4-3 present the occurrence and distribution of the surface soil samples collected as part of the Phase III RI investigation in this area. No pesticide, semivolatile, PCB, or elevated metals concentrations were identified in these samples. The analytical results were compared to residential risked-based screening criteria (see Tables 4-2 and 4-3) and background levels to determine if further evaluation was warranted. As shown on these tables, no chemical concentrations exceeded the residential criteria; therefore, no further evaluation or risk assessment for this area was conducted.

4.2 SUBSURFACE SOILS

A total of 86 subsurface samples were collected outside the removal areas. All samples were analyzed according to EPA CLP protocol. All samples were analyzed for TCL VOCs and TAL metals; 72 were also analyzed for TCL SVOCs and PCBs, and 11 were analyzed for pesticides. One sample, S6-TP29W3, contained TCE (56 µg/kg). This sample was collected from the southern end of feature TR4 and consisted of a yellow-gray material encountered at 8 feet below ground surface. Four other samples were collected from this area. None contained TCE. PCE was detected in two subsurface samples. Sample S6-SB1805 contained 28 µg/kg of PCE. This sample was collected from the northwestern end of feature TR11. The sample was collected from 5 feet below ground surface and consisted of a red clay-like material. A sample of the soil immediately below this sample (SS-SB1807) did not contain PCE. The only other positive identification of PCE was in sample S6-SB3605. This sample, collected at 5 feet below ground from the northern end of a suspected trench in the western side of the site, contained an estimated concentration of 4 µg/kg.

Benzo(a)pyrene and Aroclor 1254 (PCBs) were the only other organic contaminants found in excess of recreational RBCs in any of the samples. Benzo(a)pyrene was identified at 2,900 µg/kg and 2,800 µg/kg in samples TP-29W3 and SB-4002, respectively. These samples were collected from opposite sides of the site (southern portion of TR4 and the northwestern end of TR12) and do not show any pattern. One sample, TP-29W3, contained the PCB Aroclor 1254 (4,200 µg/kg) above the RBC. Table 4-4 presents the range of positive detections and the background concentrations for comparison. Figure 4-3 illustrates the occurrence and distribution of analytical

TABLE 4-2
OCCURRENCE DISTRIBUTION AND A COMPARISON TO SOIL CRITERIA FOR INORGANICS IN SURFACE SOIL AT SUSPECTED SITE 7
FORMER NAWC WARMINSTER
(mg/kg)

	BACKGROUND			SITE-RELATED			SOIL CRITERIA	SOIL CRITERIA	RC EXCEEDS
SUBSTANCE	FREQUENCY OF DETECTION	RANGE OF POSITIVE DETECTION	REPRESENTATIVE CONCENTRATION	FREQUENCY OF DETECTION	RANGE OF POSITIVE DETECTION*	REPRESENTATIVE CONCENTRATION	PENNSYLVANIA (MG/KG)	FEDERAL (MG/KG)	ANY SOIL CRITERIA
ALUMINUM	31 / 31	4780 - 18100	15282	10 / 10	5540 - 17400	15387	220000	78000	NO
ARSENIC	27 / 31	0.28 - 12.1	10.50	10 / 10	1.4 - 6.8	5.54	12	0.4	NO
BARIUM	27 / 29	34.1 - 225	74.12	10 / 10	22.7 - 74.2	57.52	15000	5500	NO
BERYLLIUM	27 / 31	0.31 - 1.7	0.90	10 / 10	0.3 - 0.89	0.83	4.2	0.1	NO
CALCIUM	25 / 29	240 - 1910	773	10 / 10	428 - 980	857.79	-	-	NA
CHROMIUM	31 / 31	7.9 - 35.3	21.59	10 / 10	7.4 - 26.6	24.97	220000	78000	NO
COBALT	27 / 30	1.6 - 22.1	10.32	10 / 10	1.6 - 12.9	11.93	13000	4700	NO
COPPER	29 / 31	3.6 - 30.6	13.56	10 / 10	2.2 - 12.6	12.6	8100	3100	NO
CYANIDE	0 / 21	-	-	1 / 10	5.9	2.09	4400	1600	NO
IRON	31 / 31	6980 - 410500	54527	10 / 10	7850 - 25700	24886	66000	23000	NO
LEAD	31 / 31	1.6 - 96.5	16.69	10 / 10	5.1 - 14.9	11.37	500	400	NO
MAGNESIUM	27 / 31	518 - 4960	2472	9 / 9	711 - 2800	2800	-	-	NA
MANGANESE	31 / 31	30.9 - 2010	527.88	10 / 10	19.7 - 503	503	10000	390	NO
NICKEL	20 / 27	4.1 - 21.7	14.40	10 / 10	3.3 - 14	13.55	4400	1600	NO
POTASSIUM	27 / 29	89.1 - 3050	886	10 / 10	165 - 1080	1076	-	-	NA
THALLIUM	3 / 31	0.37 - 0.42	-	1 / 10	1.2	0.70	18	6.3	NO
VANADIUM	31 / 31	15.4 - 45	33.01	10 / 10	13.7 - 39.3	37.87	13	550	NO
ZINC	27 / 29	9 - 60	31.34	9 / 9	13.9 - 36.4	34.936083	66000	23000	NO

* = QUALIFIERS FOR DATA ARE PRESENTED IN DATA PRESENTATION TABLES

TABLE 4-3
OCCURRENCE DISTRIBUTION AND A COMPARISON TO SOIL CRITERIA FOR ORGANICS IN SURFACE SOIL AT SUSPECTED SITE 7
FORMER NAWC WARMINSTER
(mg/kg)

SUBSTANCE	BACKGROUND			SITE-RELATED			SOIL CRITERIA PENNSYLVANIA (UG/KG)	SOIL CRITERIA FEDERAL (UG/KG)	RC EXCEEDS ANY SOIL CRITERIA
	FREQUENCY OF DETECTION	RANGE OF POSITIVE DETECTION	REPRESENTATIVE CONCENTRATION	FREQUENCY OF DETECTION	RANGE OF POSITIVE DETECTION*	REPRESENTATIVE CONCENTRATION			
TETRACHLOROETHENE	0 / 20	-	-	1 / 10	2	2	340000	12000	NO
TOLUENE	3 / 20	2	-	1 / 10	1	1	44000000	16000000	NO
TRICHLOROETHENE	0 / 20	-	-	9 / 10	3 - 34	14.91	440000	58000	NO

* = QUALIFIERS FOR DATA ARE PRESENTED IN DATA PRESENTATION TABLES

TABLE 4-4
OCCURRENCE AND DISTRIBUTION OF ORGANICS AND INORGANICS IN SITEWIDE SUBSURFACE SOILS, SITES 6 and 7
NAWC WARMINSTER, PENNSYLVANIA

	Background Data					Site-Related Data					
Substance	Freq. of Detection	Range of Positive Detection Min.	Range of Positive Detection Max.	Mean of All Data	Sampling Round and Location of Maximum	Freq. of Detection	Range of Positive Detection Min.	Range of Positive Detection Max.	Mean of All Data	Sampling Round and Location of Maximum	Representative Concentration
aluminum	31/31	4780	18100	13400	BG-12	86/86	1970	251000	15000	S6-TP-COMP	15600
antimony	1/22	13.6	13.6	3.75	BG-16	22/86	2.6	164	7.26	S6-TP08-01	7.16
arsenic	27/31	0.28	12.1	3.88	BG-11	83/86	0.86	80.7	10.9	S6-TP02-01	12.6
barium	27/29	34.1	225	61.6	BG-28	83/86	12.6	922	113	S6-TP02-01	130
beryllium	27/31	0.31	1.7	0.806	BG-31	81/86	0.23	4.6	0.898	S6-SB-4005	0.99
cadmium	0/31	-			NA	31/85	0.41	152	13.2	S6-TP-29-07	23.5
calcium	25/29	240	1910	664	BG-24	83/86	340	145000	17200	S6-TP-33-W1	27400
chromium	31/31	7.9	35.3	19.4	BG-12	85/86	4.4	46800	1650	S6-TP-29-W3	2280
cobalt	27/30	1.6	22.1	8.9	BG-31	83/86	1.8	146	16.7	S6-TP-29-W3	18.3
copper	29/31	3.6	30.6	11.8	BG-29	83/86	2.9	14300	330	S6-TP-COMP	230
iron	31/31	6980	410500	33100	BG-30	86/86	4130	264000	46800	S6-TP-35-07	51000
lead	31/31	1.6	96.5	11.7	BG-13	85/86	3.1	39300	595	S6-TP02-01	130
magnesium	27/31	518	4960	1980	BG-24	84/86	456	77000	3930	S6-TP-33-W1	3650
manganese	31/31	30.9	2010	424	BG-28	86/86	65	1320	517	S6-SB-1805	592
mercury	1/28	0.37	0.37	0.0436	BG-23	32/86	0.06	5.6	0.624	S6-SB-2104	0.818
nickel	20/27	4.1	21.7	10.5	BG-31	86/86	2.9	345	25.8	S6-TP02-01	27.1
potassium	27/29	89.1	3050	706	BG-24	80/86	138	8740	722	S6-TP-29-W3	808
selenium	0/20	-			NA	4/86	0.83	5	2.17	S6-TP02-01	2.84
silver	0/17	-			NA	62/86	0.63	368	45.8	S6-TP-36-09	111
sodium	5/20	55.2	86.7	102	BG-25	73/85	44.6	740	117	S6-TP02-01	130
thallium	3/31	0.37	0.42	0.378	BG-31	40/86	3.7	89.1	10.9	S6-SB-3804	19.6
vanadium	31/31	15.4	45	29.7	BG-12	82/86	6.3	73	26.2	S6-SB12-02	40.8
zinc	27/29	9	60	27.7	BG-13	83/86	9.1	78600	1150	S6-TP-29-W3	370
4,4'-DDE	1/21	820	820	41	BG-12	1/11	3.725	3.725	2.27	S6-TP14-02	2.61
4,4'-DDT	1/21	1440	1440	70.5	BG-12	2/11	4.8	10.2	3.11	S6-TP14-02	4.42
alpha-chlordane	0/21	-			NA	1/11	8.4	8.4	1.7	S6-TP02-01	2.46
Aroclor-1242	0/21	-			NA	1/72	21	21	37.2	S6-TP18-02	21

TABLE 4-4
OCCURRENCE AND DISTRIBUTION OF ORGANICS AND INORGANICS IN SITEWIDE SUBSURFACE SOILD, SITES 6 AND 7
NAWC WARMINSTER, PENNSYLVANIA
PAGE 2 OF 3

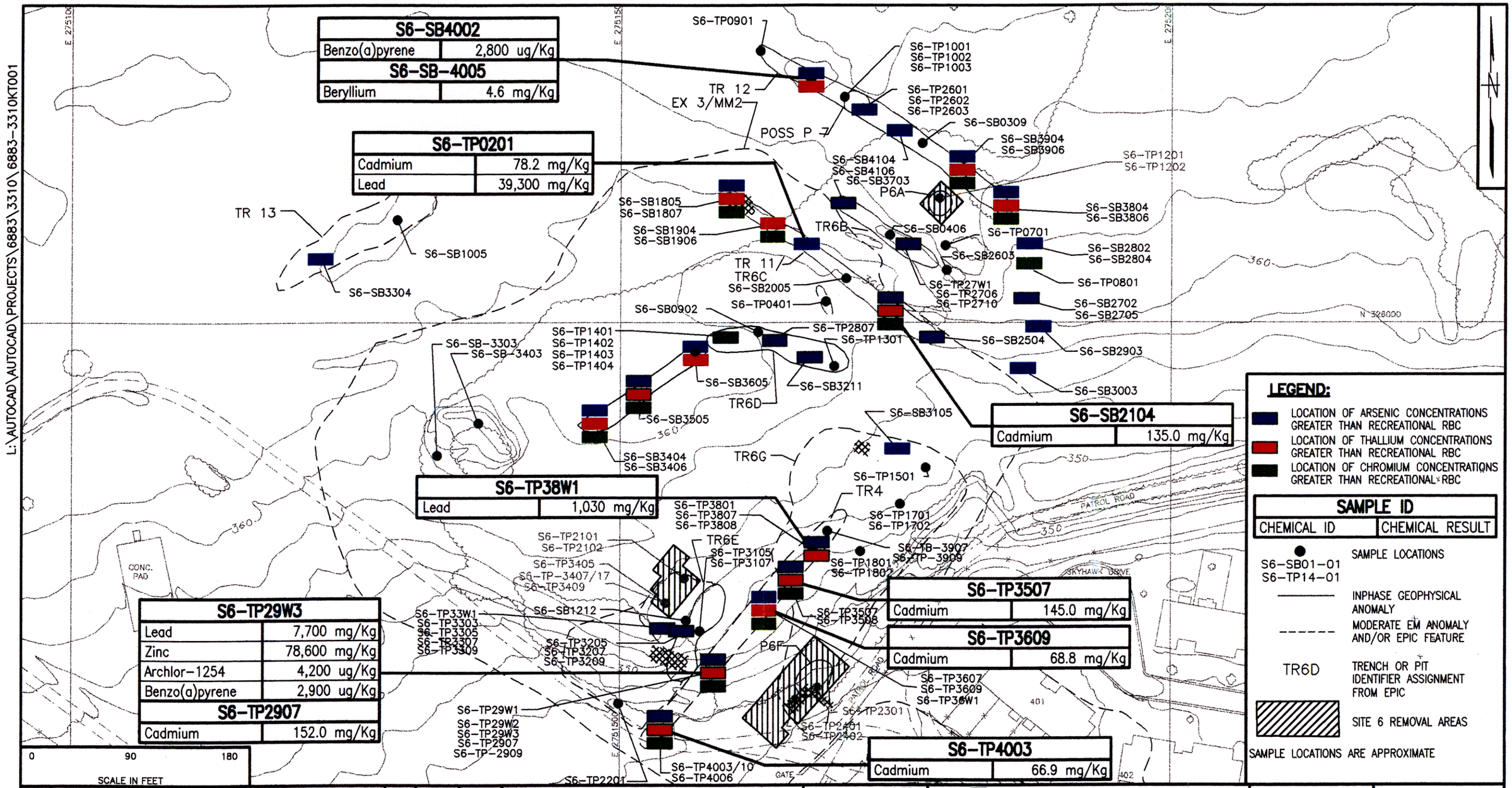
	Background Data					Site-Related Data				
Substance	Freq. of Detection	Range of Positive Detection Min.	Range of Positive Detection Max.	Mean of All Data	Sampling Round and Location of Maximum	Freq. of Detection	Range of Positive Detection Min.	Range of Positive Detection Max.	Mean of All Data	Sampling Round and Location of Maximum	Representative Concentration
Aroclor-1248	0/21	-			NA	2/73	75	710	47.1	S6-TP-36-09	44.6
Aroclor-1254	1/21	51	51	38.6	BG-13	25/72	7.2	4200	180	S6-TP-29-W3	146
Aroclor-1260	0/21	-			NA	27/73	9	5100	221	S6-TP-29-W3	190
dieldrin	0/21	-			NA	1/10	6.1	6.1	2.41	S6-TP02-01	3.05
gamma-chlordane	0/21	-			NA	1/11	9.2	9.2	1.77	S6-TP02-01	2.6
methoxychlor	0/21	-			NA	1/11	14	14	11.2	S6-TP14-02	12.4
1,2,4-trimethylbenzene	0/0	-				1/62	170	170	6.62	S6-TP-29-W3	5.07
1,3,5-trimethylbenzene	0/0	-				1/62	120	120	5.81	S6-TP-29-W3	4.89
1,3-dichlorobenzene	0/11	-			NA	1/72	8	8	31.7	S6-TP-38-W1	8
2,4-dimethylphenol	0/11	-			NA	1/72	1100	1100	234	S6-TP-29-W3	243
2-methylnaphthalene	0/11	-			NA	1/72	50	50	237	S6-TP18-02	50
4-methylphenol	0/11	-			NA	1/72	6300	6300	307	S6-TP-29-W3	276
acenaphthene	0/11	-			NA	2/72	45	49	235	S6-SB-4002	49
acenaphthylene	0/11	-			NA	3/72	48	89	233	S6-SB-4104	89
anthracene	0/11	-			NA	5/72	79	340	239	S6-SB-4104	250
benz(a)anthracene	0/11	-			NA	25/72	33	1500	245	S6-SB-4002	282
benzo(a)pyrene	0/11	-			NA	25/72	42	2800	268	S6-SB-4002	291
benzo(b)fluoranthene	1/11	58	58	185	BG-13	16/72	82	4100	336	S6-SB-4002	340
benzo(g,h,i)perylene	0/11	-			NA	16/72	43	330	222	S6-TP-33-W1	245
benzo(k)fluoranthene	1/11	46	46	184	BG-13	13/72	87	1600	282	S6-SB-4002	300
bis(2-ethylhexyl)phthalate	1/11	50	50	154	BG-16	17/55	39	5400	372	S6-SB-3904	395
butylbenzylphthalate	0/11	-			NA	3/72	55	70	231	S6-SB-3804	70
chrysene	1/11	51	51	185	BG-13	27/72	33	1600	237	S6-SB-4002	271
di-n-butylphthalate	0/11	-			NA	13/72	29	16000	413	S6-TP-29-W3	295
dibenz(a,h)anthracene	0/11	-			NA	4/72	63	220	234	S6-SB-4002	220
fluoranthene	1/11	92	92	188	BG-13	29/72	35	1800	263	S6-SB-4002	298
fluorene	0/11	-			NA	1/72	50	50	237	S6-TP-33-W1	50

TABLE 4-4
OCCURRENCE AND DISTRIBUTION OF ORGANICS AND INORGANICS IN SITEWIDE SUBSURFACE SOILD, SITES 6 AND 7
NAWC WARMINSTER, PENNSYLVANIA

	Background Data					Site-Related Data				
Substance	Freq. of Detection	Range of Positive Detection Min.	Range of Positive Detection Max.	Mean of All Data	Sampling Round and Location of Maximum	Freq. of Detection	Range of Positive Detection Min.	Range of Positive Detection Max.	Mean of All Data	Sampling Round and Location of Maximum	Representative Concentration
indeno(1,2,3-cd)pyrene	0/11	-			NA	14/72	46	1200	239	S6-SB-4002	259
phenanthrene	1/11	51	51	185	BG-13	17/72	43	620	225	S6-TP-33-W1	254
phenol	0/11	-			NA	1/72	5300	5300	291	S6-TP-29-W3	270
pyrene	1/11	100	100	189	BG-13	28/72	35	2000	303	S6-SB-4002	339
2-butanone	0/20	-			NA	3/85	18	52	32.5	S6-TP-36-09	38.2
acetone	4/19	8	12	46	BG-24	17/84	22	330	39.6	S6-TP-36-09	70.9
carbon disulfide	0/20	-			NA	2/85	2	3	4.73	S6-TP-36-09	3
ethylbenzene	0/20	-			NA	1/85	36	36	4.96	S6-TP-29-W3	5.07
n-butylbenzene	0/0	-				1/62	1	1	4.2	S6-TP-31-05	1
p-isopropyltoluene	0/0	-				1/62	3	3	4.23	S6-SB-1807	3
sec-butylbenzene	0/0	-				1/62	0.9	0.9	4.2	S6-SB-1807	0.9
tetrachloroethene	0/20	-			NA	2/85	4	28	4.58	S6-SB-1805	4.81
toluene	3/20	2	2	42.7	BG-17	3/85	1	3	4.72	S6-TP-36-09	3
trichloroethene	0/20	-			NA	1/85	56	56	5.19	S6-TP-29-W3	5.19
xylene (total)	0/20	-			NA	3/85	2	620	11.8	S6-TP-29-W3	6.14

Notes:

Units are mg/kg for inorganics, ug/kg for organics.
Number of sample results excludes rejected data or blank-qualified data. Duplicates are consolidated into one result.
Mean of all data includes positive detections and non-detected results. Detection limits are divided by two.
The determination of representative concentrations is based on comparison of maximum to the 95 % UCL, which is presented in a separate table.
Frequency of detection refers to number of times compound was detected among all samples versus total number of samples.
Number of samples may vary based on the number of usable results.



NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

DRAWN BY A.S.M. DATE 12/2/1998
CHECKED BY DATE
COST/SCHED-AREA
SCALE 1 in. = 90 ft.

Tetra Tech NUS, Inc.

ANALYTICAL RESULTS
SUBSURFACE SOIL SAMPLES
AREA B - SITES 6 & 7
FORMER NAWC WARMINSTER
WARMINSTER, PENNSYLVANIA

CONTRACT NO. N62472-90-D-1298
OWNER NO. CTO 0252
APPROVED BY DATE
APPROVED BY DATE
DRAWING NO. FIGURE 4-3
REV. 0

FORM CADD NO. L:\ACAD14\BLOCKS\BORDERS\TtNUS_BH3.DWG

results in excess of the recreational RBCs. Section 5.0 details the methodology and selection process for establishing RBCs and evaluates the risks associated with the contaminant levels.

Arsenic was the most frequent contaminant detected in subsurface samples at Sites 6 and 7. Thirty-nine of the 86 analyzed samples contained arsenic concentrations in excess of the recreational RBC (8.4 mg/kg). Because of the large number of samples exceeding the RBC, individual concentrations are not shown on Figure 4-3. The sample locations where concentrations exceeded the RBC have been highlighted to illustrate the areal extent of arsenic throughout the site.

Arsenic concentrations in excess of the RBC ranged from 8.5 mg/kg (TP-3607) to 80.7 mg/kg (TP-0201). The maximum background concentration reported was 12.1 mg/kg and the recreational RBC, as defined in Section 5.0, is 8.4 mg/kg. Table 4-5 presents arsenic concentrations in excess of the RBC identified in site-related samples, in descending order of concentration. As can be seen, 20 of the samples contained arsenic concentrations below the maximum background concentration. Little discernible pattern of contamination can be identified in the location or distribution of the containment levels. However, four of the highest concentrations were from samples collected from a layer of oxidized-looking course sludge-like material encountered 7 to 9 feet below ground surface in feature TR4 (TP-29W3, TP-2907, TP-3609, and TP-3507).

Chromium was also identified in a significant number (16) of samples at concentrations greater than the recreational RBC (631 mg/kg). Figure 4-1 illustrates the locations where chromium concentrations exceeded the RBC. Table 4-6 provides a listing, in descending order of concentration, of chromium concentrations in excess of the recreational RBC. As detailed in Section 5.0, the recreational RBC was established assuming the presence of hexavalent chromium, the less common and more toxic form of chromium, because no selective analysis to determine the form of chromium was performed.

As with arsenic, little contamination pattern is apparent from the distribution of chromium concentrations identified at Sites 6 and 7. However, three of the four highest concentrations were identified in the same samples from TR4 that exhibited the highest arsenic concentrations (TP-29W3, TP-2907, and TP-3609).

TABLE 4-5

SUBSURFACE ARSENIC CONCENTRATIONS IN EXCESS OF RECREATIONAL RBC

SITES 6 AND 7 - NAWC WARMINSTER, PENNSYLVANIA

Sample Location	Arsenic Concentration
TP-0201	80.7
SB-1805	68
SB-4005	37.9
TP-29W3	35.5
TP-2907	28.3
TP-3609	25.3
SB-3904	24.5
TP-3507	23.5
TP-4003	19.8
SB-3804	19.4
SB-2903	16.5
SB-3404	16.5
TP-4006	14.8
TP-3303	14.3
TP-29W2	13.9
TP-3207	13.8
SB-2504	13.8
TP-2807	12.7
SB-2802	12.4
SB-3003	12.1
SB-3406	11.9
TP-3508	11.7
SB-2104	11.4
SB-3211	11
SB-3806	10.9
SB-3505	10.2
SB-2702	10
SB-4002	10
SB-2705	9.9
TP-38W1	9.9
TP-29W1	9.7
SB-4104	9.6
SB-3304	9.3
SB-3605	9.1
SB-2603	9.1
SB-3703	9
TP-2706	8.8
SB-3105	8.7
TP-3607	8.5

TABLE 4-6

SUBSURFACE CHROMIUM CONCENTRATIONS IN EXCESS OF RECREATIONAL RBC

SITES 6 AND 7 - NAWC WARMINSTER, PENNSYLANVIA

Sample Location	Chromium Concentration
TP-29W3	46,800
SB-1805	22,900
TP-2907	12,400
TP-3609	8,490
TP-0801	7,140
SB-3904	6,910
SB-3804	5,840
SB-2104	5,690
SB-1904	5,540
SB-3404	3,900
TP-3507	3,410
TP-4003	2,680
SB-3505	2,300
TP-4006	2,080
SB-3605	1,720
TP-29W2	945

Thallium was also present in a significant number (16) of samples at concentrations in excess of the recreational RBC (10.1 mg/kg). Figure 4-3 presents the locations of these samples, and Table 4-7 presents the analytical results for each sample in descending order of concentration.

As with the arsenic and chromium, thallium concentrations in excess of the RBC appear to be widespread throughout the site. Two of the highest concentrations are from samples collected from the southeastern end of feature TR12 (SB-3804, SB-3904). Other high-level concentrations were noted in samples from features TR11 (SB-2104 and SB-1805) and TR4 (TP-3609). These sampling locations also exhibited relatively high concentrations of arsenic and chromium (see Tables 4-5 and 4-6).

Other contaminants exceeding recreational RBCs are shown on Figure 4-3, along with the sample concentration. As can be seen, cadmium was the next most widespread contaminant identified in excess of the recreational RBC (63.1 mg/kg). The majority of cadmium concentrations in excess of the RBC are in the samples that contained the maximum arsenic, chromium, and thallium concentrations. One of these samples, TP-29W3, also contained the only significant PCB (-1254; 4,300 µg/kg) and zinc (78,600 mg/kg) concentrations and notable lead (7,700 mg/kg) and benzo(a)pyrene (2,900 µg/kg) concentrations.

As indicated above, the distribution of any individual contaminant within Sites 6 and 7 does not present a strong pattern of contamination. However, when the patterns of individual contaminants are viewed in combination, a pattern does appear (see Figure 4-3). The most significant arsenic, chromium, thallium, and cadmium concentrations appear to be co-located in three general areas consisting of the southeastern end of feature TR12, the northwestern portion of feature TR11, and the central portion of TR4. This latter area also contained the most significant levels of other contaminants present in Sites 6 and 7.

Because of this apparent pattern of contamination, a further review of contaminant levels was performed to identify potential areas of greater risk that may warrant separate evaluation and risk assessment. These areas have been designated as risk zones 1, 2, and 3 and are presented in Figure 4-4. Tables 4-8, 4-9, and 4-10 present the occurrence and distribution of contaminants for each of these zones, respectively. In general, the samples that contained the high levels of contaminants were collected from depths that ranged from 4 to 9 feet below ground surface. The type of contaminant identified may be indicative of sludges produced in the treatment of industrial wastewaters produced from metal plating operations, as were reportedly disposed at Site 7.

TABLE 4-7

SUBSURFACE THALLIIUM CONCENTRATIONS IN EXCESS OF RECREATIONAL RBC

SITES 6 AND 7 - NAWC WARMINSTER, PENNSYLANVIA

Sample Location	Thallium Concentration
SB-3804	89.1
SB-3904	86
SB-2104	74.9
SB-1805	69.9
TP-3609	62.4
SB-3404	51.2
TP-3507	47.2
TP-2907	46.4
TP-4003	35.9
SB-1904	32.8
TP-20W3	31.9
SB-3505	30
SB-3605	21.9
TP-4006	21.9
SB-4005	16.8
TP-38W1	16.7

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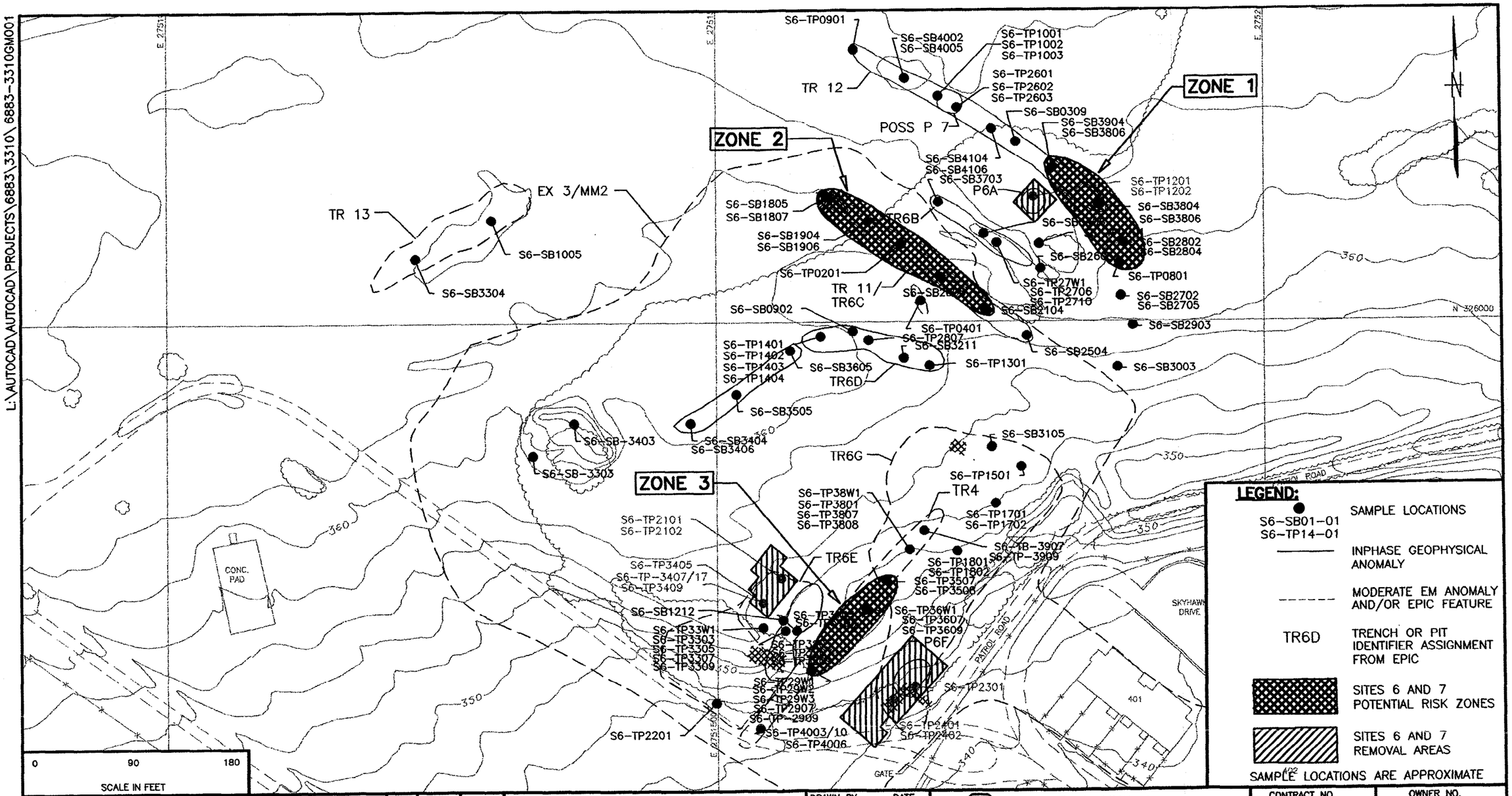

NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

DRAWN BY A.S.M. DATE 12-2-1998
CHECKED BY DATE
COST/SCHED-AREA
SCALE 1 in. = 90 ft.

Tetra Tech NUS, Inc.

POTENTIAL RISK ZONES
AREA B – SITES 6 & 7
FORMER NAWC WARMINSTER
WARMINSTER, PENNSYLVANIA

CONTRACT NO. N62472-90-D-1298
OWNER NO. CTO 0252
APPROVED BY DATE
APPROVED BY DATE
DRAWING NO. **FIGURE 4-4**
REV. 0

FORM CADD NO. L:\ACAD14\BLOCKS\BORDERS\TtNUS_BH3.DWG

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TABLE 4-8
CURRENCE AND DISTIRBUTION OF ORGANICS AND INORGANICS IN HOT SPOT 2 SUBSURFACE SOILS, SITES 6 AN NAWC WARMINSTER, PENNSYLVANIA

	Background Data					Site-Related Data					
Substance	Freq. of Detection	Range of Positive Detection Min.	Range of Positive Detection Max.	Mean of All Data	Sampling Round and Location of Maximum	Freq. of Detection	Range of Positive Detection Min.	Range of Positive Detection Max.	Mean of All Data	Sampling Round and Location of Maximum	Representative Concentration
aluminum	31/31	4780	18100	13400	BG-12	7/7	3300	13600	7970	S6-SB-2802	10900
antimony	1/22	13.6	13.6	3.75	BG-16	3/7	6.4	164	26	S6-TP08-01	164
arsenic	27/31	0.28	12.1	3.88	BG-11	7/7	3.4	24.5	11.2	S6-SB-3904	17.3
barium	27/29	34.1	225	61.6	BG-28	7/7	24.8	384	154	S6-TP08-01	384
beryllium	27/31	0.31	1.7	0.806	BG-31	6/7	0.3	1.2	0.651	S6-SB-3909	1.2
cadmium	0/31	-			NA	3/7	32.5	42.4	16.3	S6-SB-3804	42.4
calcium	25/29	240	1910	664	BG-24	7/7	465	121000	50000	S6-SB-3904	121000
chromium	31/31	7.9	35.3	19.4	BG-12	7/7	8	7140	2890	S6-TP08-01	7140
cobalt	27/30	1.6	22.1	8.9	BG-31	7/7	8	52.4	26.8	S6-SB-3804	52.4
copper	29/31	3.6	30.6	11.8	BG-29	7/7	2.9	534	192	S6-TP08-01	534
iron	31/31	6980	410500	33100	BG-30	7/7	8310	232000	108000	S6-SB-3804	232000
lead	31/31	1.6	96.5	11.7	BG-13	7/7	3.3	128	49.2	S6-SB-3904	128
magnesium	27/31	518	4960	1980	BG-24	7/7	646	5770	2950	S6-SB-3904	4210
manganese	31/31	30.9	2010	424	BG-28	7/7	250	899	551	S6-SB-3904	899
mercury	1/28	0.37	0.37	0.0436	BG-23	3/7	2.1	5.2	1.52	S6-TP08-01	5.2
nickel	20/27	4.1	21.7	10.5	BG-31	7/7	8	113	44.6	S6-SB-3804	113
potassium	27/29	89.1	3050	706	BG-24	5/7	207	778	383	S6-SB-3909	778
silver	0/17	-			NA	6/7	0.79	330	138	S6-TP08-01	330
sodium	5/20	55.2	86.7	102	BG-25	6/7	89.8	198	118	S6-SB-3904	158
thallium	3/31	0.37	0.42	0.378	BG-31	4/7	3.7	89.1	27.6	S6-SB-3804	89.1
vanadium	31/31	15.4	45	29.7	BG-12	6/7	11.3	38.8	18.3	S6-SB-3806	28.8
zinc	27/29	9	60	27.7	BG-13	7/7	13.1	377	160	S6-SB-3804	377
Aroclor-1260	0/21	-			NA	3/6	13	1400	429	S6-SB-3904	1400
benz(a)anthracene	0/11	-			NA	2/6	91	180	178	S6-SB-3804	180
benzo(a)pyrene	0/11	-			NA	2/6	110	210	186	S6-SB-3804	210
benzo(g,h,i)perylen	0/11	-			NA	1/6	300	300	238	S6-SB-3804	300

TABLE 4-8
OCCURRENCE AND DISTRIBUTION OF ORGANICS AND INORGANICS IN HOT SPOT 1 SUBSURFACE SOILS, SITES 6 AND 7
NAWC WARMINSTER, PENNSYLVANIA
PAGE 2 OF 2

	Background Data					Site-Related Data					
Substance	Freq. of Detection	Range of Positive Detection Min.	Range of Positive Detection Max.	Mean of All Data	Sampling Round and Location of Maximum	Freq. of Detection	Range of Positive Detection Min.	Range of Positive Detection Max.	Mean of All Data	Sampling Round and Location of Maximum	Representative Concentration
bis(2-ethylhexyl)ph	1/11	50	50	154	BG-16	2/6	1500	5400	1280	S6-SB-3904	5400
butylbenzylphthala	0/11	-			NA	1/6	70	70	200	S6-SB-3804	70
chrysene	1/11	51	51	185	BG-13	2/6	170	190	193	S6-SB-3804	190
fluoranthene	1/11	92	92	188	BG-13	2/6	79	120	166	S6-SB-3804	120
indeno(1,2,3-cd)py	0/11	-			NA	1/6	110	110	207	S6-SB-3804	110
pyrene	1/11	100	100	189	BG-13	2/6	130	290	203	S6-SB-3804	261
acetone	4/19	8	12	46	BG-24	1/7	22	22	28.6	S6-SB-3904	22

Notes:

Units are mg/kg for inorganics, ug/kg for organics.
Number of sample results excludes rejected data or blank-qualified data. Duplicates are consolidated into one result.
Mean of all data includes positive detections and non-detected results. Detection limits are divided by two.
The determination of representative concentrations is based on comparison of maximum to the 95 % UCL, which is presented in a separate table.
Frequency of detection refers to number of times compound was detected among all samples versus total number of samples.
Number of samples may vary based on the number of usable results.

TABLE 4-9
OCCURRENCE AND DISTRIBUTION OF ORGANICS AND INORGANICS IN HOT SPOT 2 SUBSURFACE SOILS, SITES 6 AND 7
NAWC WARMINSTER, PENNSYLVANIA

	Background Data					Site-Related Data					
Substance	Freq. of Detection	Range of Positive Detection Min.	Range of Positive Detection Max.	Mean of All Data	Sampling Round and Location of Maximum	Freq. of Detection	Range of Positive Detection Min.	Range of Positive Detection Max.	Mean of All Data	Sampling Round and Location of Maximum	Representative Concentration
aluminum	31/31	4780	18100	13400	BG-12	7/7	4100	41400	13400	S6-TP02-01	38600
antimony	1/22	13.6	13.6	3.75	BG-16	3/7	8.4	68	14.5	S6-SB-1805	68
arsenic	27/31	0.28	12.1	3.88	BG-11	7/7	5.2	80.7	24.6	S6-TP02-01	80.7
barium	27/29	34.1	225	61.6	BG-28	7/7	27.4	922	240	S6-TP02-01	922
beryllium	27/31	0.31	1.7	0.806	BG-31	7/7	0.38	1.1	0.729	S6-SB-1807	0.946
cadmium	0/31	-			NA	4/7	48.5	135	45.4	S6-SB-2104	82.5
calcium	25/29	240	1910	664	BG-24	7/7	675	123000	43300	S6-SB-1805	80600
chromium	31/31	7.9	35.3	19.4	BG-12	7/7	9.2	22900	4910	S6-SB-1805	22900
cobalt	27/30	1.6	22.1	8.9	BG-31	7/7	8	63.4	27.7	S6-SB-2104	63.4
copper	29/31	3.6	30.6	11.8	BG-29	7/7	10.4	1880	458	S6-TP02-01	1880
iron	31/31	6980	410500	33100	BG-30	7/7	11700	261000	104000	S6-SB-1805	261000
lead	31/31	1.6	96.5	11.7	BG-13	7/7	3.8	39300	5670	S6-TP02-01	39300
magnesium	27/31	518	4960	1980	BG-24	7/7	723	4060	2650	S6-TP02-01	3530
manganese	31/31	30.9	2010	424	BG-28	7/7	227	1320	747	S6-SB-1805	1010
mercury	1/28	0.37	0.37	0.0436	BG-23	4/7	1.4	5.6	2	S6-SB-2104	3.62
nickel	20/27	4.1	21.7	10.5	BG-31	7/7	9.1	345	89.4	S6-TP02-01	345
potassium	27/29	89.1	3050	706	BG-24	6/7	324	1550	642	S6-TP02-01	1340
selenium	0/20	-			NA	1/7	5	5	3.76	S6-TP02-01	5
silver	0/17	-			NA	7/7	0.65	308	127	S6-SB-2104	220
sodium	5/20	55.2	86.7	102	BG-25	7/7	98.4	740	228	S6-TP02-01	532
thallium	3/31	0.37	0.42	0.378	BG-31	4/7	6.7	74.9	26.9	S6-SB-2104	74.9
vanadium	31/31	15.4	45	29.7	BG-12	6/7	16.6	36.8	21	S6-SB-1807	29.1
zinc	27/29	9	60	27.7	BG-13	7/7	18.7	3800	766	S6-TP02-01	3800
alpha-chlordane	0/21	-			NA	1/1	8.4	8.4	8.4	S6-TP02-01	8.4
Aroclor-1254	1/21	51	51	38.6	BG-13	3/7	61	750	220	S6-SB-1805	750
Aroclor-1260	0/21	-			NA	2/7	440	760	193	S6-SB-2104	760
dieldrin	0/21	-			NA	1/1	6.1	6.1	6.1	S6-TP02-01	6.1

TABLE 4-9
OCCURRENCE AND DISTRIBUTION OF ORGANICS AN INORGANICS IN HOT SPOT 2 SUBSURFACE SOILS, SITE 6 AND 7
NAWC WARMINSTER, PENNSYLANIVA
PAGE 2 OF 2

	Background Data					Site-Related Data					
Substance	Freq. of Detection	Range of Positive Detection Min.	Range of Positive Detection Max.	Mean of All Data	Sampling Round and Location of Maximum	Freq. of Detection	Range of Positive Detection Min.	Range of Positive Detection Max.	Mean of All Data	Sampling Round and Location of Maximum	Representative Concentration
gamma-chlordane	0/21	-			NA	1/1	9.2	9.2	9.2	S6-TP02-01	9.2
benz(a)anthracene	0/11	-			NA	1/6	120	120	272	S6-SB-2104	120
benzo(a)pyrene	0/11	-			NA	2/6	140	150	200	S6-SB-2104	150
benzo(b)fluoranthene	1/11	58	58	185	BG-13	1/6	140	140	275	S6-SB-2104	140
benzo(g,h,i)perylene	0/11	-			NA	1/6	90	90	267	S6-SB-2104	90
benzo(k)fluoranthene	1/11	46	46	184	BG-13	1/6	480	480	332	S6-SB-2104	480
bis(2-ethylhexyl)phthalate	1/11	50	50	154	BG-16	3/6	60	870	273	S6-SB-1805	870
chrysene	1/11	51	51	185	BG-13	1/6	120	120	272	S6-SB-2104	120
di-n-butylphthalate	0/11	-			NA	4/6	42	370	182	S6-SB-1805	370
fluoranthene	1/11	92	92	188	BG-13	1/6	210	210	287	S6-SB-2104	210
indeno(1,2,3-cd)pyrene	0/11	-			NA	1/6	82	82	265	S6-SB-2104	82
phenanthrene	1/11	51	51	185	BG-13	1/6	98	98	268	S6-SB-2104	98
pyrene	1/11	100	100	189	BG-13	1/6	210	210	287	S6-SB-2104	210
acetone	4/19	8	12	46	BG-24	1/7	98	98	96.6	S6-SB-1904	98
p-isopropyltoluene	0/0	-				1/6	3	3	10.2	S6-SB-1807	3
sec-butylbenzene	0/0	-				1/6	0.9	0.9	9.82	S6-SB-1807	0.9
tetrachloroethene	0/20	-			NA	1/7	28	28	7.86	S6-SB-1805	23.1
toluene	3/20	2	2	42.7	BG-17	1/7	2	2	9.79	S6-SB-2104	2

Notes:

Units are mg/kg for inorganics, ug/kg for organics.
Number of sample results excludes rejected data or blank-qualified data. Duplicates are consolidated into one result.
Mean of all data includes positive detections and non-detected results. Detection limits are divided by two.
The determination of representative concentrations is based on comparison of maximum to the 95 % UCL, which is presented in a separate table.
Frequency of detection refers to number of times compound was detected among all samples versus total number of samples.
Number of samples may vary based on the number of usable results.

TABLE 4-10
OCCURRENCE AND DISTRIBUTION OF ORGANICS AND INORGANICS IN HOT SPOT 3 SUBSURFACE SOILS, SITES 6 AND 7
NAWC WARMINSTER, PENNSYLVANIA

	Background Data					Site-Related Data					
Substance	Freq. of Detection	Range of Positive Detection Min.	Range of Positive Detection Max.	Mean of All Data	Sampling Round and Location of Maximum	Freq. of Detection	Range of Positive Detection Min.	Range of Positive Detection Max.	Mean of All Data	Sampling Round and Location of Maximum	Representative Concentration
aluminum	31/31	4780	18100	13400	BG-12	9/9	3360	28400	9460	S6-TP-29-W2	17600
antimony	1/22	13.6	13.6	3.75	BG-16	4/9	9.6	48.3	11.9	S6-TP-29-W3	48.3
arsenic	27/31	0.28	12.1	3.88	BG-11	9/9	5.9	35.5	18	S6-TP-29-W3	31.9
barium	27/29	34.1	225	61.6	BG-28	9/9	41.3	536	218	S6-TP-36-09	536
beryllium	27/31	0.31	1.7	0.806	BG-31	9/9	0.35	1.2	0.71	S6-TP-35-08	0.885
cadmium	0/31	-			NA	8/9	0.64	152	48.5	S6-TP-29-07	152
calcium	25/29	240	1910	664	BG-24	9/9	1490	79600	26400	S6-TP-36-09	79600
chromium	31/31	7.9	35.3	19.4	BG-12	9/9	15.8	46800	8050	S6-TP-29-W3	46800
cobalt	27/30	1.6	22.1	8.9	BG-31	9/9	6.6	146	41.7	S6-TP-29-W3	146
copper	29/31	3.6	30.6	11.8	BG-29	9/9	8.3	920	211	S6-TP-29-W2	920
iron	31/31	6980	410500	33100	BG-30	9/9	15000	264000	100000	S6-TP-35-07	264000
lead	31/31	1.6	96.5	11.7	BG-13	9/9	9.8	7700	926	S6-TP-29-W3	7700
magnesium	27/31	518	4960	1980	BG-24	9/9	1100	4970	2300	S6-TP-36-07	3340
manganese	31/31	30.9	2010	424	BG-28	9/9	259	1160	722	S6-TP-35-07	1120
mercury	1/28	0.37	0.37	0.0436	BG-23	7/9	0.2	3.4	1.22	S6-TP-36-09	3.4
nickel	20/27	4.1	21.7	10.5	BG-31	9/9	8.3	66.2	29.9	S6-TP-29-07	66.2
potassium	27/29	89.1	3050	706	BG-24	8/9	197	8740	1350	S6-TP-29-W3	4910
silver	0/17	-			NA	9/9	1.1	368	132	S6-TP-36-09	368
sodium	5/20	55.2	86.7	102	BG-25	9/9	96.8	405	144	S6-TP-29-W3	203
thallium	3/31	0.37	0.42	0.378	BG-31	6/9	4.7	62.4	23	S6-TP-36-09	62.4
vanadium	31/31	15.4	45	29.7	BG-12	7/9	18.6	32.3	19	S6-TP-29-W1	26.2
zinc	27/29	9	60	27.7	BG-13	9/9	35.2	78600	9020	S6-TP-29-W3	78600
Aroclor-1248	0/21	-			NA	2/9	75	710	164	S6-TP-36-09	710
Aroclor-1254	1/21	51	51	38.6	BG-13	4/8	91	4200	797	S6-TP-29-W3	4200
Aroclor-1260	0/21	-			NA	5/9	13	5100	808	S6-TP-29-W3	5100
1,2,4-trimethylbenzene	0/0	-				1/9	170	170	22.1	S6-TP-29-W3	79.8
1,3,5-trimethylbenzene	0/0	-				1/9	120	120	16.5	S6-TP-29-W3	50.4

TABLE 4-10
OCCURRENCE AND DISTRIBUTION OF ORGANICS AND INORGANICS IN HOT SPOT 3 SUBSURFACE SOILS, SITES 6 AND 7
NAWC WARMINSTER, PENNSYLVANIA
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	Background Data					Site-Related Data				
Substance	Freq. of Detection	Range of Positive Detection Min.	Range of Positive Detection Max.	Mean of All Data	Sampling Round and Location of Maximum	Freq. of Detection	Range of Positive Detection Min.	Range of Positive Detection Max.	Mean of All Data	Sampling Round and Location of Maximum	Representative Concentration
2,4-dimethylphenol	0/11	-			NA	1/9	1100	1100	333	S6-TP-29-W3	508
4-methylphenol	0/11	-			NA	1/9	6300	6300	911	S6-TP-29-W3	2480
benz(a)anthracene	0/11	-			NA	4/9	42	120	293	S6-TP-35-07	120
benzo(a)pyrene	0/11	-			NA	5/9	42	140	269	S6-TP-35-07	140
benzo(b)fluoranthene	1/11	58	58	185	BG-13	1/9	150	150	359	S6-TP-35-07	150
benzo(g,h,i)perylene	0/11	-			NA	1/9	89	89	353	S6-TP-35-07	89
benzo(k)fluoranthene	1/11	46	46	184	BG-13	1/9	470	470	395	S6-TP-35-07	470
bis(2-ethylhexyl)phthalate	1/11	50	50	154	BG-16	4/5	39	310	389	S6-TP-36-09	310
chrysene	1/11	51	51	185	BG-13	6/9	51	320	147	S6-TP-29-W3	276
di-n-butylphthalate	0/11	-			NA	4/9	48	16000	1920	S6-TP-29-W3	16000
fluoranthene	1/11	92	92	188	BG-13	7/9	46	360	164	S6-TP-29-W3	295
indeno(1,2,3-cd)pyrene	0/11	-			NA	1/9	87	87	352	S6-TP-35-07	87
phenanthrene	1/11	51	51	185	BG-13	4/9	62	540	227	S6-TP-29-W3	429
phenol	0/11	-			NA	1/9	5300	5300	800	S6-TP-29-W3	2030
pyrene	1/11	100	100	189	BG-13	6/9	38	230	282	S6-TP-35-07	230
2-butanone	0/20	-			NA	3/9	18	52	53	S6-TP-36-09	52
acetone	4/19	8	12	46	BG-24	4/9	36	330	107	S6-TP-36-09	307
carbon disulfide	0/20	-			NA	1/9	3	3	5.39	S6-TP-36-09	3
ethylbenzene	0/20	-			NA	1/9	36	36	7.17	S6-TP-29-W3	13.9
toluene	3/20	2	2	42.7	BG-17	2/9	1	3	5.17	S6-TP-36-09	3
trichloroethene	0/20	-			NA	1/9	56	56	9.39	S6-TP-29-W3	21.2
xylene (total)	0/20	-			NA	2/9	2	620	71.7	S6-TP-29-W3	620

TABLE 4-10
OCCURRENCE AND DISTRIBUTION OF ORGANICS AND INORGANICS IN HOT SPOT 3 SUBSURFACE SOILS, SITES 6 AND 7
NAWC WARMINSTER, PENNSYLVANIA
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Notes:

Units are mg/kg for inorganics, ug/kg for organics.
Number of sample results excludes rejected data or blank-qualified data. Duplicates are consolidated into one result.
Mean of all data includes positive detections and non-detected results. Detection limits are divided by two.
The determination of representative concentrations is based on comparison of maximum to the 95 % UCL, which is presented in a separate table.
Frequency of detection refers to number of times compound was detected among all samples versus total number of samples.
Number of samples may vary based on the number of usable results.

A total of eight subsurface soil samples were collected during test pitting operations performed in the area south and southeast of Site 6/7 as part of the Phase III RI. These samples were analyzed for VOCs only. No positive detection of any compound was identified (see Appendix B.) Only native soils or clean fill were encountered in all four test pits. This is consistent with the findings of previous investigations. When exploratory borings and test pits were advanced throughout this area no waste were found and no contamination was identified, therefore, no further evaluation or risk assessment was performed for this area.

4.3 GROUNDWATER

Groundwater was not investigated as part of this RI. Area B groundwater has been studied under several investigations and is the focus of an ongoing RI. Sites 6 and 7 are located within Area B and monitoring wells are located both up- and down-gradient of the area of concern. Figure 4-1 presents the locations of monitoring wells within Area B and shows the relationship of Site 6 and 7 to these wells.

Groundwater, in general, flows southward through the study area. As can be seen in Figure 4-1, numerous monitoring wells are located within, upgradient, and downgradient of Sites 6 and 7. Historical data from numerous sampling events, including quarterly and semi-annual sampling and area-specific studies (HNUS Draft Area B Hydrogeology Report, 1995; TtNUS Summary Report for Tenth Round Perimeter Monitoring, September 1998; U.S. Navy Record of Decision OU1, 1993), have identified volatile organic contamination within Area B. The most recent round of sampling performed in Area B was a comprehensive round of groundwater sampling and water-level measurements conducted on all Area B monitoring wells (TtNUS Summary Report Area B Comprehensive Round of Groundwater Sampling, November 1998). The results of this sampling confirmed the presence of trace to low levels of VOCs throughout Area B. The source of the VOC contamination is unknown or undefined at this time.

The 1998 comprehensive groundwater sampling of Area B included the collection and analysis of samples for metals. The results of this sampling are presented in the referenced November 1998 Summary Report. The analytical results indicated that metals are not of concern in Area B groundwater. With the exception of one sample collected within the Navy enlisted housing area that contained lead, no metals in excess of federal Maximum Contaminant Levels (MCLs) or Drinking Water Health Advisory Levels were identified within Area B.

The surface and subsurface sample results for Sites 6/7 were reviewed and compared to PADEP guidelines for the protection of groundwater. Eight of the 141 samples collected contained contaminants above these groundwater protection criteria. The only contaminants identified above groundwater protection levels were cadmium (samples TP-36-09, TP29-07, TP-35-07, TP-02-01, SB-21-04, and TP-40-03), lead (samples TP-29-W3, TP-02-01, and TP-38-W1), and Silver (sample TP-36-09). Four of these samples were collected from within Zone 3 and two were from within Zone 2 (see Figure 4-4).

Considering the low frequency of exceedences of the soil to groundwater protection levels (8 out of 141 samples) and the lack of groundwater contamination with these metals, Sites 6/7 do not appear to be a source of groundwater contamination. Further studies and investigations of Area B groundwater are ongoing and will be assessed in a separate focused RI report.

5.0 HHRA FOR NAWC WARMINSTER SITES 6 AND 7

The human health risk assessment (HHRA) for NAWC Warminster Sites 6 and 7 is presented in this section. This section is divided into Methods for the Human Health Risk Assessment (5.1), Data Evaluation (5.2), Toxicity Assessment (5.3), Exposure Assessment (5.4), Risk Characterization (5.5), Uncertainty Analysis (5.6), and Conclusions (5.7). Section 5.1 presents the methodology for doing the HHRA, and Sections 5.2 through 5.7 present the actual results of the HHRA at NAWC Warminster Sites 6 and 7.

5.1 METHODS FOR THE HUMAN HEALTH RISK ASSESSMENT APPROACH

The objectives of the risk assessment for Sites 6 and 7 were to estimate the actual or potential risks to human health resulting from the presence of contamination in surface soil and subsurface soil and to provide the basis for determining the need for remedial measures for these media. A risk assessment will be performed for Sites 6 and 7 only. The lack of contamination and evidence of a site or release at the other suspected locations within the study area do not support the need for a risk assessment. Three major aspects of chemical contamination must be considered when assessing public health risks: contaminants with toxic characteristics must be found in environmental media and must be released by either natural processes or by human action; potential exposure points must exist either at the source or via migration pathways if exposure occurs at a remote location other than the source; and human or environmental receptors must be present at the point of exposure. Risk is a function of both toxicity and exposure; without any one of the three factors listed above, there is no risk.

In order to estimate the potential for human health risk attributable to NAWC Warminster Sites 6 and 7, information regarding the toxicity of the compounds detected in the various media, the distribution of contamination, potential migration pathways, and a site-specific estimate of chemical intake via assumed exposure routes were combined. The risk assessment processes were in accordance with current EPA risk assessment guidance (see EPA references at end of document) and were performed according to methods established by NORTHDIV and EPA Region III.

The human health risk assessment consists of five sections: Data Evaluation, Toxicity Assessment, Exposure Assessment, Risk Characterization, and Uncertainty Analysis. Each section is briefly discussed below.

Data Evaluation (Sections 5.1.1 and 5.2) is primarily concerned with distributional analysis of the data, background comparison tests, identification of chemicals of potential concern (COPCs), and

representative concentrations. COPCs selected in this section are representative of the type expected for potential human health exposure. Distributional analysis of the data, contaminant concentrations relative to background levels, contaminant release and environmental transport mechanisms, exposure routes, and toxicity were all considered in order to develop a list of COPCs used to define the site-associated risks.

The Toxicity Assessment (Sections 5.1.2 and 5.3) presents available reference doses, cancer slope factors, EPA weight of evidence, adjustment of the dose-response parameters, and relative potencies for polycyclic aromatic hydrocarbons (PAHs). Quantitative toxicity indices, where available, are presented in this section, including any applicable regulatory standards and criteria.

The Exposure Assessment (Sections 5.1.3 and 5.4) identifies potential human health exposure, including a characterization of the site setting, selection of potential receptors, selection of exposure routes by medium, a presentation of a site-conceptual model, derivation of exposure estimates for each pathway, and a special explanation of the blood-lead modeling. This section identifies potential pathways of COPC migration, selected potential receptors, and the estimated intakes of COPCs for the identified receptors.

Risk Characterization (Sections 5.1.4 and 5.5) presents the approaches for determining carcinogenic risks, noncarcinogenic risks, and lead risks. The risk characterization evaluates the potential for adverse health effects from exposure to COPC concentrations in environmental media by integrating information developed during the toxicity and exposure assessments.

The Uncertainty Analysis (Sections 5.1.5 and 5.6) is a discussion of the general uncertainties associated with the HHRA.

5.1.1 Methods for Data Evaluation

This section presents the approaches for distributional analysis of the data, background comparison tests, identification of COPCs, representative concentrations, and special notes concerning chromium concentrations.

5.1.1.1 Distributional Analysis of the Data

Statistical analyses discussed in this section adhere to the guidance referenced in several EPA and related publications (1989a, 1989b, 1992a, 1992b, and 1996a). Before representative concentrations (Section 5.1.1.4) could be estimated for each site, the underlying statistical distribution of data was determined for

each chemical in each medium. The Shapiro-Wilk W test or the Shapiro-Francia Test (EPA, 1992a) were performed to determine if the data set of chemical concentrations matches the shape of a normal or lognormal distribution. [The latter test is required if there are greater than 50 samples (EPA, 1992a, 1996a).] Normally distributed data exhibit a characteristic "bell-shape" curve that is symmetrical, whereas lognormal data have a skewed shape (more results at the high-concentration tail). For each chemical in each medium at a site, the W test was performed once using the original data and once after data were converted to their logarithms. A five percent level of significance was used to determine if the data deviate from either hypothesized distribution. If the W test indicated a normal distribution, then the estimation of the reasonable maximum exposure point concentration (using the upper 95th percentile, as discussed in the next section) was based upon a normal distribution and standard deviation. If taking the logarithms of the data provided a better match to the data than a normal distribution, a lognormal transformation of data was used before the upper 95th percentile concentrations were computed. In most cases, the distribution of data fit one of the above two categories. If neither distribution matched well, the default assumption of an underlying lognormal distribution was followed (EPA, 1989a).

5.1.1.2 Background Comparison Tests

To determine if results of samples from each site were elevated relative to background sample results, an array of statistical tests were performed. The name of each test, the statistical question answered by the test, the assumptions required to run the test, and the criteria used by each test to judge whether site data are greater than background are delineated in the headings and footnotes to each background comparison table presented in the site-specific sections. These statistical procedures include three quantitative tests that look for overall differences between the entire populations of site and background data values; four quantitative tests that essentially look for hot spots; and two qualitative tests that examine only the frequency of detection (proportion of detected versus non-detected values in site versus background) but not the magnitude of values.

Each statistical test was run using a decision-making probability level (P-level) of 0.05, which means that, in situations where the test conclusion states that site-related results are greater than background, the chance of the test yielding a false conclusion caused by random variations in the data set is five percent or less. The overall conclusion (whether site results are greater than background) was assumed to be "yes" if any one of the quantitative tests concluded that site data are elevated above background. If no conclusion could be reached for any of the quantitative tests (e.g., if the assumptions necessary to run each of the various tests were not valid), then the overall decision was based on the conclusions of the qualitative tests alone. Further information regarding each statistical test is presented below:

- The means of the two data sets were compared if both site and background matched the same type of distribution (normal or lognormal). If the site and background data exhibited equal standard deviations (based upon Bartlett's test for equal variances), then the student's t-test was applied; otherwise, Satterthwaite's t-test was performed to see if the site mean is greater than the background mean. The t-test is valid only if at least 85 percent of site data and 85 percent of background data are positive detects, there are at least three sampling points in each data set, and the pooled standard deviation is not zero.

- Nonparametric statistical tests, which do not require underlying assumptions regarding equal data distributions, were also applied in each case. The Mann-Whitney U-test was used to determine whether the site and background data are from populations with identical medians and rank distributions. The Mann-Whitney test involves combining the two data sets, ranking results from smallest to largest, and evaluating whether the two sites have a similar distribution of data within the range of low to high ranks. If more than 40 percent nondetected results are present in either the site or the background data set or when multiple levels of detection limits are present, a different statistically valid test, Gehan's test, was substituted because recent guidance (EPA, 1992b) indicates that the Mann-Whitney test is not valid in the aforementioned situations. (Gehan's test is statistically equivalent to the Mann-Whitney Test if all results are positive.) For either of these tests to work, not all data points can be tied and there must be at least two background data points. The Mann-Whitney U test and the Gehan test statistics were computed using appropriate score adjustments for tied values and a normal approximation when sufficient data points were available; whereas, an exact computation of probabilities was used in the situations where there were very few (for example, less than eight) data points.

- A 95 percent upper tolerance limit (UTL) test was applied to determine whether the maximum concentration detected in an area of interest was a hot spot of a magnitude exceeding 95 percent of the background population. The 95 percent UTL is defined as the calculated upper limit that, on the average, is expected to include 95 percent of the background population. If the background data were determined to match the shape of a normal or lognormal population, then the limit was calculated using the t-distribution and the appropriate normal or log-transformed mean and standard deviation from the background data set. For this test to be valid, the background data set was required to be comprised of at least 85 percent detects and at least three data points.

- A substitute procedure for the 95 percent UTL, called the 95 percent quantile test, was employed to test for hot spots if the background data were not in the shape of a lognormal or a normal population. For the quantile test to be valid, at least 19 background data points were required, no detection limit could be greater than the UTL, and at least 10 percent of the data points must be detects in the background data set.

- The upper ranks test (EPA, 1992b, 1996a) is another hot spot test. This test combines the site and background data into one set and determines whether the major portion of a subset of the largest detected results is comprised chiefly of site data rather than an equal mixture of site and background. In this procedure, the probability is calculated that k or more samples from the largest r data points in the combined data set are comprised of site data, assuming that the site and background populations are equal. In the event that there is less than a five percent chance that this could happen if the populations are indeed the same, then the test concludes that there is a hot spot comprised of k samples from the area of interest.

- In the event that none of the above quantitative statistical tests yielded a definite "yes" or "no" decision, a test of proportions was used to determine if the percentage of positively detected results was greater in the site data versus the background data. When only a very small portion of results are detected (less than 10 percent), this test is recommended (EPA, 1996a, 1989b). The test is routinely applied using a normal distribution approximation to the probability that site is above background but is not considered valid when fewer than five samples are detected in either site or background. To reach a confident decision regarding VOCs in surface water, a generalized version of the test of proportions, called the Fisher Exact Test, was required (Brownlee, 1965). This test can be applied to all situations because it calculates the exact probability for all combinations of possible outcomes and gives a probability level for the condition where the observed frequency of site detects is greater than background, given the number of samples involved.

- As recommended (EPA, 1996a, 1992a, 1989b), quantitative statistical tests were preceded by data analysis to evaluate the distributional shape for both positive and nondetected data, of which quantile plots or tables are one recommended (and efficient) approach. This data analysis is required because multiple detection limits bias or invalidate the conclusions of common statistical tests. For each chemical in each risk group, a quantile (percentile) range evaluation was required to compare the number and

magnitude of site and background nondetects. In particular, some of the above tests do not tolerate any non-detects above a certain magnitude or portion of the total. In the case of the Mann-Whitney test, careful quantitative evaluation was used to determine if the site and background populations exhibited the same distributional spread of non-detected results and whether to instead use the more robust Gehan test. For the Gehan test to be valid, the only requirement was that the method of data censoring could not be significantly different for site versus background, a condition that rendered somewhat unreliable the usability of background tests for the combined routine and low detection limit mercury data comparisons due to different proportions of low detection limit data among the site and background populations.

5.1.1.3 Identification of Chemicals of Potential Concern (COPCs)

COPC selection is based on various aspects of chemical concentration, distribution, and toxicity. Chemicals are selected to represent site contamination and will provide the framework for the quantitative risk assessment.

Inorganic and organic samples were collected from the NAWC Warminster Sites 6 and 7 in surface and subsurface soil media. The positively detected chemicals for each site are compared to background levels and presented in occurrence and distribution and background tables in site-specific Nature and Extent of Contamination sections. COPC selection is based on these tables and the following rules (EPA, 1993):

- Screen COPCs in surface and subsurface soils against risk-based concentration (RBC) criteria (EPA, 1993). Two types of RBC are used in this HHRA, recreational and residential. Residential RBCs were developed by Region III EPA. Residential RBCs are chemical-specific benchmark criteria that represent the calculated concentration for a given contaminant that might produce a cancer risk of 1E-06 or a noncarcinogenic hazard index (HI) of 1.0, given exposure to soil by residential receptors and assuming the EPA default values for upper range (RME) intake (e.g., 200 mg soil ingestion per day for a residential child). Recreational RBCs were developed using the same approach as EPA's residential RBCs; however, they were developed given exposure to soil by recreational receptors. Using the RBC screening approach, a chemical was eliminated from consideration as a COPC at a site if the maximum detected concentration was less than the RBC screening value or if site concentrations were not significantly greater than background (inorganics only). The COPC selection process for surface and subsurface soils is as follows:

Inorganics - Compare the maximum concentration detected in surface soil and subsurface soil to the recreational and residential soil RBCs determined at a risk level of 1 x 10^{-6} or a HQ of 0.1 and compare site concentration to background concentration in order to determine if the area of interest is significantly greater than background. If both criteria are met, the chemical is selected as a COPC.

Organics - Compare the maximum concentration detected in surface soil and subsurface soil to the recreational and residential soil RBCs determined at a risk level of 1 x 10^{-6} or an HQ of 0.1. All chemicals exceeding RBCs were selected as COPCs.

- The essential nutrients, including calcium, chlorine, iodine, magnesium, phosphorus, potassium, and sodium, were eliminated as COPCs if they were not present at high concentrations at a site (EPA, 1989a; EPA, 1995a).
- Lead will be evaluated as a COPC based on a derived screening levels for residential soil. Per EPA Region III directive, a value of 400 mg/kg [Office of Solid Waste and Emergency Response (OSWER) Directive, EPA, 1994a] will be used as the residential soil screening RBC.

5.1.1.4 Representative Concentrations

The risk assessment for NAWC Warminster Sites 6 and 7 will be performed using a representative concentration for each COPC in each medium identified at the particular site of interest. Current and historic concentrations of detected chemicals at each site medium will be evaluated. Usability of results is discussed below. The representative concentration was calculated using the latest risk assessment guidance from EPA (EPA, 1989a).

The validated data will be used to calculate representative concentrations. For chemicals with at least one positive detection, the corresponding non-detects will be assumed to be one-half the detection limit (sample quantitation limit). Rejected values (R) and blank qualified results (B) will be eliminated from further consideration. Estimated and biased values (J, K, L) will be used as the reported value.

Duplicate samples will be averaged together and considered as one result. For duplicates, where one result is positive and the other result is a non-detect, the problem of calculating an average result arises whenever half the detection limit exceeds the positive result. In these situations, the positive result will be used to represent the non-detect.

The calculation of the representative concentration is a two-step process. First, the distribution of the data must be determined, as discussed in the preceding section. Then, based on the distribution of the data, a representative concentration is either calculated or selected.

Several important points are associated with distribution of the data:

- The distribution of a data set is determined using a Shapiro-Wilk test.
- The distributions are classified as either lognormal, normal, or unknown.
- Environmental data are usually determined to be lognormally distributed (default).
- If the data are not determined to be either a lognormal or normal distribution, they are classified as an unknown distribution and a lognormal distribution is assumed.

For data that are considered to be lognormally distributed, the standard deviation of the log-transformed sample set must be determined, as follows:

$$S = \sqrt{\Sigma\left(\frac{\left(X_i - \mu\right)^2}{n-1}\right)}$$

where:

S = Standard deviation of the log-transformed data

X_i = Individual sample value (log-transformed)

μ = Arithmetic mean of the log-transformed n samples

n = Number of samples

Calculation of the one-sided upper 95 percent confidence limit (UCL_{LOG}) is shown on the following page.

$$UCL_{LOG} = e^{\left[\mu + 0.5s^2 + \left(\frac{sH}{\sqrt{n-1}}\right)\right]}$$

where:

e	=	constant (base of the natural log, equal to 2.718)
μ	=	Arithmetic mean of the log-transformed data
H	=	H-statistic (e.g., from table published in Gilbert, 1987)
S	=	Standard deviation of the log-transformed data
n	=	Number of samples

If the data are determined to be normally distributed, then the standard deviation of the sample set is used to calculate the one-sided 95 percent UCL, as follows:

First, the standard deviation of the sample set must be determined:

$$S = \sqrt{\sum\left(\frac{(X_i - \mu)^2}{n-1}\right)}$$

where:

S	=	Standard deviation of the data
X_i	=	Individual sample value
μ	=	Arithmetic mean of the n samples
n	=	Number of samples

The one-sided upper 95 percent confidence limit (UCL_{NOR}) is then calculated as follows:

$$UCL_{NOR} = \mu + \frac{(t * S)}{\sqrt{n}}$$

where:

S	=	Standard deviation of the data
t	=	One-sided t distribution factor
μ	=	Arithmetic mean of the n samples
n	=	Number of samples

For small sample sets or sample sets in which all positive results equal less than one-half the detection limit, the UCL can exceed the maximum detected concentration. In these cases, the maximum concentration will be selected as the representative concentration. The maximum positive value is frequently the default choice when a lognormal distribution (having a higher upper confidence limit from the distributional shape) is used.

5.1.1.5 Special Note Concerning Chromium Concentrations

Chromium data were considered to be the hexavalent chromium (VI) form as opposed to the trivalent form (chromium III) because no speciation data were available. Hexavalent chromium is considered the more toxic form; therefore, assuming all chromium is hexavalent is a conservative approach.

5.1.2 Methods for Toxicity Assessment

The purpose of this section is to identify the potential health hazards associated with exposure to each of the COPCs. A toxicological evaluation characterizes the inherent toxicity of a compound. The literature indicates that the COPCs have the potential to cause carcinogenic and/or noncarcinogenic health effects in humans. Although the COPCs may cause adverse health effects, dose-response relationships and the potential for exposure must be evaluated before the risks to receptors can be determined. Dose-response relationships correlate the magnitude of the intake with the probability of toxic effects, as discussed below. Toxicity information for the COPCs at Sites 6 and 7 is presented in Table 5-1 and Appendix D of this report in the form of toxicological profiles.

An important component of the risk assessment process is the relationship between the intake of a compound (the amount of a chemical that is absorbed by a receptor) and the potential for adverse health effects resulting from exposure to that dose. Dose-response relationships provide a means by which potential public health impacts can be quantified. The published information of doses and responses is used in conjunction with information on the nature and magnitude of human exposure to develop an estimate of potential health risks.

Reference doses (RfDs) and slope factors (SFs) have been developed by EPA (1997a, 1995a) and other sources for many organics and inorganics. This section provides a brief description of these parameters.

5.1.2.1 Reference Doses (RfDs)

The RfD is developed by EPA for chronic and/or subchronic human exposure to hazardous chemicals and is based solely on the noncarcinogenic effects of chemical substances. The RfD is usually expressed as a dose (mg) per unit body weight (kg) per unit time (day). It is generally derived by dividing a No-Observed-Adverse-Effect-Level (NOAEL) or a Lowest-Observed-Adverse-Effect-Level (LOAEL) by an

TABLE 5-1
DOSE-RESPONSE PARAMETERS - CHEMICALS OF POTENTIAL CONCERN
NAWC Warminster Sites 6 and 7, Pennsylvania

Chemical of Concern	Fraction of COPC Absorbed in the Gastrointestinal Tract (unitless)**	Toxicity Values						
		RfD*			SF			Weight of Evidence
		Oral* (mg/kg)/day		Dermal (mg/kg)/day	Oral* 1/(mg/kg)/day		Dermal 1/(mg/kg)/day	
Semivolatiles								
benz(a)anthracene	1.0				7.3E-01	E		B2
benzo(a)pyrene	1.0				7.3E+00	I		B2
benzo(b)flouranthene	1.0				7.3E-01	E		B2
dibenz(a,h)anthracene	1.0				7.3E+00	E		B2
indeno(1,2,3-cd)pyrene	1.0				7.3E-01	E		B2
Pesticides/PCBs								
Aroclor-1248	1.0				2.0E+00	I	1.78E+00	B2
Aroclor-1254	1.0	2.0E-05		2.0E-05	2.0E+00	I	1.78E+00	B2
Aroclor-1260	1.0				2.0E+00	I	1.78E+00	B2
Metals								
aluminum	0.27	1.0E+00	E	3.7E+00				
antimony	0.10	4.0E-04		4.0E-05				D
arsenic	0.95	3.0E-04		3.16E-04	1.5E+00		1.43E+00	A
barium	1.0	7.0E-02		7.0E-02				D
beryllium	0.01	5.0E-03		5.0E-01	4.3E+00		4.3E-02	B2
cadmium	0.05	5.0E-04	I	1.0E-02				
chromium	0.01	5.0E-03		5.0E-01				D
copper	0.6	4.0E-02	H	2.4E-02				D
iron	1.0	3.0E-01	E	3.0E-01				
lead	1.0							B2
manganese	1.0	1.4E-01		1.4E-01				
mercury	0.15	3.0E-04		4.5E-05				
nickel	0.1	2.0E-02		2.0E-03				D
silver	1.0	5.0E-03		5.0E-03				D
thallium	1.0	6.5E-05		6.50E-05				
vanadium	0.02	7.0E-03	H	3.50E-01				
zinc	1.0	3.0E-01		3.00E-01				D

No Value = No dose-response value is available for this chemical in this classification
* = All toxicity values are from Integrated Risk Information System (IRIS) unless otherwise noted
** = Modifying factor applied only to dermal RfDs and SFs, from ATSDR
H = Health Effects Assessment Summary Tables
A = HEAST Alternative
E = EPA-NCEA Regional Support provisional service
W = Withdrawn from IRIS or HEAST

appropriate uncertainty factor. NOAELs, etc. are determined from laboratory animal or epidemiological toxicity studies. The uncertainty factor is based on the extent and applicability of toxicity data to human exposure.

Uncertainty factors are generally applied as multiples of 10 to represent specific areas of uncertainty in the available data. A factor of 10 is used to account for variations in the general population (to protect sensitive subpopulations), extrapolation of test results from animals to humans (to account for interspecies variability), derivation of a NOAEL from a subchronic study (instead of a chronic study) for developing the RfD, and use of a LOAEL instead of a NOAEL. In addition, EPA reserves the use of a modifying factor of up to 10 for professional judgment of uncertainties in the database not already accounted for. The default value of the modifying factor is 1. The RfD incorporates the reliability of the evidence for chronic human health effects. Even if applicable human data exist, the RfD (as reduced by the uncertainty factor) still maintains a margin of safety so that chronic human health effects are not underestimated. Thus, the RfD is an acceptable guideline for evaluation of noncarcinogenic risk, although the associated uncertainties preclude its use for precise risk quantitation. RfDs for Sites 6 and 7 COPCs are provided in Table 5-1.

Noncarcinogenic risks for lead were not quantitated and compared to RfDs because EPA has implemented an approach to evaluating lead risks that goes beyond providing a single point estimate output. Instead, expected blood-lead increases were estimated, and a discussion of these results is presented in Section 5.5.

5.1.2.2 Cancer Slope Factors (SFs)

SFs are applicable for estimating the lifetime probability (assumed 70-year lifespan) of human receptors developing cancer as a result of exposure to known or potential carcinogens. This factor is generally reported in units of 1/(mg/kg/day) and is derived through an assumed low-dosage linear relationship of extrapolation from high to low dose responses determined from animal studies. The value used in reporting the slope factor is the upper 95 percent confidence limit. SFs for Sites 6 and 7 COPCs are provided in Table 5-1.

Carcinogenic risks for lead were not quantitated because no EPA consensus currently exists with respect to an inorganic lead SF. Instead, potential lead exposures were calculated using a biokinetic model to estimate expected blood-lead increases, and a discussion of these results is presented in Section 5.5.

5.1.2.3 EPA Weight-of-Evidence

The weight-of-evidence designations indicate the preponderance of evidence regarding carcinogenic effects in humans and animals. The categories are defined in Table 5-2 (EPA, 1992d).

5.1.2.4 Adjustment of Dose-Response Parameters

Risks associated with dermal exposures are evaluated using toxicity values that are specific to dermally absorbed doses. Most oral toxicity values are based on administered doses rather than absorbed doses (TCE being an important exception). Therefore, in accordance with Region III EPA (1995b) and EPA (1989a, Appendix A), the toxicity values based on administered doses were adjusted before they were used for evaluation of absorbed doses. Dermal RfDs and SFs are obtained from oral RfDs and SFs via the following relationships:

$$RfD_{Adjusted} = RfD_{Oral} * ABSEFF_{Oral}$$

$$SF_{Adjusted} = {SF_{Oral}}/{ABSEFF_{Oral}}$$

where:

$ABSEFF_{Oral}$ = Absorption Efficiency in the study that is the basis of the oral toxicity value.

The default ABSEFFs are designated by EPA Region III for selected compounds (EPA, 1995b) and are shown on Table 5-1.

5.1.2.5 Relative Potency Factors for PAHs

Carcinogenic PAHs are related by chemical structure. Only benzo(a)pyrene [B(a)P] has an EPA-published SF (EPA, 1997b). All other carcinogenic PAHs have SFs based on their potency relative to B(a)Ps, and these factors are published by EPA (1995a). Table 5-3 shows the relative potency factors [which are also commonly known as toxicity equivalence factors (TEFs)].

5.1.2.6 Special Note Concerning Chromium Concentrations

Chromium data were considered to be the hexavalent chromium (VI) form as opposed to the trivalent form (chromium III) because no speciation data were available. Hexavalent chromium is considered the more toxic form; therefore, assuming all chromium is hexavalent is a conservative approach.

TABLE 5-2
EPA Weight if Evidence Carcinogenic Classification
NAWC Warminster Sites 6 and 7

EPA Category	Description of Group	Description of Evidence
Group A	Human carcinogen	Sufficient evidence from epidemiologic studies to support a causal association between exposure and cancer
Group B1	Probable human Carcinogen	Limited evidence of carcinogenicity in humans from epidemiologic studies
Group B2	Probable human carcinogen	Sufficient evidence of carcinogenicity in animals; inadequate evidence of carcinogenicity in humans
Group C	Possible human carcinogen	Limited evidence of carcinogenicity in animals
Group D	Bot classified	Inadequate evidence of carcinogenicity in animals
Group E	No evidence of carcinogen	No evidence for carcinogenicity in at least two adequate animal tests or in both epidemiological and animal studies

TABLE 5-3
Relative Potency of Carcinogenic PAHs
NAWC Warminster Sites 6 and 7

Chemical	Related Potency Factor
Benz(a)anthracene	0.1
Benz(b)fluoranthene	0.1
Benz(k)fluoranthene	0.01
Benz(a)pyrene	1
Chrysene	0.001
Dibenz(a,h)anthracene	1
Indeno(1,2,3-cd)pyrene	0.1

5.1.3 Methods for Exposure Assessment

The purpose of this section is to evaluate the potential for human exposure to the chemicals detected in the environmental media at the NAWC Warminster Sites 6 and 7. This section characterizes the exposure setting and the potentially exposed populations, identifies actual or potential exposure routes, presents a general conceptual site model, and summarizes the methods used to generate exposure estimates. The nature and extent of contamination upon which the exposures are based are presented in a subsequent section of this report. To determine whether there is an actual or potential exposure, the most likely pathways of contaminant release and transport, as well as the human and environmental activity patterns, must be considered. A complete exposure pathway has three components: a source, a route of transport, and an exposure point for receptors. These components are addressed in this section.

5.1.3.1 Characterization of the Exposure Setting

A brief description of the facility, its setting, and its surroundings is provided in Sections 1.0 through 3.0 of this report. As indicated in these previous sections, the open land that contains Sites 6 and 7 has been selected for transfer by the Navy. The approved re-use plan for the property designates recreation as the targeted future use of this area.

5.1.3.2 Potential Receptors

The receptors chosen for NAWC Sites 6 and 7 are presented in this section. All the receptors listed below are applicable to every site because all selected media were sampled at each site.

Future exposure scenarios are as follows:

- Future Recreational Receptor - A future resident is a person who will participate in recreational activities at or near NAWC Warminster Sites 6 and 7 in a hypothetical future scenario. This receptor is identified as a child (from age 0 to 5 years) and as a youth (adolescent, age 6 to 16 years). This receptor is potentially exposed via ingestion of and dermal contact with COPCs in surface soil and subsurface soil (designated as futuresurface soil). Non-cancer risks are estimated separately for child versus youth, and cancer risks are considered to be cumulative (risks are summed over child and youth periods of exposure).

- Future Residential Receptor - A future resident is a person who will live in a residence at or near NAWC Warminster Sites 6 and 7 in a hypothetical future scenario. This receptor resides at a residence as a child (from age 0 to 6 years) and as an adult (for 24 years

exposure duration). This receptor is potentially exposed via ingestion of and dermal contact with COPCs in surface soil and subsurface soil (designated as future surface soil). Non-cancer risks are estimated separately for child versus adult, and cancer risks are considered cumulative (risks are summed over child and adult periods of exposure).

5.1.3.3 Exposure Routes by Medium

There are two environmental media at NAWC Warminster Sites 6 and 7 through which potential receptors (see previous section) can be either directly or indirectly exposed to site-related COPCs: surface soil and subsurface soil. Potential exposure routes include ingestion and dermal contact.

Surface Soil

Surface soil exposure routes include incidental ingestion and dermal contact. Both scenarios are based on COPC representative concentrations in surface soils. Both exposure routes will be evaluated using future recreational and residential receptors. These receptors were chosen because it is unknown whether NAWC Warminster Sites 6 and 7 (or a portion of it) might become a residential or recreational area in the future.

For surface soil, low levels of VOCs did not warrant full-scale modeling and an estimation of the exposure. VOCs were generally not detected in surface soil. Therefore, exposure to volatilized chemicals is expected to be negligible at NAWC Sites 6 and 7, and ingestion and dermal contact would contribute to the bulk of the risk.

Subsurface Soil

Because there is currently no direct contact with subsurface soil, only potential future incidental ingestion and dermal contact could be evaluated. Both exposure routes were evaluated using future recreational and residential receptors. The exposure scenarios for subsurface soil are based on the assumption that subsurface soil could eventually become surface soil if excavations, erosion, construction, or landscaping activities occurred. Exposure scenarios related to concentrations in subsurface soil are conservative based on this assumption.

5.1.3.4 Exposure Assessment and Designations of Surface versus Subsurface Soil and Individual Risk Area Analysis

Surface soil and subsurface soil will be evaluated for risk in the same way in this HHRA. Subsurface soil is assumed to become future surface soil at NAWC Warminster Sites 6 and 7. Current concentrations of

chemicals in subsurface soil are assumed to be the concentration of chemicals in future surface soil. Site-wide surface soil will be evaluated as an exposure pathway for both recreational and residential receptors. Site-wide subsurface soil will be evaluated as an exposure pathway for both recreational and residential receptors. Three potential risk areas (Zones 1, 2, and 3) were also identified and discussed in Section 2.0. These zones consist of subsurface soil samples only. The three zones will be evaluated as an exposure pathway for recreational receptors only. The three zones represent discrete exposure scenarios that are conservative in the respect that the recreational receptors will be exposed only to the specific area or zone during their exposure duration.

5.1.3.5 Conceptual Site Model

The conceptual site model for NAWC Warminster Site 6/7 incorporates information on the potential chemical sources, affected media, release mechanisms, routes of migration, and known or potential human receptors. The purpose of the conceptual site model is to provide a framework in which to identify potential exposure pathways occurring at the sites. Information provided on site characterization, chemical characterization, local land and water uses, and potential receptors is used to identify potential exposure pathways for the site. The general conceptual site model for NAWC Warminster Sites 6 and 7 is presented in Figure 5-1.

5.1.3.6 Exposure Estimates

The estimation methods and models used in this section are consistent with current EPA risk assessment guidance (EPA, 1989a; EPA, 1991d; EPA, 1996c). Exposure estimates associated with each exposure route are presented below. All exposure scenarios incorporate the representative concentrations in the estimation of intakes. One type of exposure scenario is considered in this HHRA, reasonable maximum exposure (RME). RME incorporates input parameters into the exposure scenarios that are protective of 90 or 95 percent of the population.

Noncarcinogenic risks are estimated using the concept of an average annual exposure. The intake incorporates terms describing the exposure time and/or frequency that represent the number of hours per day and the number of days per year that exposure occurs. This is used along with the "averaging time," which converts the daily exposure frequency and duration to an annual exposure by dividing by 365 days per year of exposure. Noncarcinogenic risks for some exposure routes (e.g., soil) are generally greater for children than for adults because of the much lower body weights of children and their similar or higher ingestion rates. Carcinogenic risks, on the other hand, are calculated as an incremental lifetime risk and, therefore, incorporate terms to represent the exposure duration (years) over the course of a lifetime (70 years).

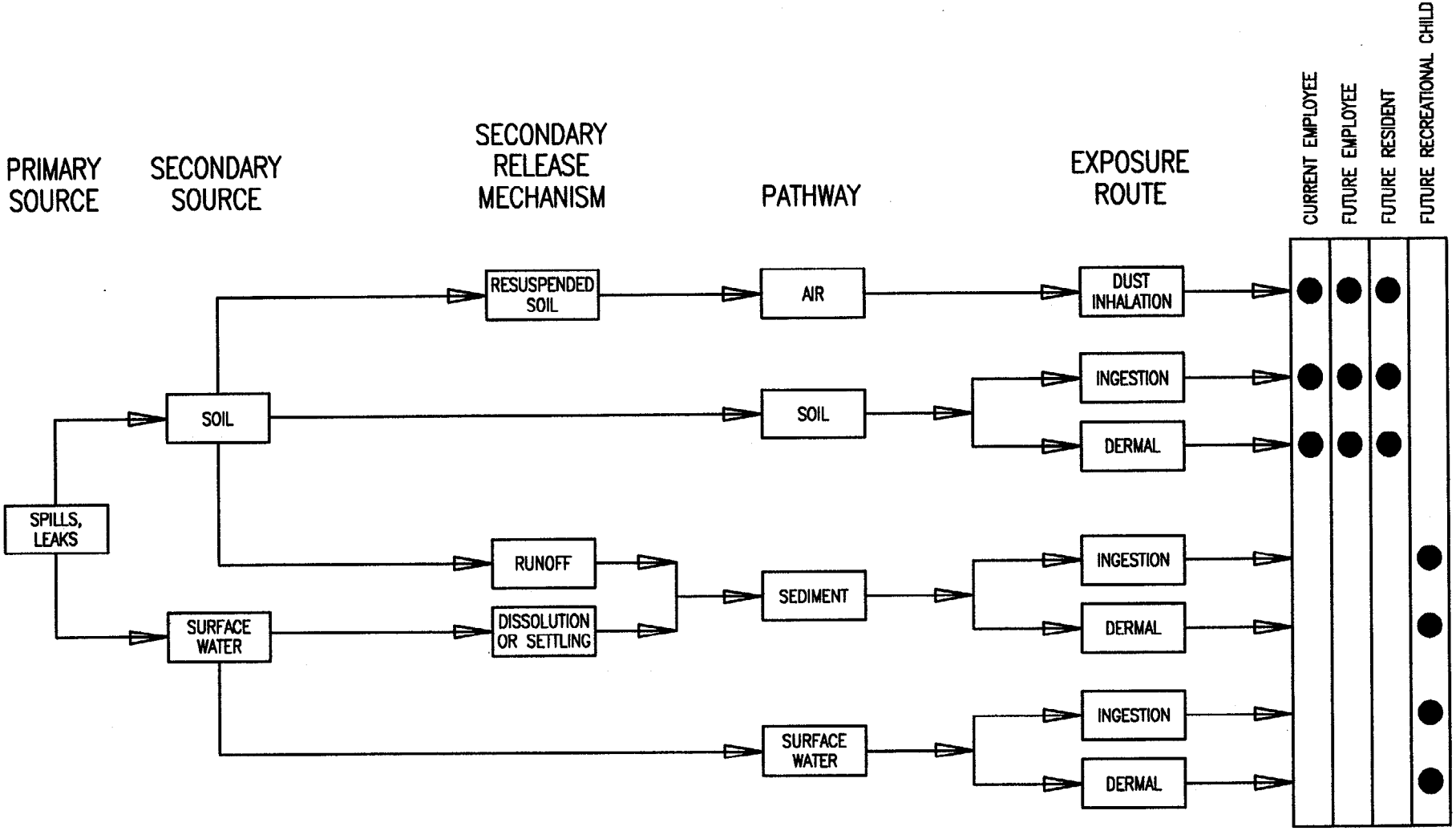

FIGURE 5-1 CONCEPTUAL SITE MODEL – HUMAN HEALTH RISK ASSESSMENT
FORMER NAWC WARMINSTER

Tetra Tech NUS, Inc.

L:\PROJECTS\6883\3310\6883-3310PF01

Soil Exposure

Two potential exposure routes are associated with direct exposure to surface and subsurface soil at NAWC Warminster Sites 6 and 7. These exposure routes include ingestion and dermal contact. The methods used to assess these routes of exposure are discussed in the following text.

Incidental soil ingestion, dermal contact, and inhalation of fugitive dust exposure are estimated from the following equations (EPA, 1989a):

Ingestion:

$$INTAKE_{INGESTION}(mg / kg) / day = \frac{CS * IR_{soil} * FI * CF_1 * EF * ED}{BW * AT * 365 \, {}^{days}/_{year}}$$

Dermal Contact:

$$INTAKE_{DERMAL}(mg / kg) / day = \frac{DA_{event} * SA * EF * ED * EV}{BW * AT * 365 \, {}^{days}/_{year}} \text{ (Adults)}$$

$$INTAKE_{DERMAL} = \frac{DA_{event} * EV * EF}{AT * 365 \, {}^{days}/_{year}} * \sum_{i=m}^{n} \frac{SA_i * ED_i}{BW_i} \text{ (Children and Youth, accounts changing SA and BW)}$$

$$DA_{event} = CS * AF * ABS_{dermal} * CF_1$$

where:

CS	=	Chemical concentration in soil (mg/kg or µg/kg soil)
IR_{soil}	=	Soil ingestion rate (mg soil/day)
FI	=	Fraction ingested from contaminated source (unitless)
ET	=	Exposure time (hr/day)
EF	=	Exposure frequency (days/yr.)
ED	=	Exposure duration (years)
EV	=	Event frequency (events/day)

BW	=	Body weight (kg)
AT	=	Averaging time (years)
DA_{event}	=	Dose absorbed per unit area per event (mg/cm^2-event)
CF_1	=	Conversion factor (1 x 10^{-6} kg/mg for inorganics; 1 x 10^{-9} kg/µg for organics)
SA	=	Skin surface area available for contact (cm^2/day)
SA_i	=	Surface area exposed at age i (cm^2)
ED_i	=	Exposure duration at age i (years)
BW_i	=	Body weight at age i (kg)
AF	=	Soil-to-skin adherence factor (mg/cm^2)
ABS_{dermal}	=	Absorption fraction (unitless)

A sample calculation for ingestion of surface soil is provided in Appendix D. The input parameters for this exposure route, along with the rationale for the selection of each value, are presented in Table 5-4 and 5-5 for RME. As discussed in Section 5.1.3.2, the potential receptors for this scenario were future recreational and residential receptors. EPA or conventional values were used for all input parameters.

A sample calculation for dermal contact with surface soil is provided in Appendix D. The input parameters for this exposure route, along with the rationale for the selection of each value, are presented in Table 5-4 and 5-5 for RME. As discussed in Section 5.1.3.2, the potential receptors for this scenario were future recreational and residential receptors. EPA or conventional values were used for most input parameters. For the dermal pathway, it was assumed that the primary areas of skin available for future adult residential receptors would be the hands and arms for future residential and recreational children and future recreational youths, 25 percent of body surface area would be exposed.

Blood-Lead Modeling

As outlined in Office of Solid Waste and Emergency Response (OSWER) directive 9355.4-12 (EPA, 1994a), EPA has implemented an approach to evaluating lead risks that recognizes the multimedia nature of lead exposures, incorporating absorption and pharmacokinetic information. Research has been done concerning lead intake and resultant blood-lead levels. Determinations of lead uptake from soil, sediment, drinking water, and surface water were considered. For the purposes of this risk assessment, each pathway was evaluated separately so that the contribution of lead from each source and each exposure route could be evaluated. Potential blood-lead level increases were estimated and are discussed, along with the potential implications of blood-lead results for each site. The following paragraphs present information that is useful in estimating lead exposure.

TABLE 5-4
Exposure Parameters For Surface And Subsurface Soil Ingestion and Dermal Contact
Future Recreational Receptor
NAWC Warminster Sites 6 and 7

PARAMETER	CHILD (0-5 YRS)	YOUTH (6-16 YRS)	UNITS	SOURCE
CS	Chemical Specific	Chemical Specific	mg/kg	EPA 1989a
IR_{soil}	200	100	mg soil/day	EPA 1991d
FI	1	1	Unitless	Assumption
EF	24	24	days/year	Assumption
ED	5	11	years	EPA 1989a, 1991d
EV	1	1	events/day	
BW	16.6	45.2	kg	EPA 1991d, 1989a
AT_{cancer}	70	70	years	EPA 1989a
$AT_{non\text{-}ancer}$	5	11	years	EPA 1989a
DA_{event}	Chemical Specific	Chemical Specific	mg/cm^2	
$CF_{1\text{-}inorganics}$	1×10^{-6}	1×10^{-6}	kg/mg	
$CF_{1\text{-}organics}$	1×10^{-9}	1×10^{-6}	kg/ug	
SA	-	-	cm^2	EPA 1996e
SA_j	Varies with age	Varies with age	cm^2	EPA 1989a
ED_j	1-year increments	1-year increments	years	EPA 1989a, 1991d
BW_j	Varies with age	Varies with age	kg	EPA 1996e
AF	1	1	mg/cm^2	EPA 1992e
ABS_{dermal}	Chemical Specific	Chemical Specific	unitless	EPA 1995a

TABLE 5-5
Exposure Parameters For Surface And Subsurface Soil Ingestion and Dermal Contact
Future Residential Receptor
NAWC Warminster Sites 6 and 7

PARAMETER	CHILD (0-5 YRS)	YOUTH (6-16 YRS)	UNITS	SOURCE
CS	Chemical Specific	Chemical Specific	Mg/kg	EPA 1989a
IR_{soil}	200	100	mg soil/day	EPA 1991d
FI	1	1	Unitless	Assumption
EF	350	350	days/year	EPA 1989a, 1991d
ED	6	24	years	EPA 1989a, 1991d
EV	1	1	events/day	
BW	15	70	kg	EPA 1991d, 1989a
AT_{cancer}	70	70	years	EPA 1989a
$AT_{non\text{-}ancer}$	6	24	years	EPA 1989a
DA_{event}	Chemical Specific	Chemical Specific	mg/cm^2	
$CF_{1\text{-}inorganics}$	1×10^{-6}	1×10^{-6}	kg/mg	
$CF_{1\text{-}organics}$	1×10^{-9}	1×10^{-6}	kg/ug	
SA	-	3,508*	cm^2	EPA 1996e
SA_j	Varies with age	-	cm^2	EPA 1989a
ED_j	1-year increments	-	years	EPA 1989a, 1991d
BW_j	Varies with age	-	kg	EPA 1996e
AF	1	1	mg/cm^2	EPA 1992e
ABS_{dermal}	Chemical Specific	Chemical Specific	unitless	EPA 1995a

*Average of male and female surface areas for arms and hands

No threshold has been defined for effects related to blood-lead increases. The estimated increases at these sites are well below the concentrations at which effects such as anemia and neuropathy occur (40 µg/dL and above) (Doull et al. 1986). Effects below 10 µg/dL are difficult to define. Inhibition of certain enzymes involved in red blood cell metabolism has been reported to occur at 10 to 15 µg/dL and possibly lower (EPA, 1991b). Small increases in blood pressure have been related to adults with blood-lead levels down to 7 µg/dL (EPA, 1991b). Probably the subpopulation most sensitive to effects at the 3 to 7 µg/dL range (where the concentrations estimated for this study area would fall) would be infants, whose early neurological development can be affected by blood-lead concentrations reportedly down to 5 µg/dL (EPA, 1991b). Lead is also a fairly common environmental contaminant and, for this reason, typical blood-lead levels in the population at large may already exceed the concentrations discussed here.

Estimates of blood-lead levels in residential children (age 0 through 6 years) were made using the Integrated Exposure and Uptake Biokinetic (IEUBK) Model (version 0.99) developed by EPA. The model was applied to each site where lead was selected as a COPC in surface soil. The output for each run of the IEUBK Model is the estimated percentage of residential children (age 0 through 6 years) with a blood-lead level above 10 µg/dL (considered to be the significant cutoff level above which adverse effects cannot be ruled out). When the percentage of the population estimated to have blood levels above 10 µg/dL is greater than five percent, then EPA considers the potential for adverse effects to be significant (EPA, 1994b). The estimated percentage of residential children (age 0 through 6 years) with a blood-lead level above 10 µg/dL is presented in the site-specific text contained in subsequent sections of this report.

5.1.4 Methods for Risk Characterization

Potential human health risks resulting from the exposures outlined in the preceding sections are characterized on a quantitative and qualitative basis in this section. Quantitative risk estimates are generated based on risk assessment methods outlined in current EPA guidance (EPA, 1989a).

Noncarcinogenic risk estimates are presented in the form of Hazard Quotients (HQs) and Hazard Indices (HIs) that are determined through integration of estimated intakes with published RfDs. Incremental cancer risk estimates are provided in the form of dimensionless probabilities based on SFs.

Estimated human intakes were developed for each of the specific exposure routes discussed in the preceding sections. Both carcinogenic and noncarcinogenic risks are summarized for each exposure route on a series of tables in this section.

5.1.4.1 Carcinogenic Risks

Incremental cancer risk estimates are generated for each of the exposure pathways using the estimated intakes and published SFs, as follows:

$$\text{Risk} = \text{Intake} * \text{SF}$$

If the above equation results in a risk greater than 0.01, the following equation is used:

$$\text{Risk} = 1 - e^{-(\text{Intake}*\text{SF})}$$

The risk determined using these equations is a unitless expression of an individual's increased likelihood of developing cancer as a result of exposure to carcinogenic chemicals. An incremental cancer risk of 1E-06 indicates that the exposed receptor has a one in a million chance of developing cancer under the defined exposure scenario. Alternatively, such a risk may be interpreted as representing one additional case of cancer in an exposed population of one million persons. The calculated cancer risks should be recognized as upper-limit estimates. SFs are the upper 95 percent confidence limit of a dose-response curve generally derived from animal studies. Actual human risk, while not identifiable, is not expected to exceed the upper limit based on the SFs and may, in fact, be lower.

EPA has generally defined risks in the range of 1E-04 to 1E-06 or less as being acceptable for most hazardous waste facilities addressed under CERCLA. For CERCLA activities, residual risks on the order of 1E-06 are the primary goal but are often modified by such regulatory requirements as MCLs or chemical-specific clean-up goals.

5.1.4.2 Noncarcinogenic Risks

Noncarcinogenic risks are estimated using the concept of HQs and HIs. The HQ is the ratio of the estimated intake and the RfD for a selected chemical of concern, as follows:

$$\text{HQ} = \frac{\text{Intake}}{\text{RfD}}$$

HIs are the sums of the individual HQs for the COPCs. If the value of the HQ or the HI exceeds unity (1.0), the potential for noncarcinogenic health risks associated with exposure to that particular chemical or particular chemical mixture, respectively, cannot be ruled out (EPA, 1986b). If the individual HQs are less than 1.0 and the HI is greater than 1.0, particular attention should be paid to the target organ(s) affected

by each chemical because these are generally the organ(s) associated with RfD-derived effects, and toxicity for different organs is not truly additive. The HI is not a mathematical prediction of the severity of toxic effects; it is simply a numerical indicator of the possibility of the occurrence of noncarcinogenic (threshold) effects.

5.1.4.3 Lead Risks

EPA's approach to evaluating lead risks goes beyond providing a single point estimate output and incorporates absorption and pharmacokinetic properties. Section 5.1.3.6 discusses background information related to blood-lead estimation methods. Soil concentrations for lead were assessed for each applicable site where lead was selected as a COPC.

5.1.4.4 Receptor Risks

Receptor risks are presented for each exposure pathway evaluated at NAWC Warminster Site 6 in the form of tables and summary text. Each of these sections includes summaries of risks estimated by the exposure scenarios. It should be noted that, in each risk summary table where HQs are reported as"N/A," the HQs were not calculable because no RfD has been established. Usually in such cases, carcinogenicity is considered to be more important, since carcinogenicity will generally be seen at lower doses than noncarcinogenic effects. Cancer risks of zero or "N/A" generally indicate that the chemical is not carcinogenic or that an SF has not yet been developed.

5.1.5 Uncertainty Analysis

As discussed in EPA (1989a), the risk measures used in Superfund site risk assessments are not fully probabilistic estimates of risk but rather are conditional estimates based on a considerable number of assumptions about exposure and toxicity. There are uncertainties associated with each aspect of risk assessment, from environmental data collection through risk characterization. To support decision-making processes, significant general uncertainties in the risk assessment for NAWC Warminster Site 6/7 are noted in the following sections. Site-specific uncertainties are discussed in Section 5.6

5.1.5.1 Uncertainties in the Physical Setting and Receptor Exposure Pathways

Sections 5.1.3.2 and 5.1.3.3 discuss the rationale for including specific potential receptors and exposure routes by medium. Based on known and projected activity patterns, future receptors in the study area were considered to engage in a range of activities adequately approximated by default exposure parameter assumptions. It is unknown whether some of these receptors will actually exist, adding to the uncertainty in

the risk assessment. However, for future land use, the chosen receptors are expected to adequately define any possible uses of the land at the site. The current reuse plan for NAWC Sites 6 and 7 states that the site will be designated as recreational open space.

5.1.5.2 Environmental Data Collection Uncertainties

Selection of Locations and Number of Samples

For each site, the areal extent of the samples (including the number collected and location of the sampling points) in a particular medium impacts the calculation of representative concentrations. Every effort was made to collect samples that reflect actual site conditions and to include areas thought to contain the most significant contamination or exposure problems. The magnitude of this uncertainty on risks is unknown; however, biased sampling may result in an overestimation of the risks at the site

Selection of Samples with Naturally Occurring Background Levels

A number of background samples were collected that measure the range of concentrations of substances in each medium that are associated with non-site-related sources within the vicinity of the NAWC Warminster Sites 6 and 7. The diversity and abundance of inorganics in soil samples are determined by the soil's content in bedrock or other deposits and the effects of climatic and biological factors. However, if native soil types are encountered in site-related samples that are unlike those of background samples, then the evaluation of naturally occurring levels could be biased and might lead to overestimation or underestimation of the amount of contamination attributable to the site.

5.1.5.3 Analytical Data Uncertainties

Incorporation of Data from Different Investigations

Because of uncertainties regarding the validation status and usability of results from earlier investigations performed by various parties, only validated data were used for the risk assessment. Data obtained during earlier investigations were examined during project planning and were used to focus the sample collection effort to include potential areas of interest. Historical data were used in this risk assessment. Data were collected over several years at this site. The contaminant concentrations could have changed at the site based on migration or physical removal of contaminated media. Therefore, uncertainty exists in using historical data because current conditions may not be represented by historical data. Areal extent of the samples (including the number collected and location of the sampling points) in a particular medium at a

site was one such uncertainty. Every effort was made to collect samples that reflect actual site conditions. However, biased sampling may have occurred if an unknown area of contamination at a particular site was under- or over-sampled. Established data validation procedures were applied to define uncertainties in terms of qualifying data as inaccurate or imprecise and eliminate data points that are unusable for risk assessment. This treatment does not eliminate all uncertainty but focuses attention on potential areas of concern regarding accuracy, precision, and data gaps.

Analytical Data Usability

Established data validation procedures were applied to define analytical uncertainties in terms of qualifying data as inaccurate or imprecise and to eliminate data points that are unusable for risk assessment. This treatment does not eliminate all uncertainty but focuses attention on potential areas of concern regarding accuracy, precision, and data gaps. The overall percentages of rejected data points were acceptably low.

5.1.5.4 Data Evaluation Uncertainties

Accuracy of Statistical Tests Used in Background Comparisons

When a limited number of points are sampled, such as occurred for hot spot analysis, reduced accuracy is expected for the upper 95 percent tolerance limit. In such cases, this statistic is still expected to, on the average, estimate the upper 95 percentile of the population. However, for an individual case, the true percentage of the population that exceeds the calculated tolerance limit will be more likely to differ markedly from the predicted five percent when too few samples are collected. In the event that the upper 95 percent tolerance limit for background samples is overestimated, this could defeat the attempt to identify site-related samples with levels greater than naturally occurring background and may lead to an underestimate of the risk attributable to a site. To help ensure that data points above background were not overlooked, a conservative combination of several background tests were used in conjunction (the test of proportions, Fishers's exact test, the upper ranks test, the quantile test, the 95 percent UTL test, the Mann-Whitney U-test, Gehan's test, the student's t-test, and Satterthwaite's t-test).

Statistically Representative Exposure Concentrations

Uncertainties exist regarding selection of a concentration for input into the quantitative risk assessment. The use of the representative concentration to estimate risk is generally regarded as a conservative estimate since this entails using either the upper 95 percent confidence limit on the arithmetic mean (based on normal or log-transformed data distribution) or the maximum concentration. The choice of the representative

concentration as the value for input into the risk assessment generally lowers the chances of under estimation of the actual risk present in a pathway at a particular area of interest to a potential receptor. However, the use of the representative concentration may overestimate the actual risk present in an exposure pathway at a particular area of interest.

Distributional Shape of the Sample Population

The ability (power) of the W test to be able to correctly identify genuine differences between the shape of a sample population versus a reference normal or lognormal population is reduced when too few samples are collected. If an incorrect distributional assumption is made based on this test, this could lead to an over- or underestimate of the upper 95 percent concentration, which in turn would create some additional uncertainty as to whether the calculated risk is a reasonable approximation of high-end exposure.

5.1.5.5 Exposure Model Applicability and Assumptions

Uncertainties in Chemical Specific Properties

The chemical-specific parameters such as Koc were literature-derived values that are measured under conditions that may or may not be representative of on-site conditions. Parameters such as vapor pressure and solubility were not always obtainable at the desired temperature. Parameters such as the Kd for metals are strongly influenced by other factors such as the chemical form of the metal, the soil type, and pH.

Soil Dermal Absorption Model Applicability

The model for dermal exposure to soil and sediment assumes that only a very thin, constant-thickness layer of soil is available for contaminant transfer to the stratum corneum and that a constant amount of contaminant, proportional to the soil concentration, will be absorbed per unit area of skin and per exposure event. However, adherence to skin varies with such factors as particle size, soil type, and organic carbon content. As estimated by EPA (1992f), the absorbed dermal dose could vary by as much as a factor of 50 from the model estimates, even assuming that activity patterns lead to the exposure duration applied in the experimental trials used to develop absorption factors. Because of the lack of reliable data regarding dermal absorption factors, the risk assessment provides default soil absorption factors for all substances except for chemicals for which well-documented absorption factors are available (arsenic, cadmium, pentachlorophenol, PCBs, chlorinated dioxins, ethylbenzene, toluene, xylenes, and PCE). Even so, considerable uncertainty exists with the accuracy of estimates applied for these chemicals.

5.1.5.6 Exposure Intake Parameter Uncertainties

Standard Default Exposure Assumptions

Exposure assumptions can add uncertainty into the risk assessment process based on input values selected for each exposure route. For example, not all people weigh 70 kilograms, ingest 100 mg of water per day, and live at the same residence for 30 years. The rationale for each assumption was provided in each table of input parameters. Receptor characteristics, such as age and body weight, were based on published values. Conservative values (based on reasonable maximum exposure or professional judgment) were used in most exposure equations, except where average values were expected to better correspond to actual site conditions.

Soil Exposure

The use of current subsurface soil concentrations to represent future subsurface excavation exposure concentrations assumes two things that add to the uncertainty of this risk assessment. First, this exposure scenario assumes that soil would be excavated to the sampling depth. Second, this exposure scenario assumes that, once the soil is excavated to the subsurface soil sampling depth, no degradation of the chemicals in the subsurface soil would have taken place and/or no additional contamination would be transported to the soils. These uncertainties cause an over-estimation of the exposure at NAWC Sites 6 and 7 because subsurface soil contaminant concentrations are generally greater than surface soil contaminant concentrations.

Potential Risk zone Exposure

Recreational exposure to Zones 1, 2, and 3 adds uncertainty to the risk assessment. The zone exposure scenarios assume that the recreational receptor is exposed to the same location for the exposure frequency and duration. This is conservative because it is unlikely that the receptor would be exposed to the same location during the entire exposure period. This uncertainty would tend to over-estimate the risk at NAWC Sites 6 and 7.

5.1.5.7 Toxicity Assessment Uncertainty

There is uncertainty associated with the RfDs and SFs. The uncertainty results from the extrapolation of animal data to humans, the extrapolation of carcinogenic effects from the laboratory high-dose to the environmental low-dose scenarios, and interspecies and intraspecies variations in toxicological endpoints

caused by chemical exposure. The use of EPA SF values is generally considered to be conservative because the doses are based on no-effect or lowest-observed-effect levels and then further reduced with uncertainty factors to increase the margin of safety by a factor in the neighborhood of 10 to 1,000 fold. The RfDs and SFs of some chemicals have not been established, and therefore toxicity could not be quantitatively assessed. In most cases, where RfDs were unavailable for carcinogens, the carcinogenic risk is considered to be much more significant since carcinogenic effects usually occur at much lower doses.

Additional uncertainties were associated with the adjustment of oral dose-response parameters to compute dermally absorbed doses. As noted, when absorption factors were not available, the chemical was assumed to be 100 percent absorbed during the RfD or SF study. While this is likely to be realistic for volatile compounds, the assumption could be underprotective for chemicals absorbed less than 100 percent.

5.1.5.8 Risk Characterization Uncertainty

From a toxicological standpoint, it is not strictly correct to add HQs for a total HI, because RfDs are based on effects to various target organs. However, if the HI is less than 1.0, this demonstrates that, even when this conservative calculation is performed, the noncarcinogenic HI does not indicate a hazard for a particular exposure pathway. This is a conservative approach that will generally overestimate the HI for a particular pathway. To reduce the extent of overestimation when significant risks occurred at an area of interest, a less conservative approach was used wherein noncancer risks were grouped and summed together for only those chemicals affecting the same target organ/organ system. One additional source of uncertainty in the HI approach is that these models assumed that chemicals did not interact synergistically (a possible underestimate of the actual risk) or antagonistically (a possible overestimate of the actual risk).

5.1.5.9 IEUBK Modeling Uncertainty

The IEUBK model accounts for the multimedia nature of lead exposure, incorporates absorption and pharmacokinetic information, and allows the risk manager to consider the potential distributions of exposure and risk likely to occur at a site (the model goes beyond providing a single point estimate output). Although uncertainties are associated with blood-lead modeling using the IEUBK model, these uncertainties are considered lower than those that conceivably would result from similar lead evaluations performed using a traditional toxicity slope-based approach. Important uncertainties and limitations in the use of the IEUBK model are as follows:

The IEUBK model is predictive of blood lead for residential children in the range of 6 months to 7 years of age, which typically is considered to be a more sensitive subpopulation than adults. The model does not

apply to adults in either residential or occupational settings. In addition, the IEUBK model does not predict the blood-lead levels of pregnant women and does not include an exposure component based on the transfer of lead from the mother's blood to the fetus before birth, although a significant potential exists for adverse effects of prenatal lead exposure on neurobehavioral and physical development (EPA, 1994b).

The IEUBK model uses a default of 30 percent lead absorption from soil. However, the bioavailability of lead from different sources may be variable due to differences in lead speciation, particle size, and mineral matrix and may also vary as a function of physiological parameters such as age, nutritional status, gastric pH, and transit time. For example, lead absorption from paint chips in soil may be different than lead absorption from other chemical forms.

Blood-lead variability in the IEUBK model is characterized by a single number, the geometric standard deviation, which is set to a default value of 1.6. This value represents the aggregate uncertainty in all sources of population variability, including biological, uptake, exposure, sampling, and analytical components. Child blood-lead level predictions obtained using the IEUBK model reflect only the contributions of sources entered into the model and do not take into account any existing body burden that may be the result of prior exposures or any exposures that may have taken place at alternate locations away from the household or neighborhood level, such as parks or daycare centers.

5.2 DATA EVALUATION

A list of the chemicals of potential concern (COPCs) was developed for each environmental medium, as necessary. The COPCs were selected in accordance with the protocol established in the Section 5.1.1. Only those chemicals found to be of potential concern were considered for evaluation in the quantitative risk assessment. A discussion of those chemicals identified as COPCs for each medium is provided in this section.

5.2.1 COPCs Selected Based on Recreational RBCs

5.2.1.1 Surface Soils

Pesticides, PAHs, PCBs, phthalates, volatiles, and metals were detected in Sites 6 and 7 site-wide surface soil samples. The occurrence and distribution, COPC selection results (selected based on maximum concentrations versus recreational RBCs), background comparisons, and representative concentrations for chemicals detected in Site 6/7 site-wide surface soils are presented in Table 5-6.

TABLE 5-6
CTION OF CHEMICALS OF POTENTIAL CONCERN IN SURFACE SOILS, SITES 6 AND 7, (RECREATIONAL RBCS)
NAWC WARMINSTER, PENNSYLVANIA

Substance	Site-Related Frequency of Detection	Range of Positive Detections for Site		Are Site Results Above Background ?	Recreational Risk-Based Concentration	Chemical Selected as a COPC ?	Representative Concentration For Site Data
		Minimum	Maximum				
aluminum	29/29	5940	22100	Y	1388520.8	N	14500
antimony	2/10	5.1	5.1	N	50.5	N	4.38
arsenic	29/29	4.6	15.1	Y	8.4	Y	9.88
barium	29/29	30.2	1030	Y	8836	N	111
beryllium	29/29	0.39	1.9	Y	2.9	N	1.01
cadmium	5/29	3.3	18.9	Y	63.1	N	2.98
calcium	29/29	506	40000	Y		N	6170
chromium	29/29	13.2	2760	Y	631.1	Y	239
cobalt	29/29	5.1	20.9	Y	7573.8	N	10.8
copper	29/29	7.3	867	Y	5049.2	N	76
cyanide	1/17	3.9	3.9	N	2524.6	N	0.912
iron	29/29	13200	56300	N	37868.8	N	24600
lead	29/29	8.3	278	Y	400	N	46.6
magnesium	29/29	1390	14400	Y		N	2950
manganese	29/29	123	3040	Y	2903.3	Y	702
mercury	11/29	0.05	25.6	Y	37.9	N	0.497
nickel	19/29	9.7	29.9	Y	2524.6	N	14.6
potassium	28/29	363	973	N		N	660
silver	14/29	0.77	123	N	631.1	N	19.2
sodium	12/29	49.1	130	N		N	65.9
thallium	9/29	5.1	15.1	Y	10.1	Y	5.84
vanadium	29/29	13.4	41.7	N	883.6	N	32.3
zinc	29/29	24.9	1840	Y	37868.8	N	122
4,4'-DDD	1/16	7.7	7.7	N	52400	N	2.74
4,4'-DDT	2/16	5.5	6.5	N	37000	N	2.99
alpha-chlordane	1/17	8.2	8.2	NA	7600	N	1.71
Aroclor-1254	3/29	180	490	N	2500	N	67.5

TABLE 5-6
SELECTION OF CHEMICALS OF POTENTIAL CONCERN IN SURFACE SOILS, SITES 6 AND 7 (RECREATIONAL RBCs)
NAWC WARMINSTER, PENNSYLVANIA
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Substance	Site-Related Frequency of Detection	Range of Positive Detections for Site		Are Site Results Above Background ?	Recreational Risk-Based Concentration	Chemical Selected as a COPC ?	Representative Concentration For Site Data
		Minimum	Maximum				
Aroclor-1260	6/29	13 -	1000	N	6300	N	53.2
endrin	1/17	14 -	14	NA	37900	N	3.19
2-methylnaphthalene	1/29	1100 -	1100	N		N	253
acenaphthene	1/29	4100 -	4100	N	7573800	N	326
anthracene	2/29	100 -	6000	N	37868800	N	354
benz(a)anthracene	5/29	42 -	13000	N	17200	N	468
benzo(a)pyrene	5/29	45 -	11000	N	1700	Y	462
benzo(b)fluoranthene	6/29	54 -	13000	N	17200	N	480
benzo(g,h,i)perylene	6/29	41 -	3700	N		N	336
benzo(k)fluoranthene	4/29	360 -	7900	N	172400	N	418
benzoic acid	3/12	220 -	240	NA	504916700	N	240
bis(2-ethylhexyl)phthalate	1/26	2700 -	2700	N	898800	N	372
butylbenzylphthalate	2/29	49 -	700	N	25245800	N	245
chrysene	5/29	53 -	14000	N	172[illegible]800	N	474
dibenz(a,h)anthracene	3/29	44 -	1200	N	1700	N	265
dibenzofuran	1/29	2100 -	2100	N	504900	N	284
fluoranthene	7/29	36 -	28000	N	5049200	N	665
fluorene	1/29	2800 -	2800	N	5049200	N	300
indeno(1,2,3-cd)pyrene	5/29	49 -	4600	N	17200	N	344
phenanthrene	4/29	53 -	28000	N		N	582
pyrene	5/29	73 -	25000	N	3786900	N	594
bromomethane	1/29	3 -	3	NA	176700	N	3
methylene chloride	2/25	4 -	6	N	1677800	N	6
toluene	11/29	1 -	15	N	25245800	N	5.32
trichloroethene	9/29	1 -	4	NA	757400	N	4

TABLE 5-6
SELECTION OF CHEMICALS OF POTENTIAL CONCERN IN SURFACE SOILS, SITES 6 AND 7 (RECREATIONAL RBCs)
NAWC WARMINSTER, PENNSYLVANIA
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Notes:

Units are mg/kg for inorganics, ug/kg for organics.
Metals are selected as COPCs if maximum values exceed risk-based screening levels (RBCs) and site results are either above background or background comparison tests are indeterminate (NA).
Minerals that are essential nutrients (calcium, magnesium, sodium, potassium) are not included as COPCs.
The determination of site results exceeding background is based on an overall evaluation of statistical tests presented in a separate table.
Because most organics are not naturally occuring, selection of organic COPCs is based solely on exceedance of RBCs.
RBCs represent concentrations associated with a 10^{-6} cancer risk level or a non-cancer hazard index of 0.1.
Residential RBCs originate from EPA Region 3 RBCs for residential exposure, incidental soil ingestion, with non-cancer risk adjusted to 0.1 hazard ind
An RBC for lead based on cancer risk or hazard index is not available. The 400 mg/kg OSWER residential soil guideline is used as an RBC for soil ingestion.

Results of individual background comparison test are presented in Table 5-7 (see Section 5.1.1.2 for detailed information on background comparison tests).

The following chemicals were selected as COPCs in site-wide surface soils:

Inorganics	Organics
Arsenic	Benzo(a)pyrene
Chromium	
Manganese	
Thallium	

Arsenic was detected in all surface soil samples. The representative concentration for arsenic was less than the maximum arsenic concentration but exceeded the recreational RBC value. Manganese and chromium were also detected in all surface soil samples. The representative concentrations for chromium and manganese were less than the maximum chromium and manganese concentrations and were less than their respective recreational RBC values. Thallium was detected at a frequency of nine out of 29 surface soil samples. The representative concentration for thallium was less than the maximum thallium concentration and was less than the recreational RBC value. Benzo(a)pyrene was detected at a frequency of five out of 29 surface soil samples. The representative concentration for benzo(a)pyrene was less than the maximum benzo(a)pyrene concentration and was less than the recreational RBC value.

5.2.1.2 Subsurface Soil

Pesticides, PCBs, PAHs, volatiles, phthalates, semivolatiles, and metals were detected in Sites 6 and 7 site-wide subsurface soil samples. The occurrence and distribution, COPC selection results (selected based on maximum concentration versus recreational RBCs), background comparisons, and representative concentrations for chemicals detected in Site 6 site-wide subsurface soils are presented in Table 5-8. Results of individual background comparison test are presented in Table 5-9 (see Section 5.1.1.2 for detailed information on background comparison tests).

The following chemicals were selected as COPCs in subsurface soils:

Inorganics	Organics
Arsenic	Aroclor 1254
Beryllium	Benzo(a)pyrene

TABLE 5-7
Representative Concentration and Statistical Distribution of COPCs - Sitewide Surface Soil Sites 6 and 7
NAWC Warminster, Pennsylvainia

Substance	Number of Sample Results	Degrees of Freedom	Statistical Distribution of Site Data	Results of Shapiro-Wilk or Shapiro-Francia Distribution Tests			Table Value for $H_{0.95}$ (Lognorm.) or $T_{0.95}$ (Normal)	Standard Deviation or Log Standard Deviation	Arithmetic Mean of All Site Results	Upper 95 % Confidence Limit (UCL) on Mean	Maximum Positive Site Concentration	Representative Concentration (Lower of UCL vs Max)
				W-norm.	W-lognorm.	W-Table						
aluminum	29	28	normal	0.9513	0.9117	0.926	1.7011	3210	13500	14500	22100	14500
antimony	10	9	nonparametric (assumed lognorm.)	0.8076	0.7992	0.842	2.3915	0.615	2.63	4.38	5.1	4.38
arsenic	29	28	nonparametric (assumed lognorm.)	0.8057	0.8405	0.926	1.8857	0.432	8.47	9.88	15.1	9.88
barium	29	28	nonparametric (assumed lognorm.)	0.3241	0.7767	0.926	2.0809	0.665	101	111	1030	111
beryllium	29	28	lognormal	0.9154	0.9779	0.926	1.8275	0.347	0.89	1.01	1.9	1.01
cadmium	29	28	nonparametric (assumed lognorm.)	0.4671	0.7062	0.926	2.7962	1.27	2.11	2.98	18.9	2.98
calcium	29	28	nonparametric (assumed lognorm.)	0.4388	0.7388	0.926	2.7253	1.22	4760	6170	40000	6170
chromium	29	28	nonparametric (assumed lognorm.)	0.3714	0.7171	0.926	2.9898	1.41	188	239	2760	239
cobalt	29	28	lognormal	0.799	0.9266	0.926	1.7905	0.286	9.81	10.8	20.9	10.8
copper	29	28	nonparametric (assumed lognorm.)	0.3715	0.7984	0.926	2.6547	1.17	63.9	76	867	76
cyanide	17	16	nonparametric (assumed lognorm.)	0.2832	0.3282	0.892	1.9999	0.464	0.776	0.912	3.9	0.912
iron	29	28	nonparametric (assumed lognorm.)	0.7288	0.9111	0.926	1.7866	0.278	22500	24600	56300	24600
lead	29	28	nonparametric (assumed lognorm.)	0.461	0.7432	0.926	2.3811	0.947	38.3	46.6	278	46.6
magnesium	29	28	nonparametric (assumed lognorm.)	0.4058	0.644	0.926	1.9109	0.466	2640	2950	14400	2950
manganese	29	28	lognormal	0.6086	0.9559	0.926	2.0817	0.666	558	702	3040	702
mercury	29	28	nonparametric (assumed lognorm.)	0.2139	0.6946	0.926	3.0396	1.45	1	0.497	25.6	0.497
nickel	29	28	nonparametric (assumed lognorm.)	0.9027	0.9063	0.926	2.0216	0.601	11.4	14.6	29.9	14.6
potassium	29	28	normal	0.9779	0.8607	0.926	1.7011	187	601	660	973	660
silver	29	28	nonparametric (assumed lognorm.)	0.4174	0.7777	0.926	3.4861	1.76	9.12	19.2	123	19.2
sodium	29	28	nonparametric (assumed lognorm.)	0.8287	0.8856	0.926	1.9512	0.518	54.6	65.9	130	65.9
thallium	29	28	nonparametric (assumed lognorm.)	0.7075	0.7506	0.926	2.8175	1.29	2.91	5.84	15.1	5.84
vanadium	29	28	normal	0.962	0.8941	0.926	1.7011	6.32	30.3	32.3	41.7	32.3
zinc	29	28	nonparametric (assumed lognorm.)	0.2964	0.7151	0.926	2.3627	0.931	122	122	1840	122
4,4'-DDD	16	15	nonparametric (assumed lognorm.)	0.3186	0.3723	0.887	1.9004	0.337	2.38	2.74	7.7	2.74
4,4'-DDT	16	15	nonparametric (assumed lognorm.)	0.4626	0.5012	0.887	1.9319	0.375	2.52	2.99	6.5	2.99
alpha-chlordane	17	16	nonparametric (assumed lognorm.)	0.2828	0.3338	0.892	2.0393	0.504	1.46	1.71	8.2	1.71
Aroclor-1254	29	28	nonparametric (assumed lognorm.)	0.4062	0.4708	0.926	2.3613	0.93	59.7	67.5	490	67.5
Aroclor-1260	29	28	nonparametric (assumed lognorm.)	0.2438	0.5036	0.926	2.2468	0.828	60.4	53.2	1000	53.2
endrin	17	16	nonparametric (assumed lognorm.)	0.2855	0.3365	0.892	2.0082	0.473	2.72	3.19	14	3.19
2-methylnaphthalene	29	28	nonparametric (assumed lognorm.)	0.2339	0.3082	0.926	1.8084	0.316	235	253	1100	253
acenaphthene	29	28	nonparametric (assumed lognorm.)	0.2003	0.2548	0.926	1.9854	0.559	338	326	4100	326
anthracene	29	28	nonparametric (assumed lognorm.)	0.2025	0.3137	0.926	2.0651	0.648	400	354	6000	354
benz(a)anthracene	29	28	nonparametric (assumed lognorm.)	0.2051	0.4489	0.926	2.2799	0.858	645	468	13000	468
benzo(a)pyrene	29	28	nonparametric (assumed lognorm.)	0.2128	0.4802	0.926	2.2517	0.832	585	462	11000	462
benzo(b)fluoranthene	29	28	nonparametric (assumed lognorm.)	0.211	0.5105	0.926	2.3104	0.885	647	480	13000	480
benzo(g,h,i)perylene	29	28	nonparametric (assumed lognorm.)	0.2388	0.5605	0.926	2.1372	0.723	308	336	3700	336
benzo(k)fluoranthene	29	28	nonparametric (assumed lognorm.)	0.214	0.3693	0.926	2.1168	0.702	489	418	7900	418
benzoic acid	12	11	nonparametric (assumed lognorm.)	0.3574	0.4301	0.859	2.2156	0.559	316	423	240	240
bis(2-ethylhexyl)phthalate	26	25	nonparametric (assumed lognorm.)	0.2602	0.5251	0.92	2.2375	0.794	285	372	2700	372
butylbenzylphthalate	29	28	nonparametric (assumed lognorm.)	0.3735	0.4852	0.926	1.8354	0.359	216	245	700	245
chrysene	29	28	nonparametric (assumed lognorm.)	0.2043	0.4386	0.926	2.278	0.856	681	474	14000	474
dibenz(a,h)anthracene	29	28	nonparametric (assumed lognorm.)	0.314	0.5338	0.926	1.9288	0.49	227	265	1200	265
dibenzofuran	29	28	nonparametric (assumed lognorm.)	0.2107	0.2742	0.926	1.8881	0.435	269	284	2100	284
fluoranthene	29	28	nonparametric (assumed lognorm.)	0.2039	0.5575	0.926	2.5459	1.08	1170	665	28000	665

TABLE 5-7
REPRESENTATIVE CONCENTRATION AND STATISTICAL DISTRIBUTION OF COPCS - SITEWIDE SURFACE SOIL SITES 6 AND 7
NAWC WARMINSTER, PENNSYLANIA
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Substance	Number of Sample Results	Degrees of Freedom	Statistical Distribution of Site Data	Results of Shapiro-Wilk or Shapiro-Francia Distribution Tests			Table Value for $H_{0.95}$ (Lognorm.) or $T_{0.95}$ (Normal)	Standard Deviation or Log Standard Deviation	Arithmetic Mean of All Site Results	Upper 95 % Confidence Limit (UCL) on Mean	Maximum Positive Site Concentration	Representative Concentration (Lower of UCL vs Max)
				W-norm.	W-lognorm.	W-Table						
fluorene	29	28	nonparametric (assumed lognorm.)	0.2053	0.2646	0.926	1.9281	0.489	294	300	2800	300
indeno(1,2,3-cd)pyrene	29	28	nonparametric (assumed lognorm.)	0.2216	0.4788	0.926	2.0999	0.685	345	344	4600	344
phenanthrene	29	28	nonparametric (assumed lognorm.)	0.1969	0.4087	0.926	2.4286	0.987	1160	582	28000	582
pyrene	29	28	nonparametric (assumed lognorm.)	0.2025	0.4215	0.926	2.394	0.958	1080	594	25000	594
bromomethane	29	28	nonparametric (assumed lognorm.)	0.6559	0.5799	0.926	1.729	0.161	6.17	6.52	3	3
methylene chloride	25	24	nonparametric (assumed lognorm.)	0.8808	0.854	0.918	2.1676	0.72	4.8	7.06	6	6
toluene	29	28	lognormal	0.7691	0.9289	0.926	2.0162	0.595	4.21	5.32	15	5.32
trichloroethene	29	28	nonparametric (assumed lognorm.)	0.8786	0.8781	0.926	2.0146	0.593	3.57	4.59	4	4

Notes:

Units are mg/kg for inorganics, ug/kg for organics.
Number of sample results excludes rejected data or blank-qualified data. Duplicates are consolidated into one result. Non-detected results are treated as present at one-half the detection limit in all calculations.
Statistical distribution of data is determined using Shapiro-Wilk test for n <= 50, Shapiro-Francia test for n > 50. Statistical significance level is 0.05.
A normal distribution is assumed if the test statistic W-norm. is >= than the reference value (W-table), and W-norm. > W-lognorm.
A lognormal distribution is assumed if the test statistic W-lognorm. is >= the reference value (W-table), and W-lognorm. >= W-norm. A lognormal distribution is also the default assumption if neither distribution passes Shapiro test.
H-values and standard deviations of log-transformed data are used to calculate the UCL if data are assumed to be lognormally distributed. Student's T-values and standard deviations are used for normally distributed data.
Arithmetic mean includes positive detections and non-detected results (detection limits are divided by two).
The representative concentration is selected as the lower of the 95 % UCL on the mean and the maximum positive site concentration.

TABLE 5-8

ELECTION OF CHEMICALS OF POTENTIAL CONCERN IN SITEWIDE SUBSURFACE SOILS, SITES 6 AND 7 (RECREATIONAL RBCS)

NAWC WARMINSTER, PENNSYLVANIA

Substance	Site-Related Frequency of Detection	Range of Positive Detections for Site			Are Site Results Above Background ?	Recreational Risk-Based Concentration	Chemical Selected as a COPC ?	Representative Concentration For Site Data
		Minimum		Maximum				
ALUMINUM	86/86	1970	-	251000	Y	1388520.8	N	15600
ANTIMONY	22/86	2.6	-	164	N	50.5	N	7.16
ARSENIC	83/86	0.86	-	80.7	Y	8.4	Y	12.6
BARIUM	83/86	12.6	-	922	Y	8836	N	130
BERYLLIUM	81/86	0.23	-	4.6	Y	2.9	Y	0.99
CADMIUM	31/85	0.41	-	152	Y	63.1	Y	23.5
CALCIUM	83/86	340	-	145000	Y		N	27400
CHROMIUM	85/86	4.4	-	46800	Y	631.1	Y	2280
COBALT	83/86	1.8	-	146	Y	7573.8	N	18.3
COPPER	83/86	2.9	-	14300	Y	5049.2	Y	230
IRON	86/86	4130	-	264000	Y	37868.8	Y	51000
LEAD	85/86	3.1	-	39300	Y	400	Y	130
MAGNESIUM	84/86	456	-	77000	Y		N	3650
MANGANESE	86/86	65	-	1320	Y	2903.3	N	592
MERCURY	32/86	0.06	-	5.6	Y	37.9	N	0.818
NICKEL	86/86	2.9	-	345	Y	2524.6	N	27.1
POTASSIUM	80/86	138	-	8740	Y		N	808
SELENIUM	4/86	0.83	-	5	NA	631.1	N	2.84
SILVER	62/86	0.63	-	368	Y	631.1	N	111
SODIUM	73/85	44.6	-	740	Y		N	130
THALLIUM	40/86	3.7	-	89.1	Y	10.1	Y	19.6
VANADIUM	82/86	6.3	-	73	Y	883.6	N	40.8
ZINC	83/86	9.1	-	78600	Y	37868.8	Y	370
4,4'-DDE	1/11	3.725	-	3.725	N	37000	N	2.61
4,4'-DDT	2/11	4.8	-	10.2	N	37000	N	4.42
ALPHA-CHLORDANE	1/11	8.4	-	8.4	NA	7600	N	2.46
AROCLOR-1242	1/72	21	-	21	NA	6300	N	21

TABLE 5-8
SELECTON OF CHEMICALS OF POTENTIAL CONCERN IN SITEWIDE SUBSURFACE SOILS, SITES 6 AND 7 (RECREATIONAL RBCS)
NAWC WARMINSTER, PENNSYLVANIA
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Substance	Site-Related Frequency of Detection	Range of Positive Detections for Site		Are Site Results Above Background ?	Recreational Risk-Based Concentration	Chemical Selected as a COPC ?	Representative Concentration For Site Data
		Minimum	Maximum				
AROCLOR-1248	2/73	75 -	710	N	6300	N	44.6
AROCLOR-1254	25/72	7.2 -	4200	Y	2500	Y	146
AROCLOR-1260	27/73	9 -	5100	Y	6300	N	190
DIELDRIN	1/10	6.1 -	6.1	NA	800	N	3.05
GAMMA-CHLORDANE	1/11	9.2 -	9.2	NA	6300	N	2.6
METHOXYCHLOR	1/11	14 -	14	NA	631100	N	12.4
1,2,4-TRIMETHYLBENZENE	1/62	170 -	170	NA	2524600	N	5.07
1,3,5-TRIMETHYLBENZENE	1/62	120 -	120	NA	2524600	N	4.89
1,3-DICHLOROBENZENE	1/72	8 -	8	NA	7000000	N	8
2,4-DIMETHYLPHENOL	1/72	1100 -	1100	N	2524600	N	243
2-METHYLNAPHTHALENE	1/72	50 -	50	NA		N	50
4-METHYLPHENOL	1/72	6300 -	6300	N	631100	N	276
ACENAPHTHENE	2/72	45 -	49	NA	7573800	N	49
ACENAPHTHYLENE	3/72	48 -	89	NA		N	89
ANTHRACENE	5/72	79 -	340	NA	37868800	N	250
BENZ(A)ANTHRACENE	25/72	33 -	1500	N	17200	N	282
BENZO(A)PYRENE	25/72	42 -	2800	N	1700	Y	291
BENZO(B)FLUORANTHENE	16/72	82 -	4100	N	17200	N	340
BENZO(G,H,I)PERYLENE	16/72	43 -	330	NA		N	245
BENZO(K)FLUORANTHENE	13/72	87 -	1600	N	172400	N	300
BIS(2-ETHYLHEXYL)PHTHAL	17/55	39 -	5400	Y	898800	N	395
BUTYLBENZYLPHTHALATE	3/72	55 -	70	NA	25245800	N	70
CHRYSENE	27/72	33 -	1600	Y	1723800	N	271
DI-N-BUTYLPHTHALATE	13/72	29 -	16000	N	12622900	N	295
DIBENZ(A,H)ANTHRACENE	4/72	63 -	220	NA	1700	N	220
FLUORANTHENE	29/72	35 -	1800	N	5049200	N	298

TABLE 5-8
SELECTON OF CHEMICALS OF POTENTIAL CONCERN IN SITEWIDE SUBSURFACE SOILS, SITES 6 AND 7 (RECREATIONAL RBCS)
NAWC WARMINSTER, PENNSYLVANIA
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Substance	Site-Related Frequency of Detection	Range of Positive Detections for Site Minimum	Maximum	Are Site Results Above Background ?	Recreational Risk-Based Concentration	Chemical Selected as a COPC ?	Representative Concentration For Site Data
FLUORENE	1/72	50 -	50	NA	5049200	N	50
INDENO(1,2,3-CD)PYRENE	14/72	46 -	1200	N	17200	N	259
PHENANTHRENE	17/72	43 -	620	N		N	254
PHENOL	1/72	5300 -	5300	N	75737500	N	270
PYRENE	28/72	35 -	2000	N	3786900	N	339
2-BUTANONE	3/85	18 -	52	NA	7537500	N	38.2
ACETONE	17/84	22 -	330	N	1262300	N	70.9
CARBON DISULFIDE	2/85	2 -	3	NA	12622900	N	3
ETHYLBENZENE	1/85	36 -	36	NA	12622900	N	5.07
N-BUTYLBENZENE	1/62	1 -	1	NA	1262300	N	1
P-ISOPROPYLTOLUENE	1/62	3 -	3	NA		N	3
SEC-BUTYLBENZENE	1/62	0.9 -	0.9	NA	1262300	N	0.9
TETRACHLOROETHENE	2/85	4 -	28	NA	242000	N	4.81
TOLUENE	3/85	1 -	3	N	25245800	N	3
TRICHLOROETHENE	1/85	56 -	56	NA	757400	N	5.19
XYLENE (TOTAL)	3/85	2 -	620	N	252458300	N	6.14

Notes:

Units are mg/kg for inorganics, ug/kg for organics.
Metals are selected as COPCs if maximum values exceed risk-based screening levels (RBCs) and site results are either above background or background comparison tests are indeterminate (NA).
Minerals that are essential nutrients (calcium, magnesium, sodium, potassium) are not included as COPCs.
The determination of site results exceeding background is based on an overall evaluation of statistical tests presented in a separate table.
Because most organics are not naturally occuring, selection of organic COPCs is based solely on exceedance of RBCs.
RBCs represent concentrations associated with a 10^{-6} cancer risk level or a non-cancer hazard index of 0.1.
Residential RBCs originate from EPA Region 3 RBCs for residential exposure, incidental soil ingestion, with non-cancer risk adjusted to 0.1 hazard index.
An RBC for lead based on cancer risk or hazard index is not available. The 400 mg/kg OSWER residential soil guideline is used as an RBC for soil ingestion.

TABLE 5-9
Representative Concentration and Statistical Distribution of COPCs - Sitewide Subsurface Soil Sites 6 and 7
NAWC Warminster, Pennsylvania

Substance	Number of Sample Results	Degrees of Freedom	Statistical Distribution of Site Data	Results of Shapiro-Wilk or Shapiro-Francia Distribution Tests			Table Value for $H_{0.95}$ (Lognorm.) or $T_{0.95}$ (Normal)	Standard Deviation or Log Standard Deviation	Arithmetic Mean of All Site Results	Upper 95 % Confidence Limit (UCL) on Mean	Maximum Positive Site Concentration	Representative Concentration (Lower of UCL vs Max)
				W-norm.	W-lognorm.	W-Table						
aluminum	86	85	nonparametric (assumed lognorm.)	0.2124	0.8534	0.985	1.924	0.633	15000	15600	251000	15600
antimony	86	85	nonparametric (assumed lognorm.)	0.2769	0.7946	0.985	2.3284	1.11	7.26	7.16	164	7.16
arsenic	86	85	nonparametric (assumed lognorm.)	0.6074	0.9644	0.985	1.9869	0.72	10.9	12.6	80.7	12.6
barium	86	85	nonparametric (assumed lognorm.)	0.5884	0.9555	0.985	2.1141	0.877	113	130	922	130
beryllium	86	85	nonparametric (assumed lognorm.)	0.6854	0.9661	0.985	1.8472	0.515	0.898	0.99	4.6	0.99
cadmium	85	84	nonparametric (assumed lognorm.)	0.4733	0.7556	0.985	3.4786	2.11	13.2	23.5	152	23.5
calcium	86	85	nonparametric (assumed lognorm.)	0.5603	0.8991	0.985	2.9868	1.71	17200	27400	145000	27400
chromium	86	85	nonparametric (assumed lognorm.)	0.2752	0.7956	0.985	3.7068	2.29	1650	2280	46800	2280
cobalt	86	85	nonparametric (assumed lognorm.)	0.5355	0.8728	0.985	2.0296	0.775	16.7	18.3	146	18.3
copper	86	85	nonparametric (assumed lognorm.)	0.1606	0.8457	0.985	2.9237	1.66	330	230	14300	230
iron	86	85	nonparametric (assumed lognorm.)	0.5312	0.839	0.985	2.1762	0.948	46800	51000	264000	51000
lead	86	85	nonparametric (assumed lognorm.)	0.0963	0.8228	0.985	2.7802	1.53	595	130	39300	130
magnesium	86	85	nonparametric (assumed lognorm.)	0.2468	0.7953	0.985	2.0375	0.785	3930	3650	77000	3650
manganese	86	85	nonparametric (assumed lognorm.)	0.9459	0.97	0.985	1.8861	0.576	517	592	1320	592
mercury	86	85	nonparametric (assumed lognorm.)	0.5476	0.7929	0.985	2.8291	1.57	0.624	0.818	5.6	0.818
nickel	86	85	nonparametric (assumed lognorm.)	0.3975	0.8749	0.985	2.0672	0.821	25.8	27.1	345	27.1
potassium	86	85	nonparametric (assumed lognorm.)	0.3478	0.9401	0.985	1.9751	0.704	722	808	8740	808
selenium	86	85	nonparametric (assumed lognorm.)	0.8377	0.7618	0.985	2.0601	0.812	2.17	2.84	5	2.84
silver	86	85	nonparametric (assumed lognorm.)	0.5202	0.8012	0.985	3.7402	2.32	45.8	111	368	111
sodium	85	84	nonparametric (assumed lognorm.)	0.5879	0.9287	0.985	1.9119	0.614	117	130	740	130
thallium	86	85	nonparametric (assumed lognorm.)	0.5654	0.957	0.985	2.9324	1.66	10.9	19.6	89.1	19.6
vanadium	86	85	nonparametric (assumed lognorm.)	0.9338	0.5861	0.985	2.1653	0.935	26.2	40.8	73	40.8
zinc	86	85	nonparametric (assumed lognorm.)	0.0887	0.8331	0.985	2.7822	1.53	1150	370	78600	370
4,4'-DDE	11	10	nonparametric (assumed lognorm.)	0.7073	0.7522	0.85	1.8879	0.233	2.27	2.61	3.725	2.61
4,4'-DDT	11	10	nonparametric (assumed lognorm.)	0.5696	0.6992	0.85	2.2266	0.538	3.11	4.42	10.2	4.42
alpha-chlordane	11	10	nonparametric (assumed lognorm.)	0.371	0.4444	0.85	2.3714	0.639	1.7	2.46	8.4	2.46
Aroclor-1242	72	71	nonparametric (assumed lognorm.)	0.3504	0.5642	0.983	1.9328	0.626	37.2	37.6	21	21
Aroclor-1248	73	72	nonparametric (assumed lognorm.)	0.2901	0.5749	0.984	2.0163	0.738	47.1	44.6	710	44.6
Aroclor-1254	72	71	nonparametric (assumed lognorm.)	0.2776	0.7324	0.983	2.5701	1.29	180	146	4200	146
Aroclor-1260	73	72	nonparametric (assumed lognorm.)	0.2985	0.6955	0.984	2.744	1.44	221	190	5100	190
dieldrin	10	9	nonparametric (assumed lognorm.)	0.4589	0.5302	0.842	2.0456	0.363	2.41	3.05	6.1	3.05
gamma-chlordane	11	10	nonparametric (assumed lognorm.)	0.3679	0.44	0.85	2.4129	0.666	1.77	2.6	9.2	2.6
methoxychlor	11	10	nonparametric (assumed lognorm.)	0.7949	0.8282	0.85	1.8393	0.174	11.2	12.4	14	12.4
1,2,4-trimethylbenzene	62	61	nonparametric (assumed lognorm.)	0.1301	0.2875	0.981	1.9381	0.615	6.62	5.07	170	5.07
1,3,5-trimethylbenzene	62	61	nonparametric (assumed lognorm.)	0.1467	0.2986	0.981	1.9129	0.579	5.81	4.89	120	4.89
1,3-dichlorobenzene	72	71	nonparametric (assumed lognorm.)	0.445	0.5278	0.983	2.7617	1.47	31.7	29.3	8	8
2,4-dimethylphenol	72	71	nonparametric (assumed lognorm.)	0.3054	0.5171	0.983	1.7299	0.265	234	243	1100	243
2-methylnaphthalene	72	71	nonparametric (assumed lognorm.)	0.2678	0.5168	0.983	1.7624	0.339	237	249	50	50
4-methylphenol	72	71	nonparametric (assumed lognorm.)	0.1063	0.3204	0.983	1.8135	0.437	307	276	6300	276
acenaphthene	72	71	nonparametric (assumed lognorm.)	0.2868	0.5343	0.983	1.7867	0.387	235	251	49	49
acenaphthylene	72	71	nonparametric (assumed lognorm.)	0.2973	0.5757	0.983	1.7862	0.387	233	248	89	89
anthracene	72	71	nonparametric (assumed lognorm.)	0.2986	0.5985	0.983	1.7606	0.335	239	250	340	250
benz(a)anthracene	72	71	nonparametric (assumed lognorm.)	0.495	0.8288	0.983	1.9947	0.709	245	282	1500	282
benzo(a)pyrene	72	71	nonparametric (assumed lognorm.)	0.3511	0.795	0.983	1.9764	0.685	268	291	2800	291

TABEL 5-9
REPRESENTATIVE CONCENTRATION AND STATISTICAL DISTRIBUTION OF COPCS - SITEWIDE SUBSURFACE SOIL SITES 6 AND 7
NAWC WARMINSTER, PENNSYLVANIA
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Substance	Number of Sample Results	Degrees of Freedom	Statistical Distribution of Site Data	Results of Shapiro-Wilk or Shapiro-Francia Distribution Tests			Table Value for $H_{0.95}$ (Lognorm.) or $T_{0.95}$ (Normal)	Standard Deviation or Log Standard Deviation	Arithmetic Mean of All Site Results	Upper 95 % Confidence Limit (UCL) on Mean	Maximum Positive Site Concentration	Representative Concentration (Lower of UCL vs Max)
				W-norm.	W-lognorm.	W-Table						
benzo(b)fluoranthene	72	71	nonparametric (assumed lognorm.)	0.304	0.6817	0.983	1.9316	0.624	336	340	4100	340
benzo(g,h,i)perylene	72	71	nonparametric (assumed lognorm.)	0.3804	0.7215	0.983	1.8431	0.488	222	245	330	245
benzo(k)fluoranthene	72	71	nonparametric (assumed lognorm.)	0.4343	0.6915	0.983	1.8422	0.487	282	300	1600	300
bis(2-ethylhexyl)phthalate	55	54	nonparametric (assumed lognorm.)	0.2973	0.7739	0.98	2.0662	0.884	372	395	5400	395
butylbenzylphthalate	72	71	nonparametric (assumed lognorm.)	0.2916	0.5681	0.983	1.7873	0.389	231	247	70	70
chrysene	72	71	nonparametric (assumed lognorm.)	0.4806	0.8176	0.983	1.969	0.675	237	271	1600	271
di-n-butylphthalate	72	71	nonparametric (assumed lognorm.)	0.0932	0.5416	0.983	2.0236	0.746	413	295	16000	295
dibenz(a,h)anthracene	72	71	nonparametric (assumed lognorm.)	0.2934	0.5854	0.983	1.7741	0.363	234	248	220	220
fluoranthene	72	71	nonparametric (assumed lognorm.)	0.482	0.8446	0.983	2.0173	0.738	263	298	1800	298
fluorene	72	71	nonparametric (assumed lognorm.)	0.2663	0.5123	0.983	1.7622	0.339	237	249	50	50
indeno(1,2,3-cd)pyrene	72	71	nonparametric (assumed lognorm.)	0.3826	0.7007	0.983	1.8474	0.496	239	259	1200	259
phenanthrene	72	71	nonparametric (assumed lognorm.)	0.7175	0.8048	0.983	1.8552	0.508	225	254	620	254
phenol	72	71	nonparametric (assumed lognorm.)	0.1155	0.3687	0.983	1.8063	0.424	291	270	5300	270
pyrene	72	71	nonparametric (assumed lognorm.)	0.4719	0.8232	0.983	2.0516	0.78	303	339	2000	339
2-butanone	85	84	nonparametric (assumed lognorm.)	0.2912	0.7746	0.985	2.0986	0.857	32.5	38.2	52	38.2
acetone	84	83	nonparametric (assumed lognorm.)	0.4337	0.8451	0.985	2.5799	1.35	39.6	70.9	330	70.9
carbon disulfide	85	84	nonparametric (assumed lognorm.)	0.3134	0.6811	0.985	1.8172	0.462	4.73	4.89	3	3
ethylbenzene	85	84	nonparametric (assumed lognorm.)	0.2972	0.6464	0.985	1.8275	0.48	4.96	5.07	36	5.07
n-butylbenzene	62	61	nonparametric (assumed lognorm.)	0.2015	0.4191	0.981	1.8354	0.46	4.2	4.25	1	1
p-isopropyltoluene	62	61	nonparametric (assumed lognorm.)	0.1907	0.3541	0.981	1.8191	0.432	4.23	4.24	3	3
sec-butylbenzene	62	61	nonparametric (assumed lognorm.)	0.202	0.4214	0.981	1.8383	0.465	4.2	4.25	0.9	0.9
tetrachloroethene	85	84	nonparametric (assumed lognorm.)	0.4175	0.6983	0.985	1.7998	0.429	4.58	4.81	28	4.81
toluene	85	84	nonparametric (assumed lognorm.)	0.3258	0.7199	0.985	1.8309	0.486	4.72	4.93	3	3
trichloroethene	85	84	nonparametric (assumed lognorm.)	0.2548	0.6189	0.985	1.8424	0.506	5.19	5.19	56	5.19
xylene (total)	85	84	nonparametric (assumed lognorm.)	0.0848	0.4647	0.985	1.9671	0.692	11.8	6.14	620	6.14

Notes:

Units are mg/kg for inorganics, ug/kg for organics.
Number of sample results excludes rejected data or blank-qualified data. Duplicates are consolidated into one result. Non-detected results are treated as present at one-half the detection limit in all calculations.
Statistical distribution of data is determined using Shapiro-Wilk test for n <= 50, Shapiro-Francia test for n > 50. Statistical significance level is 0.05.
A normal distribution is assumed if the test statistic W-norm. is >= than the reference value (W-table), and W-norm. > W-lognorm.
A lognormal distribution is assumed if the test statistic W-lognorm. is >= the reference value (W-table), and W-lognorm. >= W-norm. A lognormal distribution is also the default assumption if neither distribution passes Shapiro test.
H-values and standard deviations of log-transformed data are used to calculate the UCL if data are assumed to be lognormally distributed. Student's T-values and standard deviations are used for normally distributed data.
Arithmetic mean includes positive detections and non-detected results (detection limits are divided by two).
The representative concentration is selected as the lower of the 95 % UCL on the mean and the maximum positive site concentration.

Cadmium
Chromium
Copper
Iron
Lead*
Thallium
Zinc

*Lead does not have an EPA qualitative listed toxicity value. Lead will be evaluated qualitatively in the uncertainty section (4.6).

Arsenic was detected at a frequency of 83 out of 86 subsurface soil samples. The representative concentration for arsenic was less than the maximum arsenic concentration but exceeded the recreational RBC value. Beryllium was detected at a frequency of 81 out of 86 subsurface soil samples. The representative concentration for beryllium was less than the maximum beryllium concentration and was less than the recreational RBC value. Beryllium concentrations in subsurface soil have a maximum concentration of 4.6 mg/kg. It is the only concentration of beryllium above the recreational RBC value (see Table 5-8). Cadmium was detected at a frequency of 31 out of 85 subsurface soil samples. The representative concentration for cadmium was less than the maximum cadmium concentration and was less than the recreational RBC value. Chromium was detected at a frequency of 85 out of 86 subsurface soil samples. The representative concentration for chromium was less than the maximum chromium concentration but exceeded the recreational RBC value. Copper was detected at a frequency of 83 out of 86 subsurface soil samples. The representative concentration for copper was less than the maximum copper concentration and less than the recreational RBC value. Iron was detected at a frequency of 86 out of 86 subsurface soil samples. The representative concentration for iron was less than the maximum iron concentration but exceeded the recreational RBC value. Lead was detected at a frequency of 85 out of 86 subsurface soil samples. The representative concentration for lead was less than the maximum lead concentration and less than the recreational RBC value. Thallium was detected at a frequency of 40 out of 86 subsurface soil samples. The representative concentration for thallium was less than the maximum thallium concentration but exceeded the recreational RBC value. Zinc was detected at a frequency of 83 out of 86 subsurface soil samples. The representative concentration for zinc was less than the maximum zinc concentration and less than the recreational RBC value. Aroclor 1254 was detected at a frequency of 25 out of 72 subsurface soil samples. The representative concentration for Aroclor 1254 was less than the maximum Aroclor 1254 concentration and less than the recreational RBC value. Benzo(a)pyrene was detected at a frequency of 25 out of 72 subsurface soil samples, with the maximum concentration

exceeding the recreational RBC value. The representative concentration for benzo(a)pyrene was less than the maximum benzo(a)pyrene concentration and less than the recreational RBC value.

5.2.1.3 Zone 1 Subsurface Soil

One PCB (Aroclor 1260), PAHs, phthalates, acetone, and metals were detected in Sites 6 and 7 subsurface soil samples at Zone 1. The occurrence and distribution, COPC selection results (selected based on maximum concentration versus recreational RBCs), background comparisons, and representative concentrations for chemicals detected in Zone 1 subsurface soils are presented in Table 5-10. Results of individual background comparison test are presented in Table 5-11 (see Section 5.1.1.2 for detailed information on background comparison tests).

The following chemicals were selected as COPCs in subsurface soils at Zone 1:

Inorganics	Organics
Antimony	None Selected
Arsenic	
Chromium	
Iron	
Thallium	

Antimony was detected at a frequency of three out of seven subsurface soil samples. The representative concentration for antimony was equal to the maximum antimony concentration. Only the maximum concentration of antimony exceeded the recreational RBC value. Arsenic, chromium, and iron were detected at a frequency of seven out of seven subsurface soil samples. The representative concentrations for arsenic, chromium, and iron were equal to their respective maximum concentrations. Four of the arsenic concentrations exceeded the recreational RBC value. Three of the chromium and iron concentrations exceeded their respective recreational RBC values. Thallium was detected at a frequency of four out of seven subsurface soil samples. The representative concentration for thallium was equal to the maximum thallium concentration. Two of the thallium concentrations exceeded the recreational RBC value. All organic chemicals were detected at concentrations less than applicable recreational RBC values; therefore, no organic chemicals were selected as COPCs.

TABLE 5-10
Selection of Chemicals of Potential Concern in Zone 1 Subsurface Soils, Sites 6 and 7 (Recreational RBCs)
NAWC Warminster, Pennsylvania

Substance	Site-Related Frequency of Detection	Range of Positive Detections for Site Minimum	Maximum	Are Site Results Above Background ?	Recreational Risk-Based Concentration	Chemical Selected as a COPC ?	Representative Concentration For Site Data
ALUMINUM	7/7	3300 -	13600	N	1388520.8	N	10900
ANTIMONY	3/7	6.4 -	164	Y	50.5	Y	164
ARSENIC	7/7	3.4 -	24.5	Y	8.4	Y	17.3
BARIUM	7/7	24.8 -	384	Y	8836	N	384
BERYLLIUM	6/7	0.3 -	1.2	N	2.9	N	1.2
CADMIUM	3/7	32.5 -	42.4	Y	63.1	N	42.4
CALCIUM	7/7	465 -	121000	Y		N	121000
CHROMIUM	7/7	8 -	7140	Y	631.1	Y	7140
COBALT	7/7	8 -	52.4	Y	7573.8	N	52.4
COPPER	7/7	2.9 -	534	Y	5049.2	N	534
IRON	7/7	8310 -	232000	Y	37868.8	Y	232000
LEAD	7/7	3.3 -	128	Y	400	N	128
MAGNESIUM	7/7	646 -	5770	Y		N	4210
MANGANESE	7/7	250 -	899	Y	2903.3	N	899
MERCURY	3/7	2.1 -	5.2	Y	37.9	N	5.2
NICKEL	7/7	8 -	113	Y	2524.6	N	113
POTASSIUM	5/7	207 -	778	N		N	778
SILVER	6/7	0.79 -	330	Y	631.1	N	330
SODIUM	6/7	89.8 -	198	Y		N	158
THALLIUM	4/7	3.7 -	89.1	Y	10.1	Y	89.1
VANADIUM	6/7	11.3 -	38.8	N	883.6	N	28.8
ZINC	7/7	13.1 -	377	Y	37868.8	N	377
AROCLOR-1260	3/6	13 -	1400	Y	6300	N	1400
BENZ(A)ANTHRACENE	2/6	91 -	180	N	17200	N	180
BENZO(A)PYRENE	2/6	110 -	210	N	1700	N	210
BENZO(G,H,I)PERYLENE	1/6	300 -	300	N		N	300
BIS(2-ETHYLHEXYL)PHTHAL	2/6	1500 -	5400	N	898800	N	5400

TABLE 5-10
SELECTION OF CHEMICALS OF POTENTIAL CONCERN IN ZONE 1 SUBSURFACE SOILS, SITES 6 AND 7 (RECREATIONAL RBCS)
NAWC WARMINSTER, PENNSYLVANIA
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Substance	Site-Related Frequency of Detection	Range of Positive Detections for Site		Are Site Results Above Background ?	Recreational Risk-Based Concentration	Chemical Selected as a COPC ?	Representative Concentration For Site Data
		Minimum	Maximum				
BUTYLBENZYLPHTHALATE	1/6	70 -	70	N	25245800	N	70
CHRYSENE	2/6	170 -	190	N	1723800	N	190
FLUORANTHENE	2/6	79 -	120	N	5049200	N	120
INDENO(1,2,3-CD)PYRENE	1/6	110 -	110	N	17200	N	110
PYRENE	2/6	130 -	290	N	3786900	N	261
ACETONE	1/7	22 -	22	N	1262300	N	22

Notes:

Units are mg/kg for inorganics, ug/kg for organics.
Metals are selected as COPCs if maximum values exceed risk-based screening levels (RBCs) and site results are either above background or background comparison tests are indeterminate (NA).
Minerals that are essential nutrients (calcium, magnesium, sodium, potassium) are not included as COPCs.
The determination of site results exceeding background is based on an overall evaluation of statistical tests presented in a separate table.
Because most organics are not naturally occuring, selection of organic COPCs is based solely on exceedance of RBCs.
RBCs represent concentrations associated with a 10^{-6} cancer risk level or a non-cancer hazard index of 0.1.
Residential RBCs originate from EPA Region 3 RBCs for residential exposure, incidental soil ingestion, with non-cancer risk adjusted to 0.1 hazard ind
An RBC for lead based on cancer risk or hazard index is not available. The 400 mg/kg OSWER residential soil guideline is used as an RBC for soil ingestion.

TABLE 5-11
Representative Concentration and Statistical Distribution of COPCs - Zone 1 Subsurface Soil Sites 6 and 7
NAWC Warminster, Pennsylvania

Substance	Number of Sample Results	Degrees of Freedom	Statistical Distribution of Site Data	Results of Shapiro-Wilk or Shapiro-Francia Distribution Tests			Table Value for $H_{0.95}$ (Lognorm.) or $T_{0.95}$ (Normal)	Standard Deviation or Log Standard Deviation	Arithmetic Mean of All Site Results	Upper 95 % Confidence Limit (UCL) on Mean	Maximum Positive Site Concentration	Representative Concentration (Lower of UCL vs Max)
				W-norm.	W-lognorm	W-Table						
aluminum	7	6	normal	0.8662	0.8453	0.803	1.9432	4040	7970	10900	13600	10900
antimony	7	6	nonparametric (assumed lognorm.)	0.4892	0.7416	0.803	6.2	1.83	26	2140	164	164
arsenic	7	6	normal	0.8751	0.8631	0.803	1.9432	8.34	11.2	17.3	24.5	17.3
barium	7	6	lognormal	0.8133	0.8549	0.803	4.0411	1.12	154	1110	384	384
beryllium	7	6	lognormal	0.913	0.9246	0.803	3.0214	0.748	0.651	1.75	1.2	1.2
cadmium	7	6	nonparametric (assumed lognorm.)	0.7256	0.6822	0.803	8.5947	2.58	16.3	566000	42.4	42.4
calcium	7	6	nonparametric (assumed lognorm.)	0.6886	0.7278	0.803	9.1679	2.76	50000	8400000000	121000	121000
chromium	7	6	lognormal	0.7217	0.8507	0.803	9.7561	2.94	2890	3280000000	7140	7140
cobalt	7	6	nonparametric (assumed lognorm.)	0.7017	0.7218	0.803	3.5036	0.931	26.8	109	52.4	52.4
copper	7	6	lognormal	0.7653	0.8363	0.803	7.5139	2.24	192	506000	534	534
iron	7	6	lognormal	0.7046	0.8042	0.803	5.2535	1.52	108000	3990000	232000	232000
lead	7	6	lognormal	0.8062	0.8719	0.803	5.2999	1.54	49.2	1960	128	128
magnesium	7	6	normal	0.9874	0.9478	0.803	1.9432	1720	2950	4210	5770	4210
manganese	7	6	lognormal	0.8579	0.8856	0.803	2.5074	0.521	551	962	899	899
mercury	7	6	nonparametric (assumed lognorm.)	0.7805	0.7271	0.803	7.1813	2.14	1.52	1730	5.2	5.2
nickel	7	6	lognormal	0.7479	0.8761	0.803	3.881	1.06	44.6	261	113	113
potassium	7	6	lognormal	0.8275	0.8434	0.803	2.9283	0.71	383	929	778	778
silver	7	6	lognormal	0.6812	0.8051	0.803	10.3505	3.13	138	890000000	330	330
sodium	7	6	normal	0.928	0.92	0.803	1.9432	54.3	118	158	198	158
thallium	7	6	lognormal	0.6578	0.8868	0.803	6.5538	1.94	27.6	7870	89.1	89.1
vanadium	7	6	normal	0.8391	0.7289	0.803	1.9432	14.3	18.3	28.8	38.8	28.8
zinc	7	6	lognormal	0.7539	0.8198	0.803	5.1972	1.5	160	5380	377	377
Aroclor-1260	6	5	nonparametric (assumed lognorm.)	0.6907	0.7117	0.788	8.4417	2.2	429	3350000	1400	1400
benz(a)anthracene	6	5	nonparametric (assumed lognorm.)	0.6893	0.6365	0.788	2.2514	0.315	178	247	180	180
benzo(a)pyrene	6	5	nonparametric (assumed lognorm.)	0.6715	0.6311	0.788	2.1414	0.249	186	238	210	210
benzo(g,h,i)perylene	6	5	nonparametric (assumed lognorm.)	0.7689	0.7815	0.788	2.1368	0.246	238	303	300	300
bis(2-ethylhexyl)phthalate	6	5	nonparametric (assumed lognorm.)	0.6366	0.7228	0.788	5.6412	1.43	1280	50100	5400	5400
butylbenzylphthalate	6	5	normal	0.8726	0.8076	0.788	2.015	84	200	269	70	70
chrysene	6	5	normal	0.8805	0.8693	0.788	2.015	12.9	193	203	190	190
fluoranthene	6	5	nonparametric (assumed lognorm.)	0.7843	0.762	0.788	2.3993	0.392	166	258	120	120
indeno(1,2,3-cd)pyrene	6	5	lognormal	0.8552	0.8793	0.788	2.3236	0.354	207	302	110	110
pyrene	6	5	lognormal	0.8875	0.8977	0.788	2.1526	0.256	203	261	290	261
acetone	7	6	normal	0.92	0.8387	0.803	1.9432	12	28.6	37.4	22	22

Notes:

Units are mg/kg for inorganics, ug/kg for organics.
Number of sample results excludes rejected data or blank-qualified data. Duplicates are consolidated into one result. Non-detected results are treated as present at one-half the detection limit in all calculations.
Statistical distribution of data is determined using Shapiro-Wilk test for n <= 50, Shapiro-Francia test for n > 50. Statistical significance level is 0.05.
A normal distribution is assumed if the test statistic W-norm. is >= than the reference value (W-table), and W-norm. > W-lognorm.
A lognormal distribution is assumed if the test statistic W-lognorm. is >= the reference value (W-table), and W-lognorm. >= W-norm. A lognormal distribution is also the default assumption if neither distribution passes Shapiro test.
H-values and standard deviations of log-transformed data are used to calculate the UCL if data are assumed to be lognormally distributed. Student's T-values and standard deviations are used for normally distributed data.
Arithmetic mean includes positive detections and non-detected results (detection limits are divided by two).
The representative concentration is selected as the lower of the 95 % UCL on the mean and the maximum positive site concentration.

5.2.1.4 Zone 2 Subsurface Soil

Pesticides, PCBs, PAHs, phthalates, volatiles, and metals were detected in Sites 6 and 7 subsurface soil samples at Zone 2. The occurrence and distribution, COPC selection results (selected based on maximum concentration versus recreational RBCs), background comparisons, and representative concentrations for chemicals detected in Zone 2 subsurface soils are presented in Table 5-12. Results of individual background comparison test are presented in Table 5-13 (see Section 5.1.1.2 for detailed information on background comparison tests).

The following chemicals were selected as COPCs in subsurface soils at Zone 2:

Inorganics	Organics
Antimony	None Selected
Arsenic	
Cadmium	
Chromium	
Iron	
Lead*	
Thallium	

*Lead does not have an EPA qualitative listed toxicity value. Lead will be evaluated qualitatively in the uncertainty section (4.6).

Antimony was detected at a frequency of three out of seven subsurface soil samples. The representative concentration for antimony was equal to the maximum antimony concentration. Only the maximum concentration of antimony exceeded the recreational RBC value. Cadmium was detected at a frequency of four out of seven subsurface soil samples. The representative concentration for cadmium was equal to the maximum cadmium concentration. Two of the cadmium concentrations exceeded the recreational RBC value. Arsenic, chromium, iron, and lead were detected at a frequency of seven out of seven subsurface soil samples. The representative concentrations for arsenic, chromium, iron, and lead were equal to their respective maximum concentrations. Four of the arsenic concentrations exceeded the recreational RBC value. Three of the chromium and iron concentrations exceeded their respective recreational RBC values. Only the maximum concentration of lead exceeded the recreational RBC value.

Thallium was detected at a frequency of four out of seven subsurface soil samples. The representative concentration for thallium was equal to the maximum thallium concentration. Three of the thallium

TABLE 5-12
Selection of Chemicals of Potential Concern in ZONE 2 Subsurface Soils, Sites 6 and 7 (Recreational RBCs)
NAWC Warminster, Pennsylvania

Substance	Site-Related Frequency of Detection	Range of Positive Detections for Site Minimum	Range of Positive Detections for Site Maximum	Are Site Results Above Background ?	Recreational Risk-Based Concentration	Chemical Selected as a COPC ?	Representative Concentration For Site Data
ALUMINUM	7/7	4100	41400	Y	1388520.8	N	38600
ANTIMONY	3/7	8.4	68	Y	50.5	Y	68
ARSENIC	7/7	5.2	80.7	Y	8.4	Y	80.7
BARIUM	7/7	27.4	922	Y	8836	N	922
BERYLLIUM	7/7	0.38	1.1	N	2.9	N	0.946
CADMIUM	4/7	48.5	135	Y	63.1	Y	82.5
CALCIUM	7/7	675	123000	Y		N	80600
CHROMIUM	7/7	9.2	22900	Y	631.1	Y	22900
COBALT	7/7	8	63.4	Y	7573.8	N	63.4
COPPER	7/7	10.4	1880	Y	5049.2	N	1880
IRON	7/7	11700	261000	Y	37868.8	Y	261000
LEAD	7/7	3.8	39300	Y	400	Y	39300
MAGNESIUM	7/7	723	4060	Y		N	3530
MANGANESE	7/7	227	1320	Y	2903.3	N	1010
MERCURY	4/7	1.4	5.6	Y	37.9	N	3.62
NICKEL	7/7	9.1	345	Y	2524.6	N	345
POTASSIUM	6/7	324	1550	N		N	1340
SELENIUM	1/7	5	5	NA	631.1	N	5
SILVER	7/7	0.65	308	Y	631.1	N	220
SODIUM	7/7	98.4	740	Y		N	532
THALLIUM	4/7	6.7	74.9	Y	10.1	Y	74.9
VANADIUM	6/7	16.6	36.8	N	883.6	N	29.1
ZINC	7/7	18.7	3800	Y	37868.8	N	3800
ALPHA-CHLORDANE	1/1	8.4	8.4	NA	7600	N	8.4
AROCLOR-1254	3/7	61	750	Y	2500	N	750
AROCLOR-1260	2/7	440	760	N	6300	N	760
DIELDRIN	1/1	6.1	6.1	NA	800	N	6.1

TABLE 5-12
SELECTION OF CHEMICAL OF POTENTIAL CONCERN IN ZONE 2 SUBSURFACE SOILS, SITES 6 AND 7 (RECREATIONAL RBCS)
NAWC WARMINSTER, PENNSYLVANIA
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Substance	Site-Related Frequency of Detection	Range of Positive Detections for Site		Are Site Results Above Background ?	Recreational Risk-Based Concentration	Chemical Selected as a COPC ?	Representative Concentration For Site Data
		Minimum	Maximum				
GAMMA-CHLORDANE	1/1	9.2 -	9.2	NA	6300	N	9.2
BENZ(A)ANTHRACENE	1/6	120 -	120	N	17200	N	120
BENZO(A)PYRENE	2/6	140 -	150	N	1700	N	150
BENZO(B)FLUORANTHENE	1/6	140 -	140	N	17200	N	140
BENZO(G,H,I)PERYLENE	1/6	90 -	90	N		N	90
BENZO(K)FLUORANTHENE	1/6	480 -	480	N	172400	N	480
BIS(2-ETHYLHEXYL)PHTHAL	3/6	60 -	870	Y	898800	N	870
CHRYSENE	1/6	120 -	120	N	1723800	N	120
DI-N-BUTYLPHTHALATE	4/6	42 -	370	N	12622900	N	370
FLUORANTHENE	1/6	210 -	210	N	5049200	N	210
INDENO(1,2,3-CD)PYRENE	1/6	82 -	82	N	17200	N	82
PHENANTHRENE	1/6	98 -	98	N		N	98
PYRENE	1/6	210 -	210	N	3786900	N	210
ACETONE	1/7	98 -	98	N	1262300	N	98
P-ISOPROPYLTOLUENE	1/6	3 -	3	NA		N	3
SEC-BUTYLBENZENE	1/6	0.9 -	0.9	NA	1262300	N	0.9
TETRACHLOROETHENE	1/7	28 -	28	NA	242000	N	23.1
TOLUENE	1/7	2 -	2	NA	25245800	N	2

TABLE 5-12
SELECTION OF CHEMICAL OF POTENTIAL CONCERN IN ZONE 2 SUBSURFACE SOILS, SITES 6 AND 7 (RECREATIONAL RBCS)
NAWC WARMINSTER, PENNSYLVANIA
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Notes

Units are mg/kg for inorganics, ug/kg for organics.
Metals are selected as COPCs if maximum values exceed risk-based screening levels (RBCs) and site results are either above background or background comparison tests are indeterminate (NA).
Minerals that are essential nutrients (calcium, magnesium, sodium, potassium) are not included as COPCs.
The determination of site results exceeding background is based on an overall evaluation of statistical tests presented in a separate table.
Because most organics are not naturally occuring, selection of organic COPCs is based solely on exceedance of RBCs.
RBCs represent concentrations associated with a 10^{-6} cancer risk level or a non-cancer hazard index of 0.1.
Residential RBCs originate from EPA Region 3 RBCs for residential exposure, incidental soil ingestion, with non-cancer risk adjusted to 0.1 hazard index.
An RBC for lead based on cancer risk or hazard index is not available. The 400 mg/kg OSWER residential soil guideline is used as an RBC for soil ingestion.

TABLE 5-13
REPRESENTATIVE CONCENTRATION AND STATISTICAL DISTRIBUTION OF COPS - ZONE 2 SUBSURFACE SOIL SITES 6 AND 7
NAWC WARMINSTER, PENNSYLVANIA

Substance	Number of Sample Results	Degrees of Freedom	Statistical Distribution of Site Data	Results of Shapiro-Wilk or Shapiro-Francia Distribution Tests			Table Value for $H_{0.95}$ (Lognorm.) or $T_{0.95}$ (Normal)	Standard Deviation or Log Standard Deviation	Arithmetic Mean of All Site Results	Upper 95 % Confidence Limit (UCL) on Mean	Maximum Positive Site Concentration	Representative Concentration (Lower of UCL vs Max)
				W-norm.	W-lognorm.	W-Table						
aluminum	7	6	lognormal	0.7326	0.9219	0.803	3.168	0.805	13400	38600	41400	38600
antimony	7	6	lognormal	0.6115	0.8571	0.803	5.277	1.53	14.5	462	68	68
arsenic	7	6	lognormal	0.7466	0.9197	0.803	3.666	0.989	24.6	115	80.7	80.7
barium	7	6	lognormal	0.6955	0.939	0.803	4.3591	1.23	240	2390	922	922
beryllium	7	6	normal	0.8911	0.8861	0.803	1.9432	0.296	0.729	0.946	1.1	0.946
cadmium	7	6	normal	0.8664	0.7403	0.803	1.9432	50.5	45.4	82.5	135	82.5
calcium	7	6	normal	0.8326	0.8202	0.803	1.9432	50700	43300	80600	123000	80600
chromium	7	6	lognormal	0.6732	0.8724	0.803	10.713	3.24	4910	92220000000	22900	22900
cobalt	7	6	lognormal	0.8312	0.882	0.803	3.3081	0.858	27.7	93.6	63.4	63.4
copper	7	6	lognormal	0.7278	0.9028	0.803	6.7152	1.99	458	223000	1880	1880
iron	7	6	lognormal	0.7597	0.8563	0.803	4.6757	1.33	104000	1630000	261000	261000
lead	7	6	lognormal	0.4605	0.8502	0.803	10.3153	3.11	5670	5060000000	39300	39300
magnesium	7	6	normal	0.9454	0.8542	0.803	1.9432	1190	2650	3530	4060	3530
manganese	7	6	normal	0.9951	0.9461	0.803	1.9432	363	747	1010	1320	1010
mercury	7	6	normal	0.863	0.7827	0.803	1.9432	2.21	2	3.62	5.6	3.62
nickel	7	6	lognormal	0.7291	0.9251	0.803	4.772	1.37	89.4	1520	345	345
potassium	7	6	lognormal	0.8101	0.9216	0.803	2.7657	0.641	642	1340	1550	1340
selenium	7	6	lognormal	0.834	0.8826	0.803	2.2866	0.403	3.76	5.52	5	5
silver	7	6	normal	0.8512	0.733	0.803	1.9432	126	127	220	308	220
sodium	7	6	lognormal	0.6303	0.8035	0.803	2.953	0.72	228	532	740	532
thallium	7	6	lognormal	0.7743	0.9063	0.803	6.8749	2.04	26.9	18900	74.9	74.9
vanadium	7	6	normal	0.9399	0.6458	0.803	1.9432	10.9	21	29.1	36.8	29.1
zinc	7	6	lognormal	0.6169	0.8951	0.803	6.8719	2.04	766	432000	3800	3800
alpha-chlordane	1		unknown (assumed lognorm.)						8.4		8.4	8.4
Aroclor-1254	7	6	nonparametric (assumed lognorm.)	0.674	0.792	0.803	5.4363	1.58	220	8700	750	750
Aroclor-1260	7	6	nonparametric (assumed lognorm.)	0.6842	0.7853	0.803	5.3267	1.55	193	6250	760	760
dieldrin	1		unknown (assumed lognorm.)						6.1		6.1	6.1
gamma-chlordane	1		unknown (assumed lognorm.)						9.2		9.2	9.2
benz(a)anthracene	6	5	lognormal	0.786	0.9164	0.788	2.7415	0.542	272	535	120	120
benzo(a)pyrene	6	5	lognormal	0.8713	0.9166	0.788	2.187	0.277	200	264	150	150
benzo(b)fluoranthene	6	5	lognormal	0.7572	0.8809	0.788	2.6518	0.506	275	505	140	140
benzo(g,h,i)perylene	6	5	lognormal	0.8226	0.9373	0.788	2.9504	0.622	267	624	90	90
benzo(k)fluoranthene	6	5	lognormal	0.8247	0.8432	0.788	2.603	0.485	332	592	480	480
bis(2-ethylhexyl)phthalate	6	5	lognormal	0.6798	0.9118	0.788	3.8019	0.902	273	1300	870	870
chrysene	6	5	lognormal	0.786	0.9164	0.788	2.7415	0.542	272	535	120	120
di-n-butylphthalate	6	5	lognormal	0.921	0.9359	0.788	3.7228	0.877	182	869	370	370
fluoranthene	6	5	nonparametric (assumed lognorm.)	0.662	0.7241	0.788	2.4993	0.44	287	470	210	210
indeno(1,2,3-cd)pyrene	6	5	lognormal	0.8311	0.9358	0.788	3.0286	0.65	265	664	82	82
phenanthrene	6	5	lognormal	0.8136	0.9357	0.788	2.8833	0.597	268	593	98	98
pyrene	6	5	nonparametric (assumed lognorm.)	0.662	0.7241	0.788	2.4993	0.44	287	470	210	210
acetone	7	6	lognormal	0.6007	0.9034	0.803	4.2687	1.2	96.6	772	98	98
p-isopropyltoluene	6	5	nonparametric (assumed lognorm.)	0.528	0.6272	0.788	4.2947	1.05	10.2	68.5	3	3
sec-butylbenzene	6	5	lognormal	0.5687	0.8593	0.788	5.0613	1.27	9.82	171	0.9	0.9
tetrachloroethene	7	6	nonparametric (assumed lognorm.)	0.6265	0.7722	0.803	3.2473	0.835	7.86	23.1	28	23.1

TABLE 5-13
REPRESENTATIVE CONCENTRATION AND STATISTICAL DISTRIBUTION OF COPCS - ZONE 2 SUBSURFACE SOIL SITES 6 AND 7
NAWC WARMINSTER, PENNSYLVANIA
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Substance	Number of Sample Results	Degrees of Freedom	Statistical Distribution of Site Data	Results of Shapiro-Wilk or Shapiro-Francia Distribution Tests			Table Value for $H_{0.95}$ (Lognorm.) or $T_{0.95}$ (Normal)	Standard Deviation or Log Standard Deviation	Arithmetic Mean of All Site Results	Upper 95 % Confidence Limit (UCL) on Mean	Maximum Positive Site Concentration	Representative Concentration (Lower of UCL vs Max)
				W-norm.	W-lognorm.	W-Table						
toluene	7	6	lognormal	0.5799	0.8066	0.803	3.8632	1.06	9.79	48.1	2	2

Notes:

Units are mg/kg for inorganics, ug/kg for organics.
Number of sample results excludes rejected data or blank-qualified data. Duplicates are consolidated into one result. Non-detected results are treated as present at one-half the detection limit in all calculations.
Statistical distribution of data is determined using Shapiro-Wilk test for n <= 50, Shapiro-Francia test for n > 50. Statistical significance level is 0.05.
A normal distribution is assumed if the test statistic W-norm. is >= than the reference value (W-table), and W-norm. > W-lognorm.
A lognormal distribution is assumed if the test statistic W-lognorm. is >= the reference value (W-table), and W-lognorm. >= W-norm. A lognormal distribution is also the default assumption if neither distribution passes Shapiro test.
H-values and standard deviations of log-transformed data are used to calculate the UCL if data are assumed to be lognormally distributed. Student's T-values and standard deviations are used for normally distributed data.
Arithmetic mean includes positive detections and non-detected results (detection limits are divided by two).
The representative concentration is selected as the lower of the 95 % UCL on the mean and the maximum positive site concentration.

concentrations exceeded the recreational RBC value. All organic chemicals were detected at concentrations less that applicable recreational RBC values, therefore no organic chemicals were selected as COPCs.

5.2.1.5 Zone 3 Subsurface Soil

PCBs, PAHs, phthalates, volatiles semivolatiles, and metals were detected in Sites 6/7 subsurface soil samples at Zone 3. The occurrence and distribution, COPC selection results (selected based on maximum concentration versus recreational RBCs), background comparisons, and representative concentrations for chemicals detected in Zone 3 subsurface soils are presented in Table 5-14. Results of individual background comparison test are presented in Table 5-15 (see Section 5.1.1.2 for detailed information on background comparison tests).

The following chemicals were selected as COPCs in subsurface soils at Zone 3:

Inorganics	Organics
Arsenic	Aroclor 1254
Cadmium	
Chromium	
Iron	
Lead*	
Thallium	
Zinc	

*Lead does not have an EPA qualitative listed toxicity value. Lead will be evaluated qualitatively in the uncertainty section (5.6).

Arsenic, chromium, iron, lead, and zinc were detected at a frequency of nine out of nine subsurface soil samples. The representative concentrations for arsenic, chromium, iron, lead, and zinc were equal to their respective maximum concentrations. Eight of the arsenic concentrations exceeded the recreational RBC value. Five of the chromium and iron concentrations exceeded their respective recreational RBC values. Only the maximum concentrations of lead and zinc exceeded their respective recreational RBC values. Cadmium was detected at a frequency of eight out of nine subsurface soil samples. The representative concentration for cadmium was equal to the maximum cadmium concentration. Three of the cadmium concentrations exceeded the recreational RBC value. Thallium was detected at a frequency of six out of nine subsurface soil samples. The representative concentration for thallium was equal to the maximum

TABLE 5-14

SELECTION OF CHEMICALS OF POTENTIAL CONCERN IN ZONE 3 SUBSURFACE SOILS, SITES 6 AND 7 (RECREATIONAL RBCs)

NAWC WARMINSTER, PENNSYLVANIA

Substance	Site-Related Frequency of Detection	Range of Positive Detections for Site Minimum	Maximum	Are Site Results Above Background ?	Recreational Risk-Based Concentration	Chemical Selected as a COPC ?	Representative Concentration For Site Data
ALUMINUM	9/9	3360 -	28400	Y	1388520.8	N	17600
ANTIMONY	4/9	9.6 -	48.3	Y	50.5	N	48.3
ARSENIC	9/9	5.9 -	35.5	Y	8.4	Y	31.9
BARIUM	9/9	41.3 -	536	Y	8836	N	536
BERYLLIUM	9/9	0.35 -	1.2	N	2.9	N	0.885
CADMIUM	8/9	0.64 -	152	Y	63.1	Y	152
CALCIUM	9/9	1490 -	79600	Y		N	79600
CHROMIUM	9/9	15.8 -	46800	Y	631.1	Y	46800
COBALT	9/9	6.6 -	146	Y	7573.8	N	146
COPPER	9/9	8.3 -	920	Y	5049.2	N	920
IRON	9/9	15000 -	264000	Y	37868.8	Y	264000
LEAD	9/9	9.8 -	7700	Y	400	Y	7700
MAGNESIUM	9/9	1100 -	4970	Y		N	3340
MANGANESE	9/9	259 -	1160	Y	2903.3	N	1120
MERCURY	7/9	0.2 -	3.4	Y	37.9	N	3.4
NICKEL	9/9	8.3 -	66.2	Y	2524.6	N	66.2
POTASSIUM	8/9	197 -	8740	Y		N	4910
SILVER	9/9	1.1 -	368	Y	631.1	N	368
SODIUM	9/9	96.8 -	405	Y		N	203
THALLIUM	6/9	4.7 -	62.4	Y	10.1	Y	62.4
VANADIUM	7/9	18.6 -	32.3	N	883.6	N	26.2
ZINC	9/9	35.2 -	78600	Y	37868.8	Y	78600
AROCLOR-1248	2/9	75 -	710	N	6300	N	710
AROCLOR-1254	4/8	91 -	4200	Y	2500	Y	4200
AROCLOR-1260	5/9	13 -	5100	Y	6300	N	5100
1,2,4-TRIMETHYLBENZENE	1/9	170 -	170	NA	2524600	N	79.8
1,3,5-TRIMETHYLBENZENE	1/9	120 -	120	NA	2524600	N	50.4

TABLE 5-14
SELECTION OF CHEMICALS OF POTENTIAL CONCERN IN ZONE 3 SUBSURFACE SOILS, SITES 6 AND 7 (RECREATIONAL RBCs)
NAWC WARMINSTER, PENNSYLVANIA
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Substance	Site-Related Frequency of Detection	Range of Positive Detections for Site Minimum	Maximum	Are Site Results Above Background ?	Recreational Risk-Based Concentration	Chemical Selected as a COPC ?	Representative Concentration For Site Data
2,4-DIMETHYLPHENOL	1/9	1100 -	1100	N	2524600	N	508
4-METHYLPHENOL	1/9	6300 -	6300	N	631100	N	2480
BENZ(A)ANTHRACENE	4/9	42 -	120	NA	17200	N	120
BENZO(A)PYRENE	5/9	42 -	140	NA	1700	N	140
BENZO(B)FLUORANTHENE	1/9	150 -	150	N	17200	N	150
BENZO(G,H,I)PERYLENE	1/9	89 -	89	NA		N	89
BENZO(K)FLUORANTHENE	1/9	470 -	470	N	172400	N	470
BIS(2-ETHYLHEXYL)PHTHAL	4/5	39 -	310	Y	898800	N	310
CHRYSENE	6/9	51 -	320	N	1723800	N	276
DI-N-BUTYLPHTHALATE	4/9	48 -	16000	N	12622900	N	16000
FLUORANTHENE	7/9	46 -	360	N	5049200	N	295
INDENO(1,2,3-CD)PYRENE	1/9	87 -	87	NA	17200	N	87
PHENANTHRENE	4/9	62 -	540	N		N	429
PHENOL	1/9	5300 -	5300	N	75737500	N	2030
PYRENE	6/9	38 -	230	N	3786900	N	230
2-BUTANONE	3/9	18 -	52	NA	7537500	N	52
ACETONE	4/9	36 -	330	Y	1262300	N	307
CARBON DISULFIDE	1/9	3 -	3	NA	12622900	N	3
ETHYLBENZENE	1/9	36 -	36	NA	12622900	N	13.9
TOLUENE	2/9	1 -	3	N	25245800	N	3
TRICHLOROETHENE	1/9	56 -	56	NA	757400	N	21.2
XYLENE (TOTAL)	2/9	2 -	620	N	252458300	N	620

TABLE 5-14
SELECTION OF CHEMICALS OF POTENTIAL CONCERN IN ZONE 3 SUBSURFACE SOILS, SITES 6 AND 7 (RECREATIONAL RBCs)
NAWC WARMINSTER, PENNSYLVANIA
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Notes:

Units are mg/kg for inorganics, ug/kg for organics.
Metals are selected as COPCs if maximum values exceed risk-based screening levels (RBCs) and site results are either above background or background comparison tests are indeterminate (NA).
Minerals that are essential nutrients (calcium, magnesium, sodium, potassium) are not included as COPCs.
The determination of site results exceeding background is based on an overall evaluation of statistical tests presented in a separate table.
Because most organics are not naturally occuring, selection of organic COPCs is based solely on exceedance of RBCs.
RBCs represent concentrations associated with a 10^{-6} cancer risk level or a non-cancer hazard index of 0.1.
Residential RBCs originate from EPA Region 3 RBCs for residential exposure, incidental soil ingestion, with non-cancer risk adjusted to 0.1 hazard index.
An RBC for lead based on cancer risk or hazard index is not available. The 400 mg/kg OSWER residential soil guideline is used as an RBC for soil ingestion.

TABLE 5-15

REPRESENTATIVE CONCENTRATIONS AND STATISTICAL DISTRIBUTION OF COPCs - ZONE 3 SUBSURFACE SOIL, SITES 6 AND 7

NAWC WARMINSTER, PENNSYLVANIA

Substance	Number of Sample Results	Degrees of Freedom	Statistical Distribution of Site Data	Results of Shapiro-Wilk or Shapiro-Francia Distribution Tests			Table Value for $H_{0.05}$ (Lognorm.) or $T_{0.05}$ (Normal)	Standard Deviation or Log Standard Deviation	Arithmetic Mean of All Site Results	Upper 95 % Confidence Limit (UCL) on Mean	Maximum Positive Site Concentration	Representative Concentration (Lower of UCL vs Max)
				W-norm.	W-lognorm	W-Table						
aluminum	9	8	lognormal	0.7489	0.9408	0.829	2.5723	0.675	9460	17600	28400	17600
antimony	9	8	nonparametric (assumed lognorm.)	0.7315	0.7852	0.829	4.5638	1.55	11.9	177	48.3	48.3
arsenic	9	8	lognormal	0.9202	0.9482	0.829	2.4719	0.619	18	31.9	35.5	31.9
barium	9	8	lognormal	0.8006	0.9118	0.829	3.2259	0.994	218	728	536	536
beryllium	9	8	normal	0.9534	0.9375	0.829	1.8595	0.283	0.71	0.885	1.2	0.885
cadmium	9	8	lognormal	0.7826	0.9047	0.829	6.7539	2.4	48.5	56300	152	152
calcium	9	8	lognormal	0.7635	0.8843	0.829	4.6447	1.58	26400	499000	79600	79600
chromium	9	8	lognormal	0.6056	0.9561	0.829	7.7201	2.76	8050	74000000	46800	46800
cobalt	9	8	lognormal	0.7791	0.883	0.829	3.5818	1.15	41.7	196	146	146
copper	9	8	lognormal	0.733	0.9108	0.829	5.0055	1.73	211	6580	920	920
iron	9	8	nonparametric (assumed lognorm.)	0.717	0.8257	0.829	3.7563	1.22	100000	559000	264000	264000
lead	9	8	lognormal	0.4133	0.8577	0.829	5.953	2.09	926	54300	7700	7700
magnesium	9	8	lognormal	0.8391	0.934	0.829	2.2217	0.463	2300	3340	4970	3340
manganese	9	8	lognormal	0.9066	0.9205	0.829	2.2999	0.515	722	1120	1160	1120
mercury	9	8	lognormal	0.7991	0.9136	0.829	4.5581	1.55	1.22	21.9	3.4	3.4
nickel	9	8	lognormal	0.8524	0.8758	0.829	2.9497	0.866	29.9	78.5	66.2	66.2
potassium	9	8	nonparametric (assumed lognorm.)	0.4574	0.8189	0.829	3.6623	1.18	1350	4910	8740	4910
silver	9	8	lognormal	0.7832	0.8975	0.829	6.3331	2.24	132	60100	368	368
sodium	9	8	nonparametric (assumed lognorm.)	0.525	0.6313	0.829	2.2154	0.459	144	203	405	203
thallium	9	8	lognormal	0.8272	0.8443	0.829	4.5025	1.53	23	371	62.4	62.4
vanadium	9	8	normal	0.8625	0.6337	0.829	1.8595	11.5	19	26.2	32.3	26.2
zinc	9	8	nonparametric (assumed lognorm.)	0.3974	0.8192	0.829	7.0864	2.52	9020	3750000	78600	78600
Aroclor-1248	9	8	nonparametric (assumed lognorm.)	0.6935	0.8	0.829	4.2635	1.43	164	1570	710	710
Aroclor-1254	8	7	lognormal	0.6164	0.8192	0.818	6.5301	2.14	797	223000	4200	4200
Aroclor-1260	9	8	lognormal	0.5602	0.8721	0.829	6.1706	2.18	808	140000	5100	5100
1,2,4-trimethylbenzene	9	8	nonparametric (assumed lognorm.)	0.3965	0.5068	0.829	3.9677	1.31	22.1	79.8	170	79.8
1,3,5-trimethylbenzene	9	8	nonparametric (assumed lognorm.)	0.4012	0.5181	0.829	3.6925	1.2	16.5	50.4	120	50.4
2,4-dimethylphenol	9	8	nonparametric (assumed lognorm.)	0.5146	0.6524	0.829	2.3523	0.548	333	508	1100	508
4-methylphenol	9	8	nonparametric (assumed lognorm.)	0.4042	0.5211	0.829	3.4972	1.11	911	2480	6300	2480
benz(a)anthracene	9	8	lognormal	0.5593	0.9162	0.829	3.3555	1.05	293	977	120	120
benzo(a)pyrene	9	8	lognormal	0.5193	0.8532	0.829	3.4334	1.09	269	912	140	140
benzo(b)fluoranthene	9	8	nonparametric (assumed lognorm.)	0.4951	0.6788	0.829	2.5649	0.671	359	618	150	150
benzo(g,h,i)perylene	9	8	nonparametric (assumed lognorm.)	0.5279	0.7849	0.829	2.7063	0.746	353	683	89	89
benzo(k)fluoranthene	9	8	nonparametric (assumed lognorm.)	0.552	0.7139	0.829	2.5359	0.655	395	680	470	470
bis(2-ethylhexyl)phthalate	5	4	lognormal	0.6844	0.9069	0.762	6.9564	1.46	389	74100	310	310
chrysene	9	8	lognormal	0.8813	0.8984	0.829	2.5534	0.665	147	276	320	276
di-n-butylphthalate	9	8	nonparametric (assumed lognorm.)	0.3956	0.6562	0.829	4.8416	1.66	1920	16800	16000	16000
fluoranthene	9	8	lognormal	0.9032	0.9569	0.829	2.4983	0.634	164	295	360	295
indeno(1,2,3-cd)pyrene	9	8	nonparametric (assumed lognorm.)	0.529	0.7877	0.829	2.7142	0.75	352	688	87	87
phenanthrene	9	8	lognormal	0.8986	0.9722	0.829	2.5542	0.665	227	429	540	429
phenol	9	8	nonparametric (assumed lognorm.)	0.4079	0.5282	0.829	3.3666	1.06	800	2030	5300	2030
pyrene	9	8	lognormal	0.5185	0.8747	0.829	3.2296	1	282	806	230	230
2-butanone	9	8	nonparametric (assumed lognorm.)	0.537	0.7945	0.829	2.6885	0.737	53	100	52	52
acetone	9	8	lognormal	0.7822	0.8528	0.829	3.0956	0.935	107	307	330	307

TABLE 5-15
REPRESENTATIVE CONCENTRATIONS AND STATISTICAL DISTRIBUTION OF COPCs - ZONE 3 SUBSURFACE SOIL, SITES 6 AND 7
NAWC WARMINSTER, PENNSYLVANIA

Substance	Number of Sample Results	Degrees of Freedom	Statistical Distribution of Site Data	Results of Shapiro-Wilk or Shapiro-Francia Distribution Tests			Table Value for $H_{0.95}$ (Lognorm.) or $T_{0.95}$ (Normal)	Standard Deviation or Log Standard Deviation	Arithmetic Mean of All Site Results	Upper 95 % Confidence Limit (UCL) on Mean	Maximum Positive Site Concentration	Representative Concentration (Lower of UCL vs Max)
				W-norm.	W-lognorm	W-Table						
carbon disulfide	9	8	nonparametric (assumed lognorm.)	0.4462	0.5393	0.829	2.5326	0.653	5.39	8.98	3	3
ethylbenzene	9	8	nonparametric (assumed lognorm.)	0.4415	0.5798	0.829	2.821	0.804	7.17	13.9	36	13.9
toluene	9	8	nonparametric (assumed lognorm.)	0.5173	0.7779	0.829	2.8168	0.802	5.17	11	3	3
trichloroethene	9	8	nonparametric (assumed lognorm.)	0.4203	0.5518	0.829	3.1228	0.947	9.39	21.2	56	21.2
xylene (total)	9	8	nonparametric (assumed lognorm.)	0.3885	0.4974	0.829	5.1398	1.78	71.7	691	620	620

Notes:

Units are mg/kg for inorganics, ug/kg for organics.
Number of sample results excludes rejected data or blank-qualified data. Duplicates are consolidated into one result. Non-detected results are treated as present at one-half the detection limit in all calculations.
Statistical distribution of data is determined using Shapiro-Wilk test for n <= 50, Shapiro-Francia test for n > 50. Statistical significance level is 0.05.
A normal distribution is assumed if the test statistic W-norm. is >= than the reference value (W-table), and W-norm. > W-lognorm.
A lognormal distribution is assumed if the test statistic W-lognorm. is >= the reference value (W-table), and W-lognorm. >= W-norm. A lognormal distribution is also the default assumption if neither distribution passes Shapiro test.
H-values and standard deviations of log-transformed data are used to calculate the UCL if data are assumed to be lognormally distributed. Student's T-values and standard deviations are used for normally distributed data.
Arithmetic mean includes positive detections and non-detected results (detection limits are divided by two).
The representative concentration is selected as the lower of the 95 % UCL on the mean and the maximum positive site concentration.

thallium concentration. Four of the thallium concentrations exceeded the recreational RBC value. Aroclor 1254 was detected at a frequency of four out of eight subsurface soil samples. The representative concentration for Aroclor 1254 was equal to the maximum Aroclor 1254. Only the maximum concentration of Aroclor 1254 exceeded the recreational RBC value.

5.2.2 COPCs Selected Based on Residential RBCs

5.2.2.1 Surface Soils

Pesticides, PAHs, PCBs, phthalates, volatiles, and metals were detected in Sites 6 and 7 site-wide surface soil samples. The occurrence and distribution, COPC selection results (selected based on maximum concentrations versus residential RBCs), background comparisons, and representative concentrations for chemicals detected in Sites 6 and 7 site-wide surface soils are presented in Table 5-16. Results of individual background comparison test are presented in Table 5-17 (see Section 5.1.1.2 for detailed information on background comparison tests).

The following chemicals were selected as COPCs in surface soils:

Inorganics	Organics
Aluminum	Aroclor 1260
Arsenic	Benz(a)anthracene
Barium	Benzo(a)pyrene
Beryllium	Benzo(b)fluoranthene
Cadmium	Dibenz(a,h)anthracene
Chromium	Indeno(1,2,3-cd)pyrene
Copper	
Manganese	
Mercury	
Thallium	

Aluminum, arsenic, beryllium, chromium, and manganese were all detected in all surface soil samples. The representative concentrations for aluminum, arsenic, beryllium, chromium, and manganese were less than their respective maximum concentrations but exceeded their respective residential RBC values. Barium and copper were also detected in all surface soil samples. The representative concentrations for barium and copper were less than their respective maximum concentrations and were less than their respective residential RBC values. Cadmium was detected at a frequency of five out of 29 surface soil

TABLE 5-16

SELECTION OF CHEMICALS OF POTENTIAL CONCERN IN SITEWIDE SURFACE SOILS, SITES 6 AND 7 (RESIDENTIAL RBCs)

NAWC WARMINSTER, PENNSYLVANIA

Substance	Site-Related Frequency of Detection	Range of Positive Detections for Site		Are Site Results Above Background ?	Residential Risk-Based Concentration	Chemical Selected as a COPC ?	Representative Concentration For Site Data
		Minimum	Maximum				
aluminum	29/29	5940 -	22100	Y	7800	Y	14500
antimony	2/10	5.1 -	5.1	N	3.1	N	4.38
arsenic	29/29	4.6 -	15.1	Y	0.43	Y	9.88
barium	29/29	30.2 -	1030	Y	550	Y	111
beryllium	29/29	0.39 -	1.9	Y	0.15	Y	1.01
cadmium	5/29	3.3 -	18.9	Y	3.9	Y	2.98
calcium	29/29	506 -	40000	Y		N	6170
chromium	29/29	13.2 -	2760	Y	39	Y	239
cobalt	29/29	5.1 -	20.9	Y	470	N	10.8
copper	29/29	7.3 -	867	Y	310	Y	76
cyanide	1/17	3.9 -	3.9	N	160	N	0.912
iron	29/29	13200 -	56300	N	2300	N	24600
lead	29/29	8.3 -	278	Y	400	N	46.6
magnesium	29/29	1390 -	14400	Y		N	2950
manganese	29/29	123 -	3040	Y	180	Y	702
mercury	11/29	0.05 -	25.6	Y	2.3	Y	0.497
nickel	19/29	9.7 -	29.9	Y	160	N	14.6
potassium	28/29	363 -	973	N		N	660
silver	14/29	0.77 -	123	N	39	N	19.2
sodium	12/29	49.1 -	130	N		N	65.9
thallium	9/29	5.1 -	15.1	Y	0.51	Y	5.84
vanadium	29/29	13.4 -	41.7	N	55	N	32.3
zinc	29/29	24.9 -	1840	Y	2300	N	122
4,4'-DDD	1/16	7.7 -	7.7	N	2700	N	2.74
4,4'-DDT	2/16	5.5 -	6.5	N	1900	N	2.99
alpha-chlordane	1/17	8.2 -	8.2	NA	490	N	1.71
Aroclor-1254	3/29	180 -	490	N	1600	N	67.5

TABLE 5-16

SELECTION OF CHEMICALS OF POTENTIAL CONCERN IN SITEWIDE SURFACE SOILS, SITES 6 AND 7 (RESIDENTIAL RBCs)

NAWC WARMINSTER, PENNSYLVANIA

Substance	Site-Related Frequency of Detection	Range of Positive Detections for Site		Are Site Results Above Background ?	Residential Risk-Based Concentration	Chemical Selected as a COPC ?	Representative Concentration For Site Data
		Minimum	Maximum				
Aroclor-1260	6/29	13	1000	N	320	Y	53.2
endrin	1/17	14	14	NA	2300	N	3.19
2-methylnaphthalene	1/29	1100	1100	N		N	253
acenaphthene	1/29	4100	4100	N	470000	N	326
anthracene	2/29	100	6000	N	2300000	N	354
benz(a)anthracene	5/29	42	13000	N	880	Y	468
benzo(a)pyrene	5/29	45	11000	N	88	Y	462
benzo(b)fluoranthene	6/29	54	13000	N	880	Y	480
benzo(g,h,i)perylene	6/29	41	3700	N		N	336
benzo(k)fluoranthene	4/29	360	7900	N	8800	N	418
benzoic acid	3/12	220	240	NA	31000000	N	240
bis(2-ethylhexyl)phthalate	1/26	2700	2700	N	46000	N	372
butylbenzylphthalate	2/29	49	700	N	1600000	N	245
chrysene	5/29	53	14000	N	88000	N	474
dibenz(a,h)anthracene	3/29	44	1200	N	88	Y	265
dibenzofuran	1/29	2100	2100	N	31000	N	284
fluoranthene	7/29	36	28000	N	310000	N	665
fluorene	1/29	2800	2800	N	310000	N	300
indeno(1,2,3-cd)pyrene	5/29	49	4600	N	880	Y	344
phenanthrene	4/29	53	28000	N		N	582
pyrene	5/29	73	25000	N	230000	N	594
bromomethane	1/29	3	3	NA	11000	N	3
methylene chloride	2/25	4	6	N	85000	N	6
toluene	11/29	1	15	N	1600000	N	5.32
trichloroethene	9/29	1	4	NA	58000	N	4

TABLE 5-16
SELECTION OF CHEMICALS OF POTENTIAL CONCERN IN SITEWIDE SURFACE SOILS, SITES 6 AND 7 (RESIDENTIAL RBCs)
NAWC WARMINSTER, PENNSYLVANIA
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Notes:

Units are mg/kg for inorganics, ug/kg for organics.
Metals are selected as COPCs if maximum values exceed risk-based screening levels (RBCs) and site results are either above background or background comparison tests are indeterminate (NA).
Minerals that are essential nutrients (calcium, magnesium, sodium, potassium) are not included as COPCs.
The determination of site results exceeding background is based on an overall evaluation of statistical tests presented in a separate table.
Because most organics are not naturally occuring, selection of organic COPCs is based solely on exceedance of RBCs.

TABLE 5-17

REPRESENTATIVE CONCENTRATION AND STATISTICAL DISTRIBUTION OF COPCs - SITEWIDE SURFACE SOIL, SITES 6 AND 7

NAWC WARMINSTER, PENNSYLVANIA

Substance	Number of Sample Results	Degrees of Freedom	Statistical Distribution of Site Data	Results of Shapiro-Wilk or Shapiro-Francia Distribution Tests			Table Value for $H_{0.95}$ (Lognorm.) or $T_{0.95}$ (Normal)	Standard Deviation or Log Standard Deviation	Arithmetic Mean of All Site Results	Upper 95 % Confidence Limit (UCL) on Mean	Maximum Positive Site Concentration	Representative Concentration (Lower of UCL vs Max)
				W-norm.	W-lognorm.	W-Table						
aluminum	33	32	normal	0.9616	0.9223	0.931	1.6939	3080	13500	14400	22100	14400
antimony	10	9	nonparametric (assumed lognorm.)	0.8076	0.7992	0.842	2.3915	0.615	2.63	4.38	5.1	4.38
arsenic	33	32	nonparametric (assumed lognorm.)	0.7837	0.8314	0.931	1.873	0.435	8.02	9.24	15.1	9.24
barium	33	32	nonparametric (assumed lognorm.)	0.3094	0.7674	0.931	2.0218	0.625	96.5	103	1030	103
beryllium	33	32	lognormal	0.9119	0.972	0.931	1.8102	0.338	0.896	1	1.9	1
cadmium	33	32	nonparametric (assumed lognorm.)	0.4992	0.7336	0.931	2.7554	1.28	2.18	3.05	18.9	3.05
calcium	33	32	nonparametric (assumed lognorm.)	0.4178	0.7429	0.931	2.5986	1.16	4360	5080	40000	5080
chromium	33	32	nonparametric (assumed lognorm.)	0.3906	0.7711	0.931	2.9513	1.43	188	259	2760	259
cobalt	33	32	lognormal	0.8364	0.9486	0.931	1.778	0.281	9.95	10.8	20.9	10.8
copper	33	32	nonparametric (assumed lognorm.)	0.3557	0.8002	0.931	2.5401	1.11	58.9	64.4	867	64.4
cyanide	21	20	nonparametric (assumed lognorm.)	0.4553	0.4897	0.908	2.2088	0.716	1.1	1.41	4.7	1.41
iron	33	32	nonparametric (assumed lognorm.)	0.7534	0.9238	0.931	1.7737	0.272	22600	24500	56300	24500
lead	33	32	nonparametric (assumed lognorm.)	0.4279	0.7537	0.931	2.5191	1.1	55.1	64	634	64
magnesium	33	32	nonparametric (assumed lognorm.)	0.3936	0.6398	0.931	1.8774	0.441	2570	2820	14400	2820
manganese	33	32	lognormal	0.5901	0.9477	0.931	2.0242	0.628	539	652	3040	652
mercury	33	32	nonparametric (assumed lognorm.)	0.2044	0.7246	0.931	2.9448	1.43	0.902	0.439	25.6	0.439
nickel	33	32	nonparametric (assumed lognorm.)	0.8987	0.8924	0.931	2.0042	0.605	11.2	14.2	29.9	14.2
potassium	33	32	normal	0.9535	0.9019	0.931	1.6939	214	616	679	1290	679
silver	33	32	nonparametric (assumed lognorm.)	0.424	0.7928	0.931	3.3786	1.73	8.79	17.3	123	17.3
sodium	33	32	nonparametric (assumed lognorm.)	0.8035	0.8732	0.931	1.9178	0.497	52.4	61.6	130	61.6
thallium	33	32	nonparametric (assumed lognorm.)	0.6675	0.7199	0.931	2.7096	1.25	2.62	4.51	15.1	4.51
vanadium	33	32	normal	0.9658	0.9079	0.931	1.6939	6.17	30.1	31.9	41.7	31.9
zinc	33	32	nonparametric (assumed lognorm.)	0.3112	0.7701	0.931	2.3327	0.935	121	126	1840	126
4,4'-DDD	20	19	nonparametric (assumed lognorm.)	0.2831	0.3338	0.905	1.8397	0.302	2.3	2.56	7.7	2.56
4,4'-DDT	20	19	nonparametric (assumed lognorm.)	0.5646	0.5966	0.905	1.9578	0.454	2.82	3.4	7.9	3.4
alpha-chlordane	21	20	nonparametric (assumed lognorm.)	0.2471	0.2973	0.908	1.949	0.454	1.37	1.54	8.2	1.54
Aroclor-1254	33	32	nonparametric (assumed lognorm.)	0.3784	0.4406	0.931	2.2701	0.878	54.9	57.9	490	57.9
Aroclor-1260	33	32	nonparametric (assumed lognorm.)	0.2281	0.4728	0.931	2.1683	0.78	55.5	47	1000	47
endrin	21	20	nonparametric (assumed lognorm.)	0.2489	0.2968	0.908	1.925	0.425	2.58	2.9	14	2.9
2-methylnaphthalene	33	32	nonparametric (assumed lognorm.)	0.2202	0.293	0.931	1.7867	0.297	231	246	1100	246
acenaphthene	33	32	nonparametric (assumed lognorm.)	0.1876	0.2406	0.931	1.9389	0.524	322	306	4100	306
anthracene	33	32	nonparametric (assumed lognorm.)	0.1894	0.296	0.931	2.0066	0.607	376	328	6000	328
benz(a)anthracene	33	32	nonparametric (assumed lognorm.)	0.1917	0.423	0.931	2.192	0.803	591	417	13000	417
benzo(a)pyrene	33	32	nonparametric (assumed lognorm.)	0.1989	0.4523	0.931	2.1682	0.78	538	412	11000	412
benzo(b)fluoranthene	33	32	nonparametric (assumed lognorm.)	0.1973	0.4817	0.931	2.2179	0.828	593	425	13000	425
benzo(g,h,i)perylene	33	32	nonparametric (assumed lognorm.)	0.2239	0.5305	0.931	2.068	0.676	295	313	3700	313
benzo(k)fluoranthene	33	32	nonparametric (assumed lognorm.)	0.2001	0.3473	0.931	2.0533	0.66	454	381	7900	381
benzoic acid	12	11	nonparametric (assumed lognorm.)	0.3574	0.4301	0.859	2.2156	0.559	316	423	240	240
bis(2-ethylhexyl)phthalate	30	29	nonparametric (assumed lognorm.)	0.2423	0.4925	0.927	2.1449	0.737	274	337	2700	337
butylbenzylphthalate	33	32	nonparametric (assumed lognorm.)	0.3536	0.4614	0.931	1.8092	0.336	214	238	700	238
chrysene	33	32	nonparametric (assumed lognorm.)	0.191	0.4133	0.931	2.1906	0.802	623	421	14000	421

TABLE 5-17

REPRESENTATIVE CONCENTRATION AND STATISTICAL DISTRIBUTION OF COPCs - SITEWIDE SURFACE SOIL, SITES 6 AND 7

NAWC WARMINSTER, PENNSYLVANIA

Substance	Number of Sample Results	Degrees of Freedom	Statistical Distribution of Site Data	Results of Shapiro-Wilk or Shapiro-Francia Distribution Tests			Table Value for $H_{0.95}$ (Lognorm.) or $T_{0.95}$ (Normal)	Standard Deviation or Log Standard Deviation	Arithmetic Mean of All Site Results	Upper 95 % Confidence Limit (UCL) on Mean	Maximum Positive Site Concentration	Representative Concentration (Lower of UCL vs Max)
				W-norm.	W-lognorm.	W-Table						
dibenz(a,h)anthracene	33	32	nonparametric (assumed lognorm.)	0.2957	0.5051	0.931	1.8893	0.458	224	256	1200	256
dibenzofuran	33	32	nonparametric (assumed lognorm.)	0.1977	0.2596	0.931	1.8551	0.408	261	271	2100	271
fluoranthene	33	32	nonparametric (assumed lognorm.)	0.1906	0.5265	0.931	2.4203	1.01	1050	561	28000	561
fluorene	33	32	nonparametric (assumed lognorm.)	0.1923	0.2502	0.931	1.8895	0.458	282	285	2800	285
indeno(1,2,3-cd)pyrene	33	32	nonparametric (assumed lognorm.)	0.2075	0.4523	0.931	2.0357	0.641	328	319	4600	319
phenanthrene	33	32	nonparametric (assumed lognorm.)	0.184	0.3849	0.931	2.3201	0.924	1040	501	28000	501
pyrene	33	32	nonparametric (assumed lognorm.)	0.1892	0.3962	0.931	2.2918	0.898	971	513	25000	513
bromomethane	33	32	nonparametric (assumed lognorm.)	0.6384	0.5637	0.931	1.7176	0.151	6.17	6.47	3	3
methylene chloride	29	28	nonparametric (assumed lognorm.)	0.8889	0.8581	0.926	2.1834	0.768	4.64	6.85	6	6
tetrachloroethene	33	32	nonparametric (assumed lognorm.)	0.8161	0.7964	0.931	1.8275	0.366	4.97	5.63	8	5.63
toluene	33	32	nonparametric (assumed lognorm.)	0.7942	0.9273	0.931	2.0176	0.62	4.14	5.23	15	5.23
trichloroethene	33	32	nonparametric (assumed lognorm.)	0.4789	0.898	0.931	2.0953	0.705	4.58	5.73	32	5.73

Notes:

Units are mg/kg for inorganics, ug/kg for organics.

Number of sample results excludes rejected data or blank-qualified data. Duplicates are consolidated into one result. Non-detected results are treated as present at one-half the detection limit in all calculations.

Statistical distribution of data is determined using Shapiro-Wilk test for n <= 50, Shapiro-Francia test for n > 50. Statistical significance level is 0.05.

A normal distribution is assumed if the test statistic W-norm. is >= than the reference value (W-table), and W-norm. > W-lognorm.

A lognormal distribution is assumed if the test statistic W-lognorm. is >= the reference value (W-table), and W-lognorm. >= W-norm. A lognormal distribution is also the default assumption if neither distribution passes Shapiro test.

H-values and standard deviations of log-transformed data are used to calculate the UCL if data are assumed to be lognormally distributed. Student's T-values and standard deviations are used for normally distributed data.

Arithmetic mean includes positive detections and non-detected results (detection limits are divided by two).

The representative concentration is selected as the lower of the 95 % UCL on the mean and the maximum positive site concentration.

samples. The representative concentration for cadmium was less than the maximum cadmium concentration and was less than the residential RBC value. Mercury was detected at a frequency of 11 out of 29 surface soil samples. The representative concentration for mercury was less than the maximum mercury concentration and was less than the residential RBC value. Thallium was detected at a frequency of nine out of 29 surface soil samples. The representative concentration for thallium was less than the maximum thallium concentration but was greater than the residential RBC value. Aroclor 1260 was detected at a frequency of six out 29 surface soil samples. The representative concentration for Aroclor 1260 was less than the maximum Aroclor 1260 concentration and was less than the residential RBC value. Carcinogenic PAHs were generally detected in 15 percent of the surface soil samples collected at NAWC Sites 6 and 7. The representative concentrations for benzo(a)pyrene and dibenz(a,h)anthracene were less than their respective maximum concentrations but were greater than their respective residential RBC values. The representative concentrations for benz(a)anthracene, benzo(b)fluoranthene, and indeno(1,2,3-cd)pyrene were less than their respective maximum concentrations and less than their respective residential RBC values.

5.2.2.2 Subsurface Soil (Based on Residential RBCs)

Pesticides, PCBs, PAHs, volatiles, phthalates, semivolatiles, and metals were detected in Sites 6 and 7 site-wide subsurface soil samples. The occurrence and distribution, COPC selection results (selected based on maximum concentration versus residential RBCs), background comparisons, and representative concentrations for chemicals detected in Sites 6 and 7 site-wide subsurface soils are presented in Table 5-18. Results of individual background comparison test are presented in Table 5-19 (see Section 5.1.1.2 for detailed information on background comparison tests).

The following chemicals were selected as COPCs in subsurface soils:

Inorganics	Organics
Aluminum	Aroclor-1248
Arsenic	Aroclor 1254
Barium	Aroclor-1260
Beryllium	Benz(a)anthracene
Cadmium	Benzo(a)pyrene
Chromium	Benzo(b)fluoranthene
Copper	Dibenz(a,h)anthracene
Iron	Indeno(1,2,3-cd)pyrene
Lead*	
Manganese	

TABLE 5-18

SELECTION OF CHEMICALS OF POTENTIAL CONCERN IN SITEWIDE SUBSURFACE SOILS, SITES 6 AND 7 (RESIDENTIAL RBCs)

NAWC WARMINISTER, PENNSYLVANIA

Substance	Site-Related Frequency of Detection	Range of Positive Detections for Site		Are Site Results Above Background ?	Residential Risk-Based Concentration	Chemical Selected as a COPC ?	Representative Concentration For Site Data
		Minimum	Maximum				
ALUMINUM	86/86	1970 -	251000	Y	7800	Y	15600
ANTIMONY	22/86	2.6 -	164	N	31	N	7.16
ARSENIC	83/86	0.86 -	80.7	Y	0.43	Y	12.6
BARIUM	83/86	12.6 -	922	Y	550	Y	130
BERYLLIUM	81/86	0.23 -	4.6	Y	0.15	Y	0.99
CADMIUM	31/85	0.41 -	152	Y	3.9	Y	23.5
CALCIUM	83/86	340 -	145000	Y		N	27400
CHROMIUM	85/86	4.4 -	46800	Y	39	Y	2280
COBALT	83/86	1.8 -	146	Y	470	N	18.3
COPPER	83/86	2.9 -	14300	Y	310	Y	230
IRON	86/86	4130 -	264000	Y	2300	Y	51000
LEAD	85/86	3.1 -	39300	Y	400	Y	130
MAGNESIUM	84/86	456 -	77000	Y		N	3650
MANGANESE	86/86	65 -	1320	Y	180	Y	592
MERCURY	32/86	0.06 -	5.6	Y	2.3	Y	0.818
NICKEL	86/86	2.9 -	345	Y	160	Y	27.1
POTASSIUM	80/86	138 -	8740	Y		N	808
SELENIUM	4/86	0.83 -	5	NA	39	N	2.84
SILVER	62/86	0.63 -	368	Y	39	Y	111
SODIUM	73/85	44.6 -	740	Y		N	130
THALLIUM	40/86	3.7 -	89.1	Y	0.51	Y	19.6
VANADIUM	82/86	6.3 -	73	Y	55	Y	40.8
ZINC	83/86	9.1 -	78600	Y	2300	Y	370
4,4'-DDE	1/11	3.725 -	3.725	N	1900	N	2.61
4,4'-DDT	2/11	4.8 -	10.2	N	1900	N	4.42
ALPHA-CHLORDANE	1/11	8.4 -	8.4	NA	490	N	2.46

TABLE 5-18
SELECTION OF CHEMICALS OF POTENTIAL CONCERN IN SITEWIDE SUBSURFACE SOILS, SITES 6 AND 7 (RESIDENTIAL RBCs)
NAWC WARMINISTER, PENNSYLVANIA
PAGE 2 OF 3

Substance	Site-Related Frequency of Detection	Range of Positive Detections for Site			Are Site Results Above Background ?	Residential Risk-Based Concentration	Chemical Selected as a COPC ?	Representative Concentration For Site Data
		Minimum		Maximum				
AROCLOR-1242	1/72	21	-	21	NA	320	N	21
AROCLOR-1248	2/73	75	-	710	N	320	Y	44.6
AROCLOR-1254	25/72	7.2	-	4200	Y	160	Y	146
AROCLOR-1260	27/73	9	-	5100	Y	320	Y	190
DIELDRIN	1/10	6.1	-	6.1	NA	40	N	3.05
GAMMA-CHLORDANE	1/11	9.2	-	9.2	NA	490	N	2.6
METHOXYCHLOR	1/11	14	-	14	NA	39000	N	12.4
1,2,4-TRIMETHYLBENZENE	1/62	170	-	170	NA	390000	N	5.07
1,3,5-TRIMETHYLBENZENE	1/62	120	-	120	NA	390000	N	4.89
1,3-DICHLOROBENZENE	1/72	8	-	8	NA	700000	N	8
2,4-DIMETHYLPHENOL	1/72	1100	-	1100	N	160000	N	243
2-METHYLNAPHTHALENE	1/72	50	-	50	NA		N	50
4-METHYLPHENOL	1/72	6300	-	6300	N	39000	N	276
ACENAPHTHENE	2/72	45	-	49	NA	470000	N	49
ACENAPHTHYLENE	3/72	48	-	89	NA		N	89
ANTHRACENE	5/72	79	-	340	NA	2300000	N	250
BENZ(A)ANTHRACENE	25/72	33	-	1500	N	880	Y	282
BENZO(A)PYRENE	25/72	42	-	2800	N	88	Y	291
BENZO(B)FLUORANTHENE	16/72	82	-	4100	N	880	Y	340
BENZO(G,H,I)PERYLENE	16/72	43	-	330	NA		N	245
BENZO(K)FLUORANTHENE	13/72	87	-	1600	N	8800	N	300
BIS(2-ETHYLHEXYL)PHTHAL	17/55	39	-	5400	Y	46000	N	395
BUTYLBENZYLPHTHALATE	3/72	55	-	70	NA	1600000	N	70
CHRYSENE	27/72	33	-	1600	Y	88000	N	271
DI-N-BUTYLPHTHALATE	13/72	29	-	16000	N	780000	N	295

TABLE 5-18

SELECTION OF CHEMICALS OF POTENTIAL CONCERN IN SITEWIDE SUBSURFACE SOILS, SITES 6 AND 7 (RESIDENTIAL RBCs)

NAWC WARMINISTER, PENNSYLVANIA

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Substance	Site-Related Frequency of Detection	Range of Positive Detections for Site		Are Site Results Above Background ?	Residential Risk-Based Concentration	Chemical Selected as a COPC ?	Representative Concentration For Site Data
		Minimum	Maximum				
DIBENZ(A,H)ANTHRACENE	4/72	63	220	NA	88	Y	220
FLUORANTHENE	29/72	35	1800	N	310000	N	298
FLUORENE	1/72	50	50	NA	310000	N	50
INDENO(1,2,3-CD)PYRENE	14/72	46	1200	N	880	Y	259
PHENANTHRENE	17/72	43	620	N		N	254
PHENOL	1/72	5300	5300	N	4700000	N	270
PYRENE	28/72	35	2000	N	230000	N	339
2-BUTANONE	3/85	18	52	NA	4700000	N	38.2
ACETONE	17/84	22	330	N	780000	N	70.9
CARBON DISULFIDE	2/85	2	3	NA	780000	N	3
ETHYLBENZENE	1/85	36	36	NA	780000	N	5.07
N-BUTYLBENZENE	1/62	1	1	NA		N	1
P-ISOPROPYLTOLUENE	1/62	3	3	NA		N	3
SEC-BUTYLBENZENE	1/62	0.9	0.9	NA	78000	N	0.9
TETRACHLOROETHENE	2/85	4	28	NA	12000	N	4.81
TOLUENE	3/85	1	3	N	1600000	N	3
TRICHLOROETHENE	1/85	56	56	NA	58000	N	5.19
XYLENE (TOTAL)	3/85	2	620	N	16000000	N	6.14

Notes:

Units are mg/kg for inorganics, ug/kg for organics.

Metals are selected as COPCs if maximum values exceed risk-based screening levels (RBCs) and site results are either above background or background comparison tests are indeterminate (NA).

Minerals that are essential nutrients (calcium, magnesium, sodium, potassium) are not included as COPCs.

The determination of site results exceeding background is based on an overall evaluation of statistical tests presented in a separate table.

Because most organics are not naturally occuring, selection of organic COPCs is based solely on exceedance of RBCs.

RBCs represent concentrations associated with a 10^{-6} cancer risk level or a non-cancer hazard index of 0.1.

Residential RBCs originate from EPA Region 3 RBCs for residential exposure, incidental soil ingestion, with non-cancer risk adjusted to 0.1 hazard i

An RBC for lead based on cancer risk or hazard index is not available. The 400 mg/kg OSWER residential soil guideline is used as an RBC for soil ingestion.

TABLE 5-19
REPRESENTATIVE CONCENTRATION AND STATISTICAL DISTRIBUTION OF COPCS - SITEWIDE SUBSURFACE SOIL SITES 6 AND 7
NAWC WARMINSTER, PENNSYLVANIA

Substance	Number of Sample Results	Degrees of Freedom	Statistical Distribution of Site Data	Results of Shapiro-Wilk or Shapiro-Francia Distribution Tests			Table Value for $H_{0.95}$ (Lognorm.) or $T_{0.95}$ (Normal)	Standard Deviation or Log Standard Deviation	Arithmetic Mean of All Site Results	Upper 95 % Confidence Limit (UCL) on Mean	Maximum Positive Site Concentration	Representative Concentration (Lower of UCL vs Max)
				W-norm.	W-lognorm	W-Table						
aluminum	86	85	nonparametric (assumed lognorm.)	0.2124	0.8534	0.985	1.924	0.633	15000	15600	251000	15600
antimony	86	85	nonparametric (assumed lognorm.)	0.2769	0.7946	0.985	2.3284	1.11	7.26	7.16	164	7.16
arsenic	86	85	nonparametric (assumed lognorm.)	0.6074	0.9644	0.985	1.9869	0.72	10.9	12.6	80.7	12.6
barium	86	85	nonparametric (assumed lognorm.)	0.5884	0.9555	0.985	2.1141	0.877	113	130	922	130
beryllium	86	85	nonparametric (assumed lognorm.)	0.6854	0.9661	0.985	1.8472	0.515	0.898	0.99	4.6	0.99
cadmium	85	84	nonparametric (assumed lognorm.)	0.4733	0.7556	0.985	3.4786	2.11	13.2	23.5	152	23.5
calcium	86	85	nonparametric (assumed lognorm.)	0.5603	0.8991	0.985	2.9868	1.71	17200	27400	145000	27400
chromium	86	85	nonparametric (assumed lognorm.)	0.2752	0.7956	0.985	3.7068	2.29	1650	2280	46800	2280
cobalt	86	85	nonparametric (assumed lognorm.)	0.5355	0.8728	0.985	2.0296	0.775	16.7	18.3	146	18.3
copper	86	85	nonparametric (assumed lognorm.)	0.1606	0.8457	0.985	2.9237	1.66	330	230	14300	230
iron	86	85	nonparametric (assumed lognorm.)	0.5312	0.839	0.985	2.1762	0.948	46800	51000	264000	51000
lead	86	85	nonparametric (assumed lognorm.)	0.0963	0.8228	0.985	2.7802	1.53	595	130	39300	130
magnesium	86	85	nonparametric (assumed lognorm.)	0.2468	0.7953	0.985	2.0375	0.785	3930	3650	77000	3650
manganese	86	85	nonparametric (assumed lognorm.)	0.9459	0.97	0.985	1.8861	0.576	517	592	1320	592
mercury	86	85	nonparametric (assumed lognorm.)	0.5476	0.7929	0.985	2.8291	1.57	0.624	0.818	5.6	0.818
nickel	86	85	nonparametric (assumed lognorm.)	0.3975	0.8749	0.985	2.0672	0.821	25.8	27.1	345	27.1
potassium	86	85	nonparametric (assumed lognorm.)	0.3478	0.9401	0.985	1.9751	0.704	722	808	8740	808
selenium	86	85	nonparametric (assumed lognorm.)	0.8377	0.7618	0.985	2.0601	0.812	2.17	2.84	5	2.84
silver	86	85	nonparametric (assumed lognorm.)	0.5202	0.8012	0.985	3.7402	2.32	45.8	111	368	111
sodium	85	84	nonparametric (assumed lognorm.)	0.5879	0.9287	0.985	1.9119	0.614	117	130	740	130
thallium	86	85	nonparametric (assumed lognorm.)	0.5654	0.957	0.985	2.9324	1.66	10.9	19.6	89.1	19.6
vanadium	86	85	nonparametric (assumed lognorm.)	0.9338	0.5861	0.985	2.1653	0.935	26.2	40.8	73	40.8
zinc	86	85	nonparametric (assumed lognorm.)	0.0887	0.8331	0.985	2.7822	1.53	1150	370	78600	370
4,4'-DDE	11	10	nonparametric (assumed lognorm.)	0.7073	0.7522	0.85	1.8879	0.233	2.27	2.61	3.725	2.61
4,4'-DDT	11	10	nonparametric (assumed lognorm.)	0.5696	0.6992	0.85	2.2266	0.538	3.11	4.42	10.2	4.42
alpha-chlordane	11	10	nonparametric (assumed lognorm.)	0.371	0.4444	0.85	2.3714	0.639	1.7	2.46	8.4	2.46
Aroclor-1242	72	71	nonparametric (assumed lognorm.)	0.3504	0.5642	0.983	1.9328	0.626	37.2	37.6	21	21
Aroclor-1248	73	72	nonparametric (assumed lognorm.)	0.2901	0.5749	0.984	2.0163	0.708	47.1	44.6	710	44.6
Aroclor-1254	72	71	nonparametric (assumed lognorm.)	0.2776	0.7324	0.983	2.5701	1.29	180	146	4200	146
Aroclor-1260	73	72	nonparametric (assumed lognorm.)	0.2985	0.6955	0.984	2.744	1.44	221	190	5100	190
dieldrin	10	9	nonparametric (assumed lognorm.)	0.4589	0.5302	0.842	2.0456	0.363	2.41	3.05	6.1	3.05
gamma-chlordane	11	10	nonparametric (assumed lognorm.)	0.3679	0.44	0.85	2.4129	0.666	1.77	2.6	9.2	2.6
methoxychlor	11	10	nonparametric (assumed lognorm.)	0.7949	0.8282	0.85	1.8393	0.174	11.2	12.4	14	12.4
1,2,4-trimethylbenzene	62	61	nonparametric (assumed lognorm.)	0.1301	0.2875	0.981	1.9381	0.615	6.62	5.07	170	5.07
1,3,5-trimethylbenzene	62	61	nonparametric (assumed lognorm.)	0.1467	0.2986	0.981	1.9129	0.579	5.81	4.89	120	4.89
1,3-dichlorobenzene	72	71	nonparametric (assumed lognorm.)	0.445	0.5278	0.983	2.7617	1.47	31.7	29.3	8	8
2,4-dimethylphenol	72	71	nonparametric (assumed lognorm.)	0.3054	0.5171	0.983	1.7299	0.265	234	243	1100	243
2-methylnaphthalene	72	71	nonparametric (assumed lognorm.)	0.2678	0.5168	0.983	1.7624	0.339	237	249	50	50
4-methylphenol	72	71	nonparametric (assumed lognorm.)	0.1063	0.3204	0.983	1.8135	0.437	307	276	6300	276
acenaphthene	72	71	nonparametric (assumed lognorm.)	0.2868	0.5343	0.983	1.7867	0.387	235	251	49	49
acenaphthylene	72	71	nonparametric (assumed lognorm.)	0.2973	0.5757	0.983	1.7862	0.387	233	248	89	89
anthracene	72	71	nonparametric (assumed lognorm.)	0.2986	0.5985	0.983	1.7606	0.335	239	250	340	250
benz(a)anthracene	72	71	nonparametric (assumed lognorm.)	0.495	0.8288	0.983	1.9947	0.709	245	282	1500	282
benzo(a)pyrene	72	71	nonparametric (assumed lognorm.)	0.3511	0.795	0.983	1.9764	0.685	268	291	2800	291

TABLE 5-19
REPRESENTATIVE CONCENTRATION AND STATISTICAL DISTRIBUTION OF COPCS - WITEWIDE SUBSURFACE SOIL SITES 6 AND 7
NAWC WARMINSTER, PENNSYLVANIA
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Substance	Number of Sample Results	Degrees of Freedom	Statistical Distribution of Site Data	Results of Shapiro-Wilk or Shapiro-Francia Distribution Tests			Table Value for $H_{0.95}$ (Lognorm.) or $T_{0.95}$ (Normal)	Standard Deviation or Log Standard Deviation	Arithmetic Mean of All Site Results	Upper 95 % Confidence Limit (UCL) on Mean	Maximum Positive Site Concentration	Representative Concentration (Lower of UCL vs Max)
				W-norm.	W-lognorm	W-Table						
benzo(b)fluoranthene	72	71	nonparametric (assumed lognorm.)	0.304	0.6817	0.983	1.9316	0.624	336	340	4100	340
benzo(g,h,i)perylene	72	71	nonparametric (assumed lognorm.)	0.3804	0.7215	0.983	1.8431	0.488	222	245	330	245
benzo(k)fluoranthene	72	71	nonparametric (assumed lognorm.)	0.4343	0.6915	0.983	1.8422	0.487	282	300	1600	300
bis(2-ethylhexyl)phthalate	55	54	nonparametric (assumed lognorm.)	0.2973	0.7739	0.98	2.0662	0.884	372	395	5400	395
butylbenzylphthalate	72	71	nonparametric (assumed lognorm.)	0.2916	0.5681	0.983	1.7873	0.339	231	247	70	70
chrysene	72	71	nonparametric (assumed lognorm.)	0.4806	0.8176	0.983	1.969	0.675	237	271	1600	271
di-n-butylphthalate	72	71	nonparametric (assumed lognorm.)	0.0932	0.5416	0.983	2.0236	0.746	413	295	16000	295
dibenz(a,h)anthracene	72	71	nonparametric (assumed lognorm.)	0.2934	0.5854	0.983	1.7741	0.363	234	248	220	220
fluoranthene	72	71	nonparametric (assumed lognorm.)	0.482	0.8446	0.983	2.0173	0.738	263	298	1800	298
fluorene	72	71	nonparametric (assumed lognorm.)	0.2663	0.5123	0.983	1.7622	0.339	237	249	50	50
indeno(1,2,3-cd)pyrene	72	71	nonparametric (assumed lognorm.)	0.3826	0.7007	0.983	1.8474	0.496	239	259	1200	259
phenanthrene	72	71	nonparametric (assumed lognorm.)	0.7175	0.8048	0.983	1.8552	0.508	225	254	620	254
phenol	72	71	nonparametric (assumed lognorm.)	0.1155	0.3687	0.983	1.8063	0.424	291	270	5300	270
pyrene	72	71	nonparametric (assumed lognorm.)	0.4719	0.8232	0.983	2.0516	0.78	303	339	2000	339
2-butanone	85	84	nonparametric (assumed lognorm.)	0.2912	0.7746	0.985	2.0986	0.857	32.5	38.2	52	38.2
acetone	84	83	nonparametric (assumed lognorm.)	0.4337	0.8451	0.985	2.5799	1.35	39.6	70.9	330	70.9
carbon disulfide	85	84	nonparametric (assumed lognorm.)	0.3134	0.6811	0.985	1.8172	0.462	4.73	4.89	3	3
ethylbenzene	85	84	nonparametric (assumed lognorm.)	0.2972	0.6464	0.985	1.8275	0.48	4.96	5.07	36	5.07
n-butylbenzene	62	61	nonparametric (assumed lognorm.)	0.2015	0.4191	0.981	1.8354	0.46	4.2	4.25	1	1
p-isopropyltoluene	62	61	nonparametric (assumed lognorm.)	0.1907	0.3541	0.981	1.8191	0.432	4.23	4.24	3	3
sec-butylbenzene	62	61	nonparametric (assumed lognorm.)	0.202	0.4214	0.981	1.8383	0.465	4.2	4.25	0.9	0.9
tetrachloroethene	85	84	nonparametric (assumed lognorm.)	0.4175	0.6983	0.985	1.7998	0.429	4.58	4.81	28	4.81
toluene	85	84	nonparametric (assumed lognorm.)	0.3258	0.7199	0.985	1.8309	0.486	4.72	4.93	3	3
trichloroethene	85	84	nonparametric (assumed lognorm.)	0.2548	0.6189	0.985	1.8424	0.506	5.19	5.19	56	5.19
xylene (total)	85	84	nonparametric (assumed lognorm.)	0.0848	0.4647	0.985	1.9671	0.692	11.8	6.14	620	6.14

Notes:

Units are mg/kg for inorganics, ug/kg for organics.
Number of sample results excludes rejected data or blank-qualified data. Duplicates are consolidated into one result. Non-detected results are treated as present at one-half the detection limit in all calculations.
Statistical distribution of data is determined using Shapiro-Wilk test for n <= 50, Shapiro-Francia test for n > 50. Statistical significance level is 0.05.
A normal distribution is assumed if the test statistic W-norm. is >= than the reference value (W-table), and W-norm. > W-lognorm.
A lognormal distribution is assumed if the test statistic W-lognorm. is >= the reference value (W-table), and W-lognorm. >= W-norm. A lognormal distribution is also the default assumption if neither distribution passes Shapiro test.
H-values and standard deviations of log-transformed data are used to calculate the UCL if data are assumed to be lognormally distributed. Student's T-values and standard deviations are used for normally distributed data.
Arithmetic mean includes positive detections and non-detected results (detection limits are divided by two).
The representative concentration is selected as the lower of the 95 % UCL on the mean and the maximum positive site concentration.

Mercury
Nickel
Silver
Thallium
Vanadium
Zinc

*Lead does not have an EPA qualitative listed toxicity value and exposure to lead will be evaluated for residential children only using the IEUBK Lead Model (v. 0.99).

Aluminum was detected at a frequency of 86 out of 86 subsurface soil samples. The representative concentration for aluminum was less than the maximum aluminum concentration but was greater than the residential RBC value. Arsenic was detected at a frequency of 83 out of 86 subsurface soil samples. The representative concentration for arsenic was less than the maximum arsenic concentration but was greater than the residential RBC value. Barium was detected at a frequency of 83 out of 86 subsurface soil samples. The representative concentration for barium was less than the maximum barium concentration and less than the residential RBC value. Beryllium was detected at a frequency of 81 out of 86 subsurface soil samples. The representative concentration for beryllium was less than the maximum beryllium concentration but was greater than the residential RBC value. Cadmium was detected at a frequency of 31 out of 85 subsurface soil samples. The representative concentration for cadmium was less than the maximum cadmium concentration but was greater than the residential RBC value. Chromium was detected at a frequency of 85 out of 86 subsurface soil samples. The representative concentration for chromium was less than the maximum chromium concentration but was greater than the residential RBC value. Copper was detected at a frequency of 83 out of 86 subsurface soil samples. The representative concentration for copper was less than the maximum copper concentration and less than the residential RBC value. Iron was detected at a frequency of 86 out of 86 subsurface soil samples. The representative concentration for iron was less than the maximum iron concentration but was greater than the residential RBC value. Lead was detected at a frequency of 85 out of 86 subsurface soil samples. The representative concentration for lead was less than the maximum lead concentration and less than the residential RBC value. Manganese was detected at a frequency of 86 out of 86 subsurface soil samples. The representative concentration for manganese was less than the maximum manganese concentration but was greater than the residential RBC value. Mercury was detected at a frequency of 32 out of 86 subsurface soil samples. The representative concentration for mercury was less than the maximum mercury concentration and less than the residential RBC value. Nickel was detected at a frequency of 86 out of 86 subsurface soil samples. The representative concentration for nickel was less than the maximum nickel concentration and less than the residential RBC value. Silver was detected at a

frequency of 62 out of 86 subsurface soil samples. The representative concentration for silver was less than the maximum silver concentration but was greater than the residential RBC value. Thallium was detected at a frequency of 40 out of 86 subsurface soil samples. The representative concentration for thallium was less than the maximum thallium concentration but was greater than the residential RBC value. Vanadium was detected at a frequency of 82 out of 86 subsurface soil samples. The representative concentration for vanadium was less than the maximum vanadium concentration and less than the residential RBC value. Zinc was detected at a frequency of 83 out of 86 subsurface soil samples. The representative concentration for zinc was less than the maximum zinc concentration and less than the residential RBC value. Aroclor 1248 was detected at a frequency of two out of 73 subsurface soil samples. The representative concentration for Aroclor 1248 was less than the maximum Aroclor 1248 concentration and less than the residential RBC value. Aroclor 1254 was detected at a frequency of 25 out of 72 subsurface soil samples. The representative concentration for Aroclor 1254 was less than the maximum Aroclor 1254 concentration and less than the residential RBC value. Aroclor 1260 was detected at a frequency of 27 out of 73 subsurface soil samples. The representative concentration for Aroclor 1260 was less than the maximum Aroclor 1260 concentration and less than the residential RBC value. Carcinogenic PAHs were generally detected in 30 percent of the subsurface soil samples collected at NAWC Site 6. The representative concentrations for benzo(a)pyrene and dibenz(a,h)anthracene were less than their respective maximum concentrations but were greater than their respective residential RBC values. The representative concentrations for benz(a)anthracene, benzo(b)fluoranthene, and indeno(1,2,3-cd)pyrene were less than their respective maximum concentrations and less than their respective residential RBC values.

5.3 TOXICITY ASSESSMENT

The toxicological profiles for selected COPCs at Sites 6 and 7 are presented in Appendix D. All relevant quantitative and qualitative toxicity assessment information and methods are presented in Section 5.1.2.

5.4 EXPOSURE ASSESSMENT

The COPCs that were selected for each environmental medium sampled at NAWC Warminster Sites 6 and 7 are presented in Section 5.2. The potential receptors identified in Section 5.1.3 include future recreational and residential receptors. Consequently, the potential receptors and exposure pathways presented in Section 5.1.3 were evaluated quantitatively. Exposure parameters, exposure routes, intakes, and other relevant exposure assessment information are presented in Section 5.1.3. Example calculations for estimated intakes are presented in Appendix D.

5.5 RISK CHARACTERIZATION

This section presents the results of the quantitative risk assessment evaluated under a reasonable maximum exposure (RME). The methods for risk characterization were presented in Section 5.1.4.

5.5.1 Risks Based on a Recreational Scenario - Site-Wide Surface Soils

5.5.1.1 Carcinogenic Risks

Table 5-20 lists the estimated chemical-specific and cumulative RME carcinogenic risks at Sites 6 and 7 for site-wide surface soils for a future recreational receptor. The estimated carcinogenic risk for the future recreational receptor is 2E-06, which is at the lower end of the EPA target cancer risk range of 1E-04 to 1E-06. The principal COPC contributing to this cancer risk is arsenic (via ingestion of surface soil). EPA's target cancer risk range of 1E-04 to 1E-06 is often used to determine the need for environmental remediation.

5.5.1.2 Noncarcinogenic Risks

Table 5-21 lists the estimated chemical-specific and cumulative RME noncarcinogenic risks at Sites 6 and 7 for site-wide surface soils for a future recreational child and youth. The cumulative HIs based on any target organ for the future recreational child and future recreational youth are less than 1.0. EPA's cumulative HI (based on the same target organ) of 1.0 is often used to determine the need for environmental remediation. EPA's HI of 1.0 is also a benchmark below which adverse noncarcinogenic health effects are not anticipated under conditions established in the exposure assessment.

5.5.2 Risks Based on a Recreational Scenario - Site-Wide Subsurface Soils

5.5.2.1 Carcinogenic Risks

Table 5-22 lists the estimated chemical-specific and cumulative RME carcinogenic risks at Sites 6 and 7 for site-wide subsurface soils for a future recreational receptor. The estimated carcinogenic risk for the future recreational receptor is 1E-05, which is within the EPA target cancer risk range of 1E-04 to 1E-06. The principal COPCs contributing to this cancer risk are arsenic (via ingestion of and dermal contact with subsurface soil as future surface soil) and beryllium (via dermal contact with subsurface soil as future surface soil). EPA's target cancer risk range of 1E-04 to 1E-06 is often used to determine the need for environmental remediation.

TABLE 5-20
Summary of Risks by COPC, Sitewide Surface Soils - Estimated RME Cancer Risks for Sites 6 and 7
NAWC Warminster, Pennsylvania

COPC	Estimated Cancer Risk Future Recreational Receptor		
	Ingestion	Dermal Contact	Total
arsenic	1.18E-06	8.34E-07	2.01E-06
chromium	NT	NT	NT
manganese	NT	NT	NT
thallium	NT	NT	NT
benzo(a)pyrene	2.68E-07	NT	2.68E-07
TOTAL RISK:	1.45E-06	8.34E-07	2.28E-06

Notes:

NT -- No toxicity factor (slope factor or RfD) was available or applicable for any COPCs selected for this area of interest and medium.

RME -- Reasonable Maximum Exposure: The combination activity patterns and intake dose assumptions that yield the highest exposure that is reasonably expected to occur.

TABLE 5-21
Summary of Risks by COPC, Sitewide Surface Soils - Estimated RME Hazard Indices for Sites 6 and 7
NAWC Warminster, Pennsylvania

COPC	Target Organ For Noncarcinogens	Estimated Hazard Index** Future Recreational Child			Estimated Hazard Index** Future Recreational Youth		
		Ingestion	Dermal Contact	Total	Ingestion	Dermal Contact	Total
arsenic	S	2.61E-02	9.38E-03	3.55E-02	4.79E-03	7.54E-03	1.23E-02
chromium	S, K	3.79E-02	4.04E-01	4.42E-01	6.95E-03	3.25E-01	3.32E-01
manganese	CNS	3.97E-03	4.24E-04	4.40E-03	7.29E-04	3.41E-04	1.07E-03
thallium	S, K, L, CNS	7.12E-02	7.60E-03	7.88E-02	1.31E-02	6.10E-03	1.92E-02
benzo(a)pyrene		NT	NT	NT	NT	NT	NT

Notes:

NT -- No toxicity factor (slope factor or RfD) was available or applicable for any COPCs selected for this area of interest and medium.

RME -- Reasonable Maximum Exposure: The combination of activity patterns and intake dose assumptions that yield the highest exposure that is reasonably expected to occur.

Target Organs: S = Skin, K = Kidney, CNS = Central Nervous System, L = Liver

TABLE 5-22
Summary of Risks by COPC, Sitewide Subsurface Soils - Estimated RME Cancer Risks for Sites 6 and 7
NAWC Warminster, Pennsylvania

COPC	Estimated Cancer Risk Future Recreational Receptor		
	Ingestion	Dermal Contact	Total
arsenic	1.50E-06	1.06E-06	2.57E-06
beryllium	3.38E-07	7.12E-06	7.45E-06
cadmium	NT	NT	NT
chromium	NT	NT	NT
copper	NT	NT	NT
iron	NT	NT	NT
lead	NT	NT	NT
thallium	NT	NT	NT
zinc	NT	NT	NT
Aroclor-1254	2.32E-08	2.93E-08	5.25E-08
benzo(a)pyrene	1.69E-07	NT	1.69E-07
TOTAL RISK:	2.03E-06	8.21E-06	1.02E-05

Notes:

NT – No toxicity factor (slope factor or RfD) was available or applicable for any COPCs selected for this area of interest and medium.

RME -- Reasonable Maximum Exposure: The combination activity patterns and intake dose assumptions that yield the highest exposure that is reasonably expected to occur.

5.5.2.2 Noncarcinogenic Risks

Table 5-23 lists the estimated chemical-specific and cumulative RME noncarcinogenic risks at Sites 6 and 7 for site-wide subsurface soils for a future recreational child and youth. The cumulative HIs based on any target organ for the future recreational child and future recreational youth are both greater than 1.0. The principal COPC contributing to the noncarcinogenic risk is chromium (via dermal contact with subsurface soil as future surface soils, chromium recreational child HI is equal to 4.2 and, recreational youth HI is equal to 3.2). The target organ for chromium is the kidney. Chromium was detected in nearly every subsurface soil sample. In addition, chromium concentrations were statistically elevated above background. The total HI for kidney as a target organ equals 4.6 for the future recreational child and 3.3 for the future recreational youth. No other combination of HQs that affect the same target organ for the future recreational child or youth would result in an HI of greater than 1.0. EPA's cumulative HI (based on the same target organ) of 1.0 is often used to determine the need for environmental remediation. EPA's HI of 1.0 is also a benchmark below which adverse noncarcinogenic health effects are not anticipated under conditions established in the exposure assessment.

5.5.3 Risks Based on a Recreational Scenario - Zone 1 - Subsurface Soils

5.5.3.1 Carcinogenic Risks

Table 5-24 lists the estimated chemicals-specific and cumulative RME carcinogenic risks at Sites 6 and 7 for Zone 1 - subsurface soils for a future recreational receptor. The estimated carcinogenic risk for the future recreational receptor is 4E-06, which is within the EPA target cancer risk range of 1E-04 to 1E-06. The principal COPC contributing to this cancer risk is arsenic (via ingestion of and dermal contact with subsurface soil as future surface soil). EPA's target cancer risk range of 1E-04 to 1E-06 is often used to determine the need for environmental remediation.

5.5.3.2 Noncarcinogenic Risks

Table 5-25 lists the estimated chemical-specific and cumulative RME noncarcinogenic risks at Sites 6 and 7 for Zone 1 - subsurface soils for a future recreational child and youth. The cumulative HIs based on any target organ for the future recreational child and future recreational youth are both greater than 1.0. The principal COPCs contributing to the noncarcinogenic risk are chromium (via ingestion of and dermal contact with subsurface soil as future surface soils, chromium recreational child HI is equal to 13 and recreational youth HI is equal to 10) and thallium (via ingestion of subsurface soil as future surface soils,

TABLE 5-23
Summary of Risks by COPC, Sitewide Subsurface Soils - Estimated RME Hazard Indices for Sites 6 and 7
NAWC Warminster, Pennsylvania

COPC	Target Organ For Noncarcinogens	Estimated Hazard Index** Future Recreational Child			Estimated Hazard Index** Future Recreational Youth		
		Ingestion	Dermal Contact	Total	Ingestion	Dermal Contact	Total
arsenic	S	3.33E-02	1.20E-02	4.52E-02	6.11E-03	9.61E-03	1.57E-02
beryllium		1.57E-04	1.67E-03	1.83E-03	2.88E-05	1.34E-03	1.37E-03
cadmium	K	1.86E-02	3.98E-02	5.84E-02	3.42E-03	3.19E-02	3.53E-02
chromium	S, K	3.61E-01	3.86E+00	4.22E+00	6.63E-02	3.10E+00	3.16E+00
copper	C, K, L	4.56E-03	8.11E-04	5.37E-03	8.36E-04	6.51E-04	1.49E-03
iron	L, DS	1.35E-01	1.44E-02	1.49E-01	2.47E-02	1.15E-02	3.63E-02
lead	C, CNS	NT	NT	NT	NT	NT	NT
thallium	S, K, L, CNS	2.39E-01	2.55E-02	2.64E-01	4.39E-02	2.05E-02	6.43E-02
zinc	C	9.77E-04	4.17E-04	1.39E-03	1.79E-04	3.35E-04	5.15E-04
Aroclor-1254	S, L, RS	5.78E-03	3.70E-03	9.49E-03	1.06E-03	2.98E-03	4.04E-03
benzo(a)pyrene		NT	NT	NT	NT	NT	NT

Notes:

NT -- No toxicity factor (slope factor or RfD) was available or applicable for any COPCs selected for this area of interest and medium.

RME -- Reasonable Maximum Exposure: The combination of activity patterns and intake dose assumptions that yield the highest exposure that is reasonably expected to occur.

** -- Hazard Indices (i.e., summation of the hazard quotients) are used only for comparison purposes and do not reflect actual additive noncarcinogenic effects.

Target Organs: S = Skin, K = Kidney, Cardiovascular System, L = Liver, CNS = Central Nervous System, DS = Digestive System, RS = Reproductive System

TABLE 5-24
Summary of Risks by COPC, Zone 1 Subsurface Soils - Estimated RME Cancer Risks for Sites 6 and 7
NAWC Warminster, Pennsylvania

COPC	Estimated Cancer Risk Future Recreational Receptor		
	Ingestion	Dermal Contact	Total
antimony	NT	NT	NT
arsenic	2.06E-06	1.46E-06	3.52E-06
chromium	NT	NT	NT
iron	NT	NT	NT
thallium	NT	NT	NT
TOTAL RISK:	2.06E-06	1.46E-06	3.52E-06

Notes:

NT -- No toxicity factor (slope factor or RfD) was available or applicable for any COPCs selected for this area of interest and medium.

RME -- Reasonable Maximum Exposure: The combination activity patterns and intake dose assumptions that yield the highest exposure that is reasonably expected to occur.

TABLE 5-25
Summary of Risks by COPC, Zone 1 Subsurface Soils - Estimated RME Hazard Indices for Sites 6 and 7
NAWC Warminster, Pennsylvania

COPC	Target Organ For Noncarcinogens	Estimated Hazard Index** Future Recreational Child			Estimated Hazard Index** Future Recreational Youth		
		Ingestion	Dermal Contact	Total	Ingestion	Dermal Contact	Total
antimony	C	3.25E-01	3.47E-01	6.72E-01	5.96E-02	2.79E-01	3.38E-01
arsenic	S	4.57E-02	1.64E-02	6.21E-02	8.39E-03	1.32E-02	2.16E-02
chromium	S, K	1.13E+00	1.21E+01	1.32E+01	2.08E-01	9.70E+00	9.91E+00
iron	L, DS	6.13E-01	6.54E-02	6.78E-01	1.12E-01	5.25E-02	1.65E-01
thallium	S, K, L, CNS	1.09E+00	1.16E-01	1.20E+00	1.99E-01	9.31E-02	2.93E-01

Notes:

NT -- No toxicity factor (slope factor or RfD) was available or applicable for any COPCs selected for this area of interest and medium.

RME -- Reasonable Maximum Exposure: The combination of activity patterns and intake dose assumptions that yield the highest exposure that is reasonably expected to occur.

** -- Hazard Indices (i.e., summation of the hazard quotients) are used only for comparison purposes and do not reflect actual additive noncarcinogenic effects.

Target Organs: S = Skin, K = Kidney, C = Cardiovascular System, L = Liver, CNS = Central Nervous System, DS = Digestive System

thallium recreational child HI is equal to 1.2). The target organ for chromium is the kidney. The target organs for thallium are the liver, the gastrointestinal (GI) tract, and the central nervous system (CNS). Chromium was detected in every subsurface soil sample. In addition, chromium concentrations were statistically elevated above background. Thallium was detected in 50 percent of subsurface soil samples. In addition, thallium concentrations were statistically elevated above background. The total HI for kidney as a target organ equals 14.4 for the future recreational child and 10.2 for the future recreational youth. The total HI for skin as a target organ equals 1.3 for the future recreational child. The total HI for liver as a target organ equals 1.9 for the future recreational child. The total HI for central nervous system as a target organ equals 1.2 for the future recreational child. No other combination of HQs that affect the same target organ for the future recreational child and youth would result in an HI of greater than 1.0. EPA's cumulative HI (based on the same target organ) of 1.0 is often used to determine the need for environmental remediation. EPA's HI of 1.0 is also a benchmark below which adverse noncarcinogenic health effects are not anticipated under conditions established in the exposure assessment.

5.5.4 Risks Based on a Recreational Scenario - Zone 2 - Subsurface Soil

5.5.4.1 Carcinogenic Risks

Table 5-26 lists the estimated chemical-specific and cumulative RME carcinogenic risks at Sites 6 and 7 for Zone 2 - subsurface soils for a future recreational receptor. The estimated carcinogenic risk for the future recreational receptor is 2E-05, which is within the EPA target cancer risk range of 1E-04 to 1E-06. The principal COPC contributing to this cancer risk is arsenic (via ingestion of and dermal contact with subsurface soil as future surface soil). EPA's target cancer risk range of 1E-04 to 1E-06 is often used to determine the need for environmental remediation.

5.5.4.2 Noncarcinogenic Risks

Table 5-27 lists the estimated chemicals-specific and cumulative RME noncarcinogenic risks at Sites 6 and 7 for Zone 2 - subsurface soils for a future recreational child and youth. The cumulative HIs based on any target organ for the future recreational child and future recreational youth are both greater than 1.0. The principal COPCs contributing to the noncarcinogenic risk are chromium (via ingestion of and dermal contact with subsurface soil as future surface soils, chromium recreational child HI is equal to 42 and recreational youth HI is equal to 31) and to a lesser extent iron and thallium based on the liver as the target organ. The target organ for chromium is the kidney. Chromium was detected in every subsurface soil sample. In addition, chromium concentrations were statistically elevated above background. The total HI for kidney and skin as target organs equals 43.6 for the future recreational child and 32.1 for the future

TABLE 5-26
Summary of Risks by COPC, ZONE 2 Subsurface Soils - Estimated RME Cancer Risks for Sites 6 and 7
NAWC Warminster, Pennsylvania

COPC	Estimated Cancer Risk Future Recreational Receptor		
	Ingestion	Dermal Contact	Total
antimony	NT	NT	NT
arsenic	9.62E-06	6.82E-06	1.64E-05
cadmium	NT	NT	NT
chromium	NT	NT	NT
iron	NT	NT	NT
lead	NT	NT	NT
thallium	NT	NT	NT
TOTAL RISK:	9.62E-06	6.82E-06	1.64E-05

Notes:

NT -- No toxicity factor (slope factor or RfD) was available or applicable for any COPCs selected for this area of interest and medium.

RME -- Reasonable Maximum Exposure: The combination activity patterns and intake dose assumptions that yield the highest exposure that is reasonably expected to occur.

TABLE 5-27
Summary of Risks by COPC, Zone 2 Subsurface Soils - Estimated RME Hazard Indices for Sites 6 and 7
NAWC Warminster, Pennsylvania

COPC	Target Organ For Noncarcinogens	Estimated Hazard Index** Future Recreational Child			Estimated Hazard Index** Future Recreational Youth		
		Ingestion	Dermal Contact	Total	Ingestion	Dermal Contact	Total
antimony	C	1.35E-01	1.44E-01	2.78E-01	2.47E-02	1.15E-01	1.40E-01
arsenic	S	2.13E-01	7.66E-02	2.90E-01	3.91E-02	6.16E-02	1.01E-01
cadmium	K	6.54E-02	1.40E-01	2.05E-01	1.20E-02	1.12E-01	1.24E-01
chromium	S, K	3.63E+00	3.87E+01	4.24E+01	6.66E-01	3.11E+01	3.18E+01
iron	L, DS	6.89E-01	7.36E-02	7.63E-01	1.27E-01	5.91E-02	1.86E-01
lead	C, CNS	NT	NT	NT	NT	NT	NT
thallium	S, K, L, CNS	9.13E-01	9.75E-02	1.01E+00	1.68E-01	7.83E-02	2.46E-01

Notes:

NT -- No toxicity factor (slope factor or RfD) was available or applicable for any COPCs selected for this area of interest and medium.

RME -- Reasonable Maximum Exposure: The combination of activity patterns and intake dose assumptions that yield the highest exposure that is reasonably expected to occur.

** -- Hazard Indices (i.e., summation of the hazard quotients) are used only for comparison purposes and do not reflect actual additive noncarcinogenic effects.

Target Organs: S = Skin, K = Kidney, C = Cardiovascular System, L = Liver, CNS = Central Nervous System, DS = Digestive System

recreational youth. The total HI for the liver as a target organ equals 1.8 for the future recreational child. No other combination of HQs that affect the same target organ for the future recreational child and youth would result in an HI of greater than 1.0. EPA's cumulative HI (based on the same target organ) of 1.0 is often used to determine the need for environmental remediation. EPA's HI of 1.0 is also a benchmark below which adverse noncarcinogenic health effects are not anticipated under conditions established in the exposure assessment.

5.5.5 Risks Based on a Recreational Scenario - Zone 3 - Subsurface Soils

5.5.5.1 Carcinogenic Risks

Table 5-28 lists the estimated chemical-specific and cumulative RME carcinogenic risks at Sites 6 and 7 for Zone 3 - subsurface soils for a future recreational receptor. The estimated carcinogenic risk for the future recreational receptor is 8E-06, which is within the EPA target cancer risk range of 1E-04 to 1E-06. The principal COPC contributing to this cancer risk is arsenic (via ingestion of and dermal contact with subsurface soil as future surface soil). EPA's target cancer risk range of 1E-04 to 1E-06 is often used to determine the need for environmental remediation

5.5.5.2 Noncarcinogenic Risks

Table 5-29 lists the estimated chemical-specific and cumulative RME noncarcinogenic risks at Sites 6 and 7 for Zone 3 - subsurface soils for a future recreational child and youth. The cumulative HIs based on any target organ for the future recreational child and future recreational youth are both greater than 1.0. The principal COPCs contributing to the noncarcinogenic risk are chromium (via ingestion of and dermal contact with subsurface soil as future surface soils, chromium recreational child HI is equal to 87 and recreational youth HI is equal to 65) and to a lesser extent iron and thallium based on the liver as the target organ. The target organ for chromium is the kidney. The target organs for thallium are liver, GI tract, and CNS. Chromium was detected in every subsurface soil sample. In addition, chromium concentrations were statistically elevated above background.

The total HI for kidney and skin as target organs equals 87.8 for the future recreational child and 65.4 for the future recreational youth. The total HI for liver as a target organ equals 1.9 for the future recreational child. No other combination of HQs that affect the same target organ for the future recreational child and youth would result in an HI of greater than 1.0. EPA's cumulative HI (based on the same target organ) of 1.0 is often used to determine the need for environmental remediation. EPA's HI of 1.0 is also a

TABLE 5-28
Summary of Risks by COPC, Zone 3 Subsurface Soils - Estimated RME Cancer Risks for Sites 6 and 7
NAWC Warminster, Pennsylvania

COPC	Estimated Cancer Risk Future Recreational Receptor		
	Ingestion	Dermal Contact	Total
arsenic	3.80E-06	2.69E-06	6.50E-06
cadmium	NT	NT	NT
chromium	NT	NT	NT
iron	NT	NT	NT
lead	NT	NT	NT
thallium	NT	NT	NT
zinc	NT	NT	NT
Aroclor-1254	6.67E-07	8.43E-07	1.51E-06
TOTAL RISK:	4.47E-06	3.54E-06	8.01E-06

Notes:

NT -- No toxicity factor (slope factor or RfD) was available or applicable for any COPCs selected for this area of interest and medium.

RME -- Reasonable Maximum Exposure: The combination activity patterns and intake dose assumptions that yield the highest exposure that is reasonably expected to occur.

TABLE 5-29
Summary of Risks by COPC, Zone 3 Subsurface Soils - Estimated RME Hazard Indices for Sites 6 and 7
NAWC Warminster, Pennsylvania

COPC	Target Organ For Noncarcinogens	Estimated Hazard Index** Future Recreational Child			Estimated Hazard Index** Future Recreational Youth		
		Ingestion	Dermal Contact	Total	Ingestion	Dermal Contact	Total
arsenic	S	8.42E-02	3.03E-02	1.15E-01	1.55E-02	2.43E-02	3.98E-02
cadmium	K	1.20E-01	2.57E-01	3.78E-01	2.21E-02	2.07E-01	2.29E-01
chromium	S, K	7.42E+00	7.92E+01	8.66E+01	1.36E+00	6.36E+01	6.49E+01
iron	L, DS	6.97E-01	7.44E-02	7.72E-01	1.28E-01	5.98E-02	1.88E-01
lead	C, CNS	NT	NT	NT	NT	NT	NT
thallium	S, K, L, CNS	7.61E-01	8.12E-02	8.42E-01	1.40E-01	6.52E-02	2.05E-01
zinc	C	2.08E-01	8.86E-02	2.96E-01	3.81E-02	7.12E-02	1.09E-01
Aroclor-1254	S, L, RS	1.66E-01	1.07E-01	2.73E-01	3.05E-02	8.56E-02	1.16E-01

Notes:

NT -- No toxicity factor (slope factor or RfD) was available or applicable for any COPCs selected for this area of interest and medium.

RME -- Reasonable Maximum Exposure: The combination of activity patterns and intake dose assumptions that yield the highest exposure that is reasonably expected to occur.

** -- Hazard Indices (i.e., summation of the hazard quotients) are used only for comparison purposes and do not reflect actual additive noncarcinogenic effects.

Target Organs: S = Skin, K = Kidney, C = Cardiovascular System, L = Liver, CNS = Central Nervous System, DS = Digestive System, RS = Reproductive System

benchmark below which adverse noncarcinogenic health effects are not anticipated under conditions established in the exposure assessment.

5.5.6 Risks Based on a Residential Scenario - Site-Wide Surface Soils

5.5.6.1 Carcinogenic Risks

Table 5-30 lists the estimated chemical-specific and cumulative RME carcinogenic risks at Sites 6 and 7 for site-wide surface soils for a future residential receptor. The estimated carcinogenic risk for the future residential receptor is 1E-04, which is at the upper end of the EPA target cancer risk range of 1E-04 to 1E-06. The principal COPCs contributing to this cancer risk are arsenic (via ingestion of and dermal contact with surface soil) and beryllium (via dermal contact with surface soil). EPA's target cancer risk range of 1E-04 to 1E-06 is often used to determine the need for environmental remediation.

5.5.6.2 Noncarcinogenic Risks

Table 5-31 lists the estimated chemical-specific and cumulative RME noncarcinogenic risks at Sites 6 and 7 for site-wide surface soils for a future residential child and adult. The cumulative HIs based on any target organ for the future residential child and future residential adult are both greater than 1.0. The principal COPCs contributing to the noncarcinogenic risk are chromium (via ingestion of and dermal contact with surface soils, chromium residential child HI is equal to 6.5 and residential adult HI is equal to 2.4) and thallium (via ingestion of surface soils, thallium residential child HI is equal to 1.3). The target organ for chromium is the kidney. The target organs for thallium are liver, GI tract, and CNS. Chromium was detected in every surface soil sample. In addition, chromium concentrations were statistically elevated above background. Thallium was detected in approximately 30 percent of the surface soil samples. In addition, thallium concentrations were statistically elevated above background. The total HI for kidney as the target organ equals 8.0 for the future residential child and 2.6 for the future residential adult. The total HI for skin as the target organ equals 8.3 for the future residential child and 2.6 for the future residential adult. The total HI for liver as a target organ equals 1.3 for the future residential child. The total HI for central nervous system as a target organ equals 1.5 for the future residential child. No other combination of HQs that affect the same target organ for the future resident would result in an HI of greater than 1.0. EPA's cumulative HI (based on the same target organ) of 1.0 is often used to determine the need for environmental remediation. EPA's HI of 1.0 is also a benchmark below which adverse noncarcinogenic health effects are not anticipated under conditions established in the exposure assessment.

TABLE 5-30
Summary of Risks by COPC, Sitewide Surface Soils - Estimated RME Cancer Risks for Sites 6 and 7
NAWC Warminster, Pennsylvania

COPC	Estimated Cancer Risk Future Residential Receptor		
	Ingestion	Dermal Contact	Total
aluminum	NT	NT	NT
arsenic	2.32E-05	1.35E-05	3.67E-05
barium	NT	NT	NT
beryllium	6.80E-06	1.17E-04	1.24E-04
cadmium	NT	NT	NT
chromium	NT	NT	NT
copper	NT	NT	NT
manganese	NT	NT	NT
mercury	NT	NT	NT
thallium	NT	NT	NT
Aroclor-1260	1.67E-07	1.72E-07	3.39E-07
benz(a)anthracene	5.35E-07	NT	5.35E-07
benzo(a)pyrene	5.28E-06	NT	5.28E-06
benzo(b)fluoranthene	5.49E-07	NT	5.49E-07
dibenz(a,h)anthracene	3.03E-06	NT	3.03E-06
indeno(1,2,3-cd)pyrene	3.93E-07	NT	3.93E-07
TOTAL RISK:	4.00E-05	1.31E-04	1.71E-04

Notes:

NT -- No toxicity factor (slope factor or RfD) was available or applicable for any COPCs selected for this area of interest and medium.

RME -- Reasonable Maximum Exposure: The combination activity patterns and intake dose assumptions that yield the highest exposure that is reasonably expected to occur.

TABLE 5-31
Summary of Risks by COPC, Sitewide Surface Soils - Estimated RME Hazard Indices for Sites 6 and 7
NAWC Warminster, Pennsylvania

COPC	Target Organ For Noncarcinogens	Estimated Hazard Index** Future Residential Child			Estimated Hazard Index** Future Residential Adult		
		Ingestion	Dermal Contact	Total	Ingestion	Dermal Contact	Total
aluminum		1.85E-01	6.58E-02	2.51E-01	1.99E-02	2.58E-02	4.57E-02
arsenic	S	4.21E-01	1.36E-01	5.57E-01	4.51E-02	5.33E-02	9.84E-02
barium	C, DS, RS	2.03E-02	1.94E-03	2.31E-02	2.17E-03	7.62E-04	3.13E-03
beryllium		2.58E-03	2.48E-02	2.73E-02	2.77E-04	9.71E-03	9.98E-03
cadmium	K	3.81E-02	7.30E-02	1.11E-01	4.08E-03	2.86E-02	3.27E-02
chromium	S, K	6.11E-01	5.86E+00	6.47E+00	6.55E-02	2.30E+00	2.36E+00
copper	C, K, L	2.43E-02	3.88E-03	2.82E-02	2.60E-03	1.52E-03	4.12E-03
manganese	CNS	6.41E-02	6.14E-03	1.27E-01	6.87E-03	2.41E-03	2.14E-02
mercury	K, CNS	6.35E-02	4.06E-02	1.04E-01	6.81E-03	1.59E-02	2.27E-02
thallium	S, K, L, CNS	1.15E+00	1.10E-01	1.26E+00	1.23E-01	4.32E-02	1.66E-01
Aroclor-1260		NT	NT	NT	NT	NT	NT
benz(a)anthracene		NT	NT	NT	NT	NT	NT
benzo(a)pyrene		NT	NT	NT	NT	NT	NT
benzo(b)fluoranthene		NT	NT	NT	NT	NT	NT
dibenz(a,h)anthracene		NT	NT	NT	NT	NT	NT
indeno(1,2,3-cd)pyrene		NT	NT	NT	NT	NT	NT

Notes:

NT -- No toxicity factor (slope factor or RfD) was available or applicable for any COPCs selected for this area of interest and medium.

RME -- Reasonable Maximum Exposure: The combination of activity patterns and intake dose assumptions that yield the highest exposure that is reasonably expected to occur.

** -- Hazard Indices (i.e., summation of the hazard quotients) are used only for comparison purposes and do not reflect actual additive noncarcinogenic effects.

Target Organs: S = Skin, K = Kidney, C = Cardiovascular System, L = Liver, CNS = Central Nervous System, DS = Digestive System, RS = Reproductive System

5.5.7 Risks Based on a Residential Scenario - Site-Wide Subsurface Soils

5.5.7.1 Carcinogenic Risks

Table 5-32 lists the estimated chemical-specific and cumulative RME carcinogenic risks at Sites 6 and 7 for site-wide subsurface soils for a future residential receptor. The estimated carcinogenic risk for the future residential receptor is 2E-04, which is at the upper end of the EPA target cancer risk range of 1E-04 to 1E-06. The principal COPCs contributing to this cancer risk are arsenic (via ingestion of and dermal contact with subsurface soil as future surface soil) and beryllium (via dermal contact with subsurface soils as future surface soil). EPA's target cancer risk range of 1E-04 to 1E-06 is often used to determine the need for environmental remediation.

5.5.7.2 Noncarcinogenic Risks

Table 5-33 lists the estimated chemical-specific and cumulative RME noncarcinogenic risks at Sites 6 and 7 for site-wide subsurface soils for a future residential child and adult. The cumulative HIs based on any target organ for the future residential child and future residential adult are both greater than 1.0. The principal COPCs contributing to the noncarcinogenic risk are chromium (via ingestion of and dermal contact with subsurface soil as future surface soils, chromium residential child HI is equal to 62 and residential adult HI is equal to 23), iron (via ingestion of subsurface soils as future surface soils, iron residential child HI is equal to 2.4), and thallium (via ingestion of subsurface soil as future surface soils, thallium residential child HI is equal to 4.2). The target organ for chromium is the kidney. The target organs for thallium are liver, the GI tract, and the CNS. The target organs for iron are the liver, pancreas, and the GI tract. Chromium was detected in nearly every subsurface soil sample. In addition, chromium concentrations were statistically elevated above background. Iron was detected in every subsurface soil sample. In addition, iron concentrations were statistically elevated above background. Thallium was detected in approximately 50 percent of the subsurface soil samples. In addition, thallium concentrations were statistically elevated above background. The total HI for kidney as the target organ equals 67.4 for the future residential child and 23.4 for the future residential adult. The total HI for skin as the target organ equals 66.8 for the future residential child and 23.3 for the future residential adult. The total HI for liver as a target organ equals 4.5 for the future residential child. The total HI for the CNS as a target organ equals 4.6 for the future residential child. No other combination of HQs that affect the same target organ for the future resident would result in an HI of greater than 1.0. EPA's cumulative HI (based on the same target organ) of 1.0 is often used to determine the need for environmental remediation.

TABLE 5-32
Summary of Risks by COPC, Sitewide Subsurface Soils - Estimated RME Cancer Risks for Sites 6 and 7
NAWC Warminster, Pennsylvania

COPC	Estimated Cancer Risk Future Residential Receptor		
	Ingestion	Dermal Contact	Total
aluminum	NT	NT	NT
arsenic	2.96E-05	1.72E-05	4.68E-05
barium	NT	NT	NT
beryllium	6.66E-06	1.15E-04	1.22E-04
cadmium	NT	NT	NT
chromium	NT	NT	NT
copper	NT	NT	NT
iron	NT	NT	NT
lead	NT	NT	NT
manganese	NT	NT	NT
mercury	NT	NT	NT
nickel	NT	NT	NT
silver	NT	NT	NT
thallium	NT	NT	NT
vanadium	NT	NT	NT
zinc	NT	NT	NT
Aroclor-1248	1.40E-07	1.44E-07	2.84E-07
Aroclor-1254	4.57E-07	4.73E-07	9.30E-07
Aroclor-1260	5.95E-07	6.15E-07	1.21E-06
benz(a)anthracene	3.22E-07	NT	3.23E-07
benzo(a)pyrene	3.33E-06	NT	3.33E-06
benzo(b)fluoranthene	3.89E-07	NT	3.89E-07
dibenz(a,h)anthracene	2.51E-06	NT	2.52E-06
indeno(1,2,3-cd)pyrene	2.96E-07	NT	2.96E-07
TOTAL RISK:	4.43E-05	1.33E-04	1.78E-04

Notes:

NT -- No toxicity factor (slope factor or RfD) was available or applicable for any COPCs selected for this area of interest and medium.

RME -- Reasonable Maximum Exposure: The combination activity patterns and intake dose assumptions that yield the highest exposure that is reasonably expected to occur.

TABLE 5-33
Summary of Risks by COPC, Sitewide Subsurface Soils - Estimated RME Hazard Indices for Sites 6 and 7
NAWC Warminster, Pennsylvania

COPC	Target Organ For Noncarcinogens	Estimated Hazard Index** Future Residential Child			Estimated Hazard Index** Future Residential Adult		
		Ingestion	Dermal Contact	Total	Ingestion	Dermal Contact	Total
aluminum		1.99E-01	7.08E-02	2.70E-01	2.14E-02	2.78E-02	4.91E-02
arsenic	S	5.37E-01	1.73E-01	7.10E-01	5.75E-02	6.80E-02	1.26E-01
barium	C, DS, RS	2.37E-02	2.28E-03	2.71E-02	2.54E-03	8.92E-04	3.66E-03
beryllium		2.53E-03	2.43E-02	2.68E-02	2.71E-04	9.51E-03	9.79E-03
cadmium	K	3.00E-01	5.76E-01	8.76E-01	3.22E-02	2.26E-01	2.58E-01
chromium	S, K	5.83E+00	5.59E+01	6.17E+01	6.25E-01	2.19E+01	2.25E+01
copper	C, K, L	7.35E-02	1.17E-02	8.53E-02	7.88E-03	4.61E-03	1.25E-02
iron	L, DS	2.17E+00	2.08E-01	2.38E+00	2.33E-01	8.17E-02	3.15E-01
lead	C, CNS	NT	NT	NT	NT	NT	NT
manganese	CNS	5.41E-02	5.18E-03	1.07E-01	5.79E-03	2.03E-03	1.80E-02
mercury	K, CNS	1.05E-01	6.68E-02	1.71E-01	1.12E-02	2.62E-02	3.74E-02
nickel	CNS	1.73E-02	1.66E-02	3.39E-02	1.86E-03	6.51E-03	8.37E-03
silver	K	2.84E-01	2.72E-02	3.11E-01	3.04E-02	1.07E-02	4.11E-02
thallium	S, K, L, CNS	3.86E+00	3.69E-01	4.22E+00	4.13E-01	1.45E-01	5.58E-01
vanadium		7.45E-02	3.57E-01	4.32E-01	7.98E-03	1.40E-01	1.48E-01
zinc	C	1.58E-02	6.04E-03	2.18E-02	1.69E-03	2.37E-03	4.06E-03
Aroclor-1248		NT	NT	NT	NT	NT	NT
Aroclor-1254	S, L, RS	9.33E-02	5.37E-02	1.47E-01	1.00E-02	2.10E-02	3.10E-02
Aroclor-1260		NT	NT	NT	NT	NT	NT
benz(a)anthracene		NT	NT	NT	NT	NT	NT
benzo(a)pyrene		NT	NT	NT	NT	NT	NT
benzo(b)fluoranthene		NT	NT	NT	NT	NT	NT
dibenz(a,h)anthracene		NT	NT	NT	NT	NT	NT
indeno(1,2,3-cd)pyrene		NT	NT	NT	NT	NT	NT

Notes:

NT -- No toxicity factor (slope factor or RfD) was available or applicable for any COPCs selected for this area of interest and medium.

RME -- Reasonable Maximum Exposure: The combination of activity patterns and intake dose assumptions that yield the highest exposure that is reasonably expected to occur.

** -- Hazard Indices (i.e., summation of the hazard quotients) are used only for comparison purposes and do not reflect actual additive noncarcinogenic effects.

Target Organs: S = Skin, K = Kidney, C = Cardiovascular System, L = Liver, CNS = Central Nervous System, DS = Digestive System, RS = Reproductive System

EPA's HI of 1.0 is also a benchmark below which adverse noncarcinogenic health effects are not anticipated under conditions established in the exposure assessment.

5.5.8 Lead Risks

The IEUBK Lead Model (v. 0.99) was used to characterize risks from lead in soil, dust, and water for the hypothetical future residential children (ages 0 through 6), who are considered the most sensitive receptor group at NAWC Warminster Site 6. The simulated range of blood-lead values that might occur in a population as a result of exposures to lead was compared to a guideline level of 10 micrograms per deciliter (µg/dL).

Lead was only evaluated for exposure to subsurface soil (as future surface soil) based on a residential scenario. Lead was not selected as a COPC in surface soils using a residential exposure pathway scenario and was not evaluated using the IEUBK Lead Model (v. 0.99).

Based on model results under an RME (using the representative concentration of lead in site-wide subsurface soil), 0.43 percent of residential children exposed under similar conditions might have blood-lead levels exceeding 10 µg/dL. This is below a protective guideline of 5 percent for the maximum proportion of individuals with blood levels exceeding 10 µg/dL (EPA, 1994b). The model inputs were default parameter values and a site soil lead concentration of 130 mg/kg.

5.6 UNCERTAINTIES

Beyond the general uncertainties associated with the HHRA process discussed in Section 5.1.5, the following uncertainties should be considered in any evaluation of Sites 6 and 7 risk assessment results:

- The uncertainty associated with the dermal exposure is high because of the derivation of the dermal slope factor and reference dose (see Section 5.1.3). The dermal toxicity factors are based on default oral absorption factors. This can result in an overestimation of the toxicity factors. It eventually causes dermal exposure to be a primary contributor to the cumulative cancer risk and HI (via surface soils) for the future recreational and residential receptors. The uncertainty associated with the dermal exposure route may overestimate the risk at NAWC Warminster Sites 6 and 7.

- Arsenic is a major contributor to the cumulative carcinogenic risks in surface soil. The carcinogenicity of arsenic via ingestion is not confirmed by the available data. However,

EPA has proposed an oral unit risk factor that was used from oral and dermal exposures to arsenic. Since arsenic is a major contributor to the risk, risks may be overstated at NAWC Warminster Sites 6 and 7.

- The use of current subsurface soil concentrations to represent future subsurface excavation exposure concentrations assumes two things that add to the uncertainty of this risk assessment. First, this exposure scenario assumes that soil would be excavated to the sampling depth (a majority of the subsurface soil samples were collected at depths greater than 4 feet). Second, this exposure scenario assumes that once the soil is excavated to the subsurface soil sampling depth, no degradation of the chemicals in the subsurface soil would have taken place and/or no additional contamination would be transported to the soils. These uncertainties cause an over-estimation of the exposure at NAWC Warminster Sites 6 and 7 because subsurface soil contaminant concentrations are generally greater than surface soil contaminant concentrations.

Chromium is a major contributor to the noncarcinogenic risk HI being greater than 1.0 at NAWC Warminster Sites 6 and 7 for several of the recreational exposure scenarios. The lack of chromium speciation data adds to uncertainty associated with the noncarcinogenic risk under the recreational exposure scenarios. The HHRA assumed all chromium present was the more toxic form, hexavalent, and leads to an overestimation of the risk.

During the Phase III RI for Warminster, speciation data were collected for chromium in Area A. Area A at Warminster included samples collected at Site 1 (surface and subsurface soil samples), Site 2 (surface and subsurface soil samples), and the Impoundment Area (subsurface soil samples). The speciation data that were collected were for hexavalent and total chromium. Over one-half of the chromium speciation samples collected at Area A had no hexavalent chromium present. The representative hexavalent chromium to total chromium concentration ratio for Site 1 was 0.24 percent; for Site 2 it was 1.9 percent; and for Site 3 it was 1.6 percent. The maximum percentage of hexavalent chromium in any sample collected in Area A during the Phase III RI was 22.64 percent (sample collected in the Impoundment Area at location IM602).

If the assumption that all chromium was present as hexavalent chromium (100 percent) was applied to the chromium concentrations at Sites 6/7 for site-wide subsurface soils, Zone 1 subsurface soils, Zone 2 subsurface soils, and Zone 3 subsurface soils for the recreational receptors, the estimated noncarcinogenic HQs associated with chromium would be as presented in Table 5-44. The current

assumption that all chromium at Sites 6 and 7 is hexavalent greatly overestimates the noncarcinogenic risks.

If the maximum percentage of hexavalent chromium in Area A samples (22.64 percent) was applied to the chromium concentrations at Sites 6 and 7 for site-wide subsurface soils, Zone 1 subsurface soils, Zone 2 subsurface soils, and Zone 3 subsurface soils for the recreational receptors, the estimated noncarcinogenic HQs associated with chromium would be affected as presented in Table 5-44. Using the maximum percentage of hexavalent chromium found in the Area A Phase III RI samples and applying it to Site 6/7 HHRA still represents a conservative approach.

If the greatest Upper Confidence Level (UCL) percentage of hexavalent chromium in Area A on a site by site basis (1.9 percent) was applied to the chromium concentrations at Sites 6 and 7 for site-wide subsurface soils, Zone 1 subsurface soils, Zone 2 subsurface soils, and Zone 3 subsurface soils for the recreational receptors, the estimated noncarcinogenic HQs associated with chromium would be affected as presented in Table 5-44. Given this ratio of 1.9 percent (hexavalent to trivalent chromium), only one of the 86 subsurface samples (46,800 mg/kg at sample location TP-29W3 in Zone 3) collected would contain chromium concentrations that exceed an HQ of 1.

- Confidence in the chromium VI study, the database, and consequently the oral RfD itself is low. Confidence in the chosen study is low because of the small number of animals tested, the small number of parameters measured, and the lack of toxic effect at the highest dose tested. Confidence in the database is low because the supporting studies are of equally low quality, and teratogenic and reproductive endpoints are not well studied. Low confidence in the RfD follows (EPA 197a). This oral RfD is limited to metallic chromium (VI) of soluble salts. It is unknown whether these chromium VI salts actually exist at NAWC Site 6/7. Examples of soluble salts include potassium dichromate (K2CR207), sodium dichromate (Na2Cr207), potassium chromate (K2Cr04), and sodium chromate (Na2Cr04). An uncertainty factor of 500 has been applied to the oral RfD and this represents two 10-fold decreases in dose to account for both the expected inter-human and inter-species variability in the toxicity of the chemical in lieu of specific data, and an additional factor of 5 to compensate for the less-than-lifetime exposure duration of the principal study.

TABLE 5-34
TOTAL CHROMIUM HQ

	Assumes all chromium is hexavalent chromium		Assumes maximum hexavalent chromium ratio (22.6%)		Assumes representative concentration ratio (1.9%)	
	Child	Youth	Child	Youth	Child	Youth
Site-wide Subsurface	4.22	3.16	1.0	0.7	0.08	0.06
Zone 1	13.1	9.91	3.0	2.2	0.25	0.19
Zone 2	42.4	31.8	9.6	7.2	0.81	0.6
Zone 3	86.6	64.9	19.6	14.7	1.65	1.23

- Future land use is designated as open-space recreational for NAWC Warminster Sites 6/7. Residential scenarios are presented for comparison purposes and are not expected at the site. The residential exposure pathways presented in this risk assessment would tend to overestimate the future risks at NAWC Warminster Sites 6 and 7 if the future land use is designated recreational open space.

- Metals are the principal contributors to the carcinogenic and noncarcinogenic risks at Sites 6 and 7 for all the receptors and exposure pathways. Metals are not highly mobile in the environmental and, without major excavation, are expected to remain in place in surface and subsurface soils.

- Lead was selected as a COPC in site-wide subsurface soil, Zone 2, and Zone 3 under recreational scenarios; however, it could not be evaluated using the IEUBK Lead Model. This would tend to underestimate the risk at NAWC Warminster Sites 6 and 7. The exposure frequency is low for the recreational receptor but it is desirable to reduce lead exposure to young children.

5.7 CONCLUSIONS

The total cumulative carcinogenic risk for the future recreational and future residential receptors is within EPA's target cancer risk range at Site 6 for exposure pathways to surface and subsurface soils. Arsenic (via ingestion and dermal contact) and beryllium (via dermal contact) are the major contributors to the

carcinogenic risks at Site 6 in surface and subsurface soils. The noncarcinogenic HIs are greater than 1.0 for the subsurface soil (site-wide, Zones 1, 2, and 3) recreational exposure scenarios. The noncarcinogenic HIs are less than 1.0 for the site-wide surface soil recreational exposure scenarios. The noncarcinogenic HIs are greater than 1.0 for site-wide surface and site-wide subsurface soil exposure scenarios under the residential exposure pathways. Chromium and thallium are the major contributors to the noncarcinogenic risk at NAWC Warminster Sites 6 and 7 for all exposure scenarios. The presence of arsenic, beryllium, and chromium is consistent with past practices at the site, which was reportedly disposal of metal waste sludges from the industrial wastewater treatment plant. The presence of thallium at NAWC Warminster is from unknown origins. However, thallium could be present based on wastes that were disposed at the site; this remains unknown. Major uncertainties exist for the HHRA and should be taken into account when deciding remedial actions for NAWC Warminster Sites 6 and 7.

REFERENCES

Brown & Root Environmental, 1995. Field Sampling Plan for Site 6 Engineering Evaluation/Cost Analysis (EE/CA), NAWC Warminster, Pennsylvania. Wayne, Pennsylvania.

Brown & Root Environmental, 1995b. Feasibility Study Report for Groundwater in Areas A, B, and D, NAWC Warminster, Pennsylvania. Wayne, Pennsylvania.

Brown & Root Environmental, 1996. Draft Site 6 Removal Evaluation Report, Naval Air Warfare Center, Warminster, Pennsylvania. Wayne, Pennsylvania.

Brown & Root Environmental, 1996. Draft Verification Sampling and Analysis Plan for Site 6 Removal Action, Naval Air Warfare Center, Warminster, Pennsylvania. Wayne, Pennsylvania.

Brown & Root Environmental, 1996. Phase III Remedial Investigation for Naval Air Warfare Center, Warminster, Pennsylvania. Wayne, Pennsylvania.

Brown & Root Environmental, 1997. Letter Report, Preliminary Data and Risk Evaluation Site 6, Area B Naval Air Warfare Center, Warminster, Pennsylvania. Wayne, Pennsylvania.

Brown & Root Environmental, 1997. Site 6 Removal Action Addendum/Clarification to Verification Sampling and Analysis Plan, Naval Air Warfare Center, Warminster, Pennsylvania. Wayne, Pennsylvania. BRPH/51-5-7-18, Wayne, Pennsylvania.

Brown & Root Environmental, 1997. Various Letters regarding Preliminary Post-Removal Sample Analytical Results Pit 6A, Trench TR6E, and Pit 6F, Site ;6 Naval Air Warfare Center, Warminster, Pennsylvania. BRPH-1-5-7-91, BRPH-51-5-7-100, BRPH-51-5-7-102, BRPH-51-6-7-31, BRPH/51-7-7-2, C-51-7-7-87, BRPH/51-7-7-110, BRPH/51-8-7-24, BRPH/51-8-7-59, BRPH/51-9-7-1, and BRPH/51-9-7-59. Wayne, Pennsylvania.

Brown & Root Environmental, 1997. Supplemental Geophysical Survey Results for Site 6, Naval Air Warfare Center, Warminster, Pennsylvania. BRPH/51-2-7-4. Wayne, Pennsylvania.

Brownlee, K.A., 1965. Statistical Theory and Methodology in Science and Engineering. New York, New York. John Wiley and Sons, Incorporated.

Cowherd, C., G. E. Muleski, P. J. Englehart, and D. A. Gillette, 1985. Rapid Assessment of Exposure to Particulate Emissions from Surface Contamination Sites. EPA/600/8-85/002, U.S. EPA Office of Health and Environmental Assessment, Washington, D.C.

Department of Navy, 1980. Navy Shore Activity Disposal Site Fact Form, Naval Air Development Center, Warminster, Pennsylvania.

Doull, J., C. D. Klaassen, and M. O. Amdur, 1986. Casarett and Doull's Toxicology: The Basic Science of Poisons, third edition, MacMillian Publishing Company, New York, New York.

EA Engineering, Science, and Technology, Incorporated, 1995. Basewide Environmental Base Line Survey, Naval Air Warfare Center, Aircraft Division, Warminster, Pennsylvania. Berkley Heights, New Jersey.

Environmental Photographic Interpretation Center (EPIC), U.S. Environmental Protection Agency (EPA), 1994. Aerial Photographic Site Analysis, NAWC Warminster, Pennsylvania. Warrenton, Virginia.

Foster Wheeler Environmental Corporation, 1997. Addendum No. 1 to the Work Plan for Various Source Removal Sites at Naval Air Warfare Center, Warminster, Pennsylvania. Langhorne, Pennsylvania.

Foster Wheeler Environmental Corporation, 1997. Close-Out Report, Site 6 Removal Action Naval Air Warfare Center, Warminster, Pennsylvania. Langhorne, Pennsylvania.

Foster, S. A. and P.C. Chrostowski, 1987. Inhalation Exposures to Volatile Organic Contaminants in the Shower. Presented at the 80th Annual Meeting of the Air Pollution Control Association. New York, NY. June.

Gehan, E., 1965. A Generalized Wilcoxon Test for Comparing Arbitrarily Singly-Censored Samples. Biometrika. Volume 52, pp. 203-223.

Gilbert, R.O., 1987. Statistical Methods for Environmental Pollution Monitoring. Van Nostrand and Reinhold, New York, NY.

Halliburton NUS Corporation, 1992b. Draft Phase II Remedial Investigation Report for NAWC. Warminster, Pennsylvania. Wayne, Pennsylvania.

Halliburton NUS Corporation, 1992b. Phase II Remedial Investigation/Feasibility Study Work Plan, Sampling and Analysis Plan. Wayne, Pennsylvania.

Halliburton NUS Corporation, 1993. Phase II Remedial Investigation Report Operable Unit 1, NAWC Warminster, Pennsylvania. Wayne, Pennsylvania.

Halliburton NUS Corporation, 1995a. Phase III Remedial Investigation Work Plan for NAWC Warminster, Pennsylvania. Wayne, Pennsylvania.

Halliburton NUS Corporation, 1995b. Phase III Remedial Investigation Quality Assurance Project Plan for NAWC Warminster, Pennsylvania. Wayne, Pennsylvania.

Pennsylvania Department of Environmental Protection, 1995. Technical Guidance Manual for land Recycling Program. Harrisburg, Pennsylvania.

Pennsylvania Department of Environmental Protection, 1997. Statewide Human Health Standards (as contained in Technical Guidance Manual for Land Recycling Program). Harrisburg, Pennsylvania.

SCM Environmental Services Group, 1991. Stages I and II - Rough Draft Remedial Investigation report for NADS Warminster, Pennsylvania. Valley Forge, Pennsylvania.

United States Environmental Protection Agency, 1986. Air Quality Criteria for Lead, EPA 600/8-83/028, Environmental Criteria and Assessment Office, Research Triangle Park, North Carolina.

United States Environmental Protection Agency, 1986b. Guidelines for the Health Risk Assessment of Chemical Mixtures. Federal Register, Vol. 51, No. 185, p. 34014 et seq. September 24.

United States Environmental Protection Agency, 1989a. Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part A). EPA 540/1-89/002, Office of Emergency and Remedial Response, Washington, D.C.

United States Environmental Protection Agency 1989b. Guidance Document on the Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities. Interim Final Guidance, EPA 530/SW-89-026, Office of Solid Waste, Washington, D.C.

United States Environmental Protection Agency 1991a. Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors. Office of Solid Waste and Emergency Response, (OSWER), Directive 9285.6-03, OSWER, Toxics Integration Branch, Washington, D.C., March 25.

United States Environmental Protection Agency 1991b. Maximum Contaminant Level Goals and National Primary Drinking Water Regulations for Lead and Copper. Final Rule, 56 Federal Register 26460-26564, June 7.

United States Environmental Protection Agency 1991c. Chemical Concentration Data Near the Detection Limit. Region III Technical Guidance Manual, EPA-3/HWMD/8-91/002.

United States Environmental Protection Agency 1991d. Exposure Point Concentrations in Groundwater. EPA Region III Technical Guidance Manual, EPA/903/8-91/002.

United States Environmental Protection Agency 1992a. Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities; Addendum to Interim Final Guidance. Office of Solid Waste Permits and State Programs Division, Washington, D.C., July.

United States Environmental Protection Agency 1992b. Methods for Evaluating the Attainment of Cleanup Standards. Volume 3. Reference Based Standards for Soils and Soil Media. Office of Policy, Planning, and Evaluation, Washington, D.C. July.

United States Environmental Protection Agency 1992c. Useability of Filtered vs. Unfiltered Metals Data for Risk Assessment. Draft Document.

United States Environmental Protection Agency 1992d. National Primary Drinking Water Regulations; Final Rule. 56 Federal Register 30265-30281, July 17.

United States Environmental Protection Agency 1992e. Estimating Exposure to Dioxin-Like Compounds. Review Draft. EPA/600/6-88/005B. August.

United States Environmental Protection Agency 1992f. Dermal Exposure Assessment: Principles and Applications, Interim Report. EPA 600/8-91/011/B, Office of Health and Environmental Assessment, Washington, D.C., January.

United States Environmental Protection Agency, 1992g. Guidelines for Exposure Assessment. Exposure Assessment Group. Office of Health and Environmental Assessment. In Federal Register, Vol. 57, No. 104, p. 22888. Friday, Mary 29.

United States Environmental Protection Agency 1993. Selected Exposure Routes and Contaminants of Concern by Risk Based Screening. Region III Technical Guidance Manual, EPA/903/R-93-001. Including Update March 14, 1997.

United States Environmental Protection Agency 1994a. Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities. Office of Solid Waste and Emergency Response, Directive 9355.4-12.

United States Environmental Protection Agency, 1994b. Guidance Manual for the Integrated Exposure Uptake Biokinetic Model for Lead in Children. EPA/540/R-93/081. Office of Emergency and Remedial Response. Washington, D.C., February.

United States Environmental Protection Agency, 1994c. Exposure Assessment Guidance for RCRA Hazardous Waste Combustion Facilities, Office of Solid Waste and Emergency Response, Draft, April 1994, EPA530-R-94-021 including Errata Modifications of Screening Guidance Fate and Transport Equations, Office of Solid Waste and Emergency Response, October 1994.

United States Environmental Protection Agency 1995a. Health Effects Assessment Summary Tables (HEAST), Annual Update FY 1995, EPA 540-R-95-036. Prepared by the Office of Health and Environmental Assessment for the Office of Solid Waste and Emergency Response and the Office of Water, Washington, D.C.

United States Environmental Protection Agency 1995b. Assessing Dermal Exposure from Soil, EPA Region III Technical Guidance Manual. EPA/903-K-95-003. December

United States Environmental Protection Agency 1996a. Guidance for Data Quality Assessment. Pre-Publication Copy. Final. EPA QA/G-9. Quality Assurance Division. Washington, D. C. February.

United States Environmental Protection Agency 1996b. Drinking Water and Health Advisories. Office of Drinking Water, Washington, D.C., May.

United States Environmental Protection Agency 1996c. Exposure Factors Handbook. Office of Research and Development. National Center for Environmental Assessment. EPA 600/P-95/002. Washington, D.C.

United States Environmental Protection Agency, 1997a. Integrated Risk Information System (IRIS). Computer Database, EPA, Washington, D.C.

United States Environmental Protection Agency 1997b. Risk-Based Concentration Table, March 1997. Region III EPA.

APPENDIX A
NOTIFICATION OF HAZARDOUS WASTE SITES

(3)

DEPARTMENT OF THE NAVY

NAVAL AIR DEVELOPMENT CENTER
WARMINSTER, PA. 18974

83A

9273

4 DEC 1980

From: Commander, Naval Air Development Center
To: Officer In Charge, Naval Energy and Environmental Support Activity, Port Hueneme, CA 93043
Via: Commanding Officer, Northern Division, Naval Facilities Engineering Command

Subj: Navy Assessment and Control of Installation Pollutants

Ref: (a) NORTHNAVFACENGCOM ltr 09BE:DRB of 23 Oct 1980
(b) CNO ltr ser 451/733807 of 8 Oct 1980

Encl: (1) Navy Shore Activity Disposal Site Fact Form

1. Enclosure (1), which has been prepared in accordance with reference (a) and (b), is hereby forwarded.

R. S. TYLER
By direction

Copy to:
NAVFACENGCOM
CHNAVMAT (08L3)

ADMINISTRATIVE RECORD

ACTIVITY NAVAL AIR DEVELOPMENT CENTER

UIC N62269

NAVY SHORE ACTIVITY DISPOSAL SITE FACT FORM

OPNAVNOTE 6240 of 11 September 1980 describes the Navy program to assess and control environmental effects of abandoned hazardous waste disposal/dumpsites at Navy shore activities. The program will be accomplished chiefly by the Naval Facilities Engineering Command (NAVFAC) under the direction of the Chief of Naval Material, but support is required from activities.

This fact form has been developed to obtain basic information relative to past hazardous waste disposal practices at your activity. The information will be used to establish priorities and initial input for further efforts described in OPNAVNOTE 6240 of 11 September 1980.

This fact form seeks information about disposal practices at your activity with respect to chemicals and other special wastes. The fact form is not concerned with the disposal of trash, garbage, and other conventional solid wastes. Information is specifically sought on past disposal operations which may have been closed but which still represent a possible threat to the environment. Assistance in completing the fact sheets is available from NAVFAC Engineering Field Divisions (EFD).

The fact form has been divided into the following sections:

Section I. General Information. Questions seek basic information about the activity and its environs.

Section II. Disposal of Special Wastes. Questions deal with identification of active and past disposal sites at the activity.

Section III. Detailed Disposal Information. Specific information is sought concerning each disposal site identified in section II. If no sites are identified, this section will not be completed.

The fact form shall be completed by 14 November 1980, signed in the box below by the activity Commanding Officer and forwarded via the cognizant NAVFAC EFD and appropriate command channels to the Naval Energy and Environmental Support Activity,

Enclosure ( )

Code 212, Port Hueneme, California 94043. A copy should be provided to the Naval Facilities Engineering Command, Code 212, 200 Stovall Street, Alexandria, Virginia 22332.

I certify that all of the statements made herein are true, complete, and correct to the best of my knowledge.

PAUL L. DUDLEY, JR.
Signature, Activity Commander/
Commanding Officer

date

ACTIVITY NAVAL AIR DEVELOPMENT CENTER

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SECTION I. GENERAL INFORMATION

Person compiling this information:

Name Joseph V. F. Clay III

Code 83A Telephone 441-3113

1. When was the activity first established? 1944

2. Briefly describe the activity's mission. NAVAIRDEVCEN, Warminster, is the Navy's principal research, development, test and evaluation center for Naval Aircraft Systems less launched weapons systems.

Has this always been the activity's mission? If not, describe previous missions and when they were changed. Present mission was changed from prior mission of conversion and modification of aircraft prior to delivery to combat units. This mission was performed for approximately 2 years from 1944 to 1946.

3. Estimate the activity's equivalent population. 2000

Equivalent Population = activity residents + 1/3 x (employees who commute in).

4. Describe the activity's location, including:

a. Location within state (e.g., northeastern corner near Podunk) Southeastern Pennsylvania, in the Philadelphia metropolitan area.

b. Lies in a generally rural or urban setting? Suburban Setting

5. Does the activity have any of the following operations (check the appropriate boxes)?

Ship Repair	[ ]	Pest Control	[X]
Aircraft Rework	[ ]	Disaster Control	[X]
Aircraft Intermediate Maintenance	[X]	Power Generation	[X]
Motor Vehicle Maintenance	[X]	DFDO Salvage Yard	[ ]
Ordnance/Demil	[ ]	Hospital, Dispensary	[X]
		Firefighting Training	[X]

Laboratory [X] What kind? See Item 6

(Continued)

SECTION I. GENERAL INFORMATION

5. (Continued)

Any other industrial operations? Please list. Machine Shop, Plating Shop, Heat Treating, Spray Painting

Were any industrial operations conducted in the past which have since been discontinued? If so, please list along with the year discontinued. Foundry (Hammer Shop) - 1945

Aircraft Modification

6. Additional Comments Laboratory Facilities at the Naval Air Development Center are Biochemistry, Corrosion Control, Hydraulic Fluids, Hydraulic Testing, Laser Research, Lubricant, Inorganic Chemistry, Inorganic Coatings, Materials Testing, Non Destruction Testing, Organic Chemistry, Inorganic Coatings, Synthetic Rubber Compounds, Salt Spray, Plastics, Polymer, Thermal Dynamics, Aircraft Fluid Systems, Elastomers Sealants and Polyurethane Processing, Metallurgical Research.

ACTIVITY NAVAL AIR DEVELOPMENT CENTER, WARMINSTER, PA

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SECTION II. DISPOSAL OF SPECIAL WASTES

This section of the fact form will ask about waste disposal sites that are or have been operated by the activity. If a disposal site(s) is identified in this section, section III should be filled out.

To complete this section (and section III, if necessary), activity records should be examined and knowledgeable activity personnel should be interviewed. Long-time activity employees will be invaluable in this effort, since they will be familiar with past disposal operations. If deemed necessary to accurately complete this section, preliminary field investigations may also be performed (however, this fact form does not warrant extensive investigations such as soil borings and waste analyses).

1. Have any of the following techniques ever been used to dispose of chemicals or special wastes on base? Do not include trash or garbage (check the appropriate boxes).

	Operations Present	Past
Solvent Pit		X
Acid/Caustic Pit		
Slurry (Chemical Mixtures) Pit		
Waste Oil/Oil Sludges Pit		
Evaporating Pit		
Grease Pit		
Surface Spreading		
Open Burning (Examples: Firefighting Training, Ordnance Waste)	X	X
Incinerator		X
Land Disposal with State Permit		

Any other disposal operations?* Please explain Sludge drying bed 1941 - 1975

Industrial waste sludges were land filled from 1941 to 1975

*Do not include industrial waste treatment/pretreatment facilities that are subject to pretreatment regulations or NPDES permits. Disposal of industrial sludge should be included, however.

(Continued)

SECTION II. DISPOSAL OF SPECIAL WASTES (CONTINUED)

2. The following questions are intended to find out whether small-scale disposal of chemicals or special wastes (whether intentional or not) may have occurred at the activity. If the activity has ever run an operation listed below, check the box in column 1 (some of these operations may have been noted in section I). If a box in column 1 is checked, go to column 2 and check the box if the answer to the question in column 2 is "yes."

	Column 1		Column 2
Refuse disposal site	[X]	Did this site ever receive chemicals or special wastes?	[X]
Pest control shop	[X]	Have pesticides or pesticide rinsates ever been disposed of anywhere on a regular basis?	[ ]
Firefighting training using open burning	[X]	Were substances other than oil (e.g., solvents) burned?	[ ]
Ordnance operations	[ ]	Were ordnance wastes ever disposed of on base?	[ ]
Storage of chemical materials or special wastes in a specified area	[X]	Have these materials ever leaked or otherwise escaped confinement?	[ ]

3. Section III should be completed for each disposal site identified in question 1 of this section. Section III should also be filled out for any significant disposal site identified in question 2. If the activity has NEVER disposed of chemicals or special wastes on base, completion of section III is not required.

4. Have any accidents involving hazardous materials ever occurred at the activity? If so, briefly describe the incidents.

Cyanide Spill - 1940 Cyanide Waste Entered unnamed tributary of Nesahminy Center.

Fish Killed.

Heat Treatment Bath emptied into storm drain which led to tributary of

Pennypack Creek. Occurred periodically, 1950 - 1951

(Continued)

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SECTION II. DISPOSAL OF SPECIAL WASTES (CONTINUED)

5. Are/were there any chemical or special waste disposal sites run by organizations outside the activity's fenceline which may present a current hazard to on-base personnel? Did the activity ever operate disposal sites on property which has since been excessed? Please explain.

NO

6. In answering the questions in this section, was reliable information available on past operations? How far back in the past? What sources were used? Please explain.

Richard Law. Buildings & Grounds Foremen 1950 1980

7. Additional comments

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SITE NUMBER 1

SECTION III. DETAILED DISPOSAL INFORMATION

This section should be completed only if active or past disposal sites were identified in section II. Section III should be completed for each site. As an example, say your activity has three sites. Make three copies of section III and complete them. Assign a number to each site (1, 2, and 3) and enter it in the upper right-hand corner.

1. Is this disposal site currently in operation or has it been closed?

   This site is closed

   Years of operation: From 1940 To 1955

2. What is/was the name of the site (e.g., slurry pit)?

   Burning Pit

3. Where is/was the site located (provide a description and give activity map coordinates)?

   This site is located at Grid coordinates E-6

4. Describe how the site is/was operated.

   Site was located at a severe embankment of a ravine found by erosion action of stream. Material was dumped over the bank and burned.

(Continued)

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SITE NUMBER 1

SECTION III. DETAILED DISPOSAL INFORMATION (CONTINUED)

5. If the site was closed, briefly describe the closure procedures.

Area was used as a disposal site for excess earth generated by grading for extension of aircraft runway.

6. As well as possible, describe the wastes that entered the site.

Type of Waste	Quantity	Origin
Paint	Unk	NAVAIRDEVCEN
Oil	"	"
Asphalt	"	"
Roofing Matl	"	"
Solvents	"	"
Scrap Metal	"	"
Chemicals	"	"
Waste From	"	"
Firing Ranges	"	"

(Continued)

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SITE NUMBER 1

SECTION III. DETAILED DISPOSAL INFORMATION (CONTINUED)

7. Describe the site's hydrogeology, including information on terrain, soils, water table depth, groundwater quality, nearby surface waters, etc.

Site was a ravine created by stream action. Depth to water table varied. An unnamed tributary of the Neshaminey Creek flows within 100 yards of the site. Ground water in the vicinity is contaminated with TCE and PCE. The naturally occurring soils at the site were of the Bowmansville and Lawrenceville Series.

8. Briefly describe animal and plant life surrounding the site, including any peculiarities (e.g., dying plants).

Site is covered with tall grasses.

9. Do personnel live or work near the site? Please explain.

Site is approximately 1000 ft from main buildings at NAVAIRDEVCEN and a food processing plant located outside the fence.

(Continued)

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SITE NUMBER 1

SECTION III. DETAILED DISPOSAL INFORMATION (CONTINUED)

10. Have there been any incidents or complaints concerning this site? Explain.

Site was closed as the results of complaints about the smoke and odors resulting from burning

11. How close is the site to the activity's boundaries?

Site is located within 100 feet of station boundary

12. Additional comments

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SITE NUMBER 2

SECTION III. DETAILED DISPOSAL INFORMATION

This section should be completed only if active or past disposal sites were identified in section II. Section III should be completed for each site. As an example, say your activity has three sites. Make three copies of section III and complete them. Assign a number to each site (1, 2, and 3) and enter it in the upper right-hand corner.

1. Is this disposal site currently in operation or has it been closed?

This site has been closed.

Years of operation: From 1965 To 1970

2. What is/was the name of the site (e.g., slurry pit)?

Sludge Pit

3. Where is/was the site located (provide a description and give activity map coordinates)?

Site is located at activity map coordinated F-6

4. Describe how the site is/was operated. A 200 ft X 12 ft X 8 ft trench dug by dozer. Industrial sludge cake hayles in by truck. Trenches were dug to receive the sludge cake every other year. Two trenches were dug at this site.

(Continued)

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SITE NUMBER 2

SECTION III. DETAILED DISPOSAL INFORMATION (CONTINUED)

5. If the site was closed, briefly describe the closure procedures.

2 ft of earth cover was placed on the pits, graded and seeded.

6. As well as possible, describe the wastes that entered the site.

Type of Waste	Quantity	Origin
Industrial water sludge cake	1400 cy	NAVAIRDEVCEN industrial waste treatment plant

(Continued)

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SITE NUMBER 2

SECTION III. DETAILED DISPOSAL INFORMATION (CONTINUED)

7. Describe the site's hydrogeology, including information on terrain, soils, water table depth, groundwater quality, nearby surface waters, etc.

Site is located in an area which gradually slopes to an unnamed tributary of the Neshaminy Creek, which is about 100 yards distant. Depth of ground water is approximately 10-15 ft. The soils naturally occurring at the site are of the Bowmansville Series.

8. Briefly describe animal and plant life surrounding the site, including any peculiarities (e.g., dying plants).

Site is covered with tall grasses.

9. Do personnel live or work near the site? Please explain.

Site is located approximately 1000 ft from the main buildings at NAVAIRDEVCEN and 1000 ft from a commercial food processing plant.

(Continued)

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SITE NUMBER 2

SECTION III. DETAILED DISPOSAL INFORMATION (CONTINUED)

10. Have there been any incidents or complaints concerning this site? Explain.

There have been no complaints about this site.

11. How close is the site to the activity's boundaries?

The site is within 100 ft of the NAVAIRDEVCEN boundary.

12. Additional comments

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SITE NUMBER 3

SECTION III. DETAILED DISPOSAL INFORMATION

This section should be completed only if active or past disposal sites were identified in section II. Section III should be completed for each site. As an example, say your activity has three sites. Make three copies of section III and complete them. Assign a number to each site (1, 2, and 3) and enter it in the upper right-hand corner.

1. Is this disposal site currently in operation or has it been closed?

   This site has been closed

   Years of operation: From 1955 To 1965

2. What is/was the name of the site (e.g., slurry pit)?

   Burning Pit

3. Where is/was the site located (provide a description and give activity map coordinates)?

   Site is located at Grid coordinate F-7

4. Describe how the site is/was operated.

   A pit 20' x 30' x 10' with sloped bottom was dug with a bulldozer. A large metal screen enclosure was placed over it. Defense and waste materials were dumped into pit and burned. Residence removed periodically and trucked to sanitary land fill on Center.

(Continued)

ACTIVITY NAVA IR DEVELOPMENT CENTER

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SITE NUMBER 3

SECTION III. DETAILED DISPOSAL INFORMATION (CONTINUED)

5. If the site was closed, briefly describe the closure proce

Metal screen enclosure was removed and pit was back filled with earth and graded.

6. As well as possible, describe the wastes that entered the

Type of Waste	Quantity	[illegible]
Trash	Unk	NAVAIRDEVCEN
Solvent	"	"
Paint	"	"
Roofing matl	"	"
Chemical	"	"

(Continued)

ACTIVITY NAVAL AIR DEVELOPMENT CENTER

UIC N62269

SITE NUMBER 3

SECTION III. DETAILED DISPOSAL INFORMATION (CONTINUED)

7. Describe the site's hydrogeology, including information on terrain, soils, water table depth, groundwater quality, nearby surface waters, etc.

Site is located within 100 yards of an unnamed tributary of the Neshaminy Creek on an area which gradually slopes to the steam bed. Ground water in the area is contaminated with TCE and PCE. The soils naturally occurring at the site were of the Chalfont Series.

8. Briefly describe animal and plant life surrounding the site, including any peculiarities (e.g., dying plants).

Vegatation on the site is generally scub brush.

9. Do personnel live or work near the site? Please explain.

Site is within 1000 ft of main buildings at NAVAIRDEVCEN and within 600 ft of the Bachelor Enlisted Quarters. Civilian housing and married officer quarters are at a distance of 1000 ft.

(Continued)

ACTIVITY NAVAL AIR DEVELOPMENT CENTER

UIC N62269

SITE NUMBER 3

SECTION III. DETAILED DISPOSAL INFORMATION (CONTINUED)

10. Have there been any incidents or complaints concerning this site? Explain.

Site was closed as the results of complaints about the smoke and odors resulting from burning.

11. How close is the site to the activity's boundaries?

Site is located within 100 feet of station boundary.

12. Additional comments

80301004

ACTIVITY NAVAL AIR DEVELOPMENT CENTER

UIC N62269

SITE NUMBER 4

SECTION III. DETAILED DISPOSAL INFORMATION

This section should be completed only if active or past disposal sites were identified in section II. Section III should be completed for each site. As an example, say your activity has three sites. Make three copies of section III and complete them. Assign a number to each site (1, 2, and 3) and enter it in the upper right-hand corner.

1. Is this disposal site currently in operation or has it been closed?

This site has been closed.

Years of operation: From 1966 To 1970

2. What is/was the name of the site (e.g., slurry pit)?

Sanitary land fill.

3. Where is/was the site located (provide a description and give activity map coordinates)?

Site is located on the airfield side of the Center at map grids H12 and H13.

4. Describe how the site is/was operated.

Trenches 12 ft X 1000 ft X 8 ft were dug using a bull dozer. Refuse was placed in 4 ft lift & compacted. Each lift was covered with 2 ft of fill as soon as refuse was placed. In all 7 trenches were dug and filled. Each trench received refuse for approximately 6 to 7 months.

(Continued)

ACTIVITY NAVAL AIR DEVELOPMENT CENTER

UIC N62269

SITE NUMBER 4

SECTION III. DETAILED DISPOSAL INFORMATION (CONTINUED)

5. If the site was closed, briefly describe the closure procedures.

Two feet of fill placed over entire site and seeded.

6. As well as possible, describe the wastes that entered the site.

Type of Waste	Quantity	Origin
Sanitary fill	25000 Cy	NAVAIRDEVCEN
Paints	"	"
Waste Oil	"	"
Waste Metal	"	"
Construction Wastes	"	"
Solvents	"	"
Domestic Waste Sludge	"	NAVAIRDEVCEN Sewage Treatment Plant
Aircraft Paints	"	NAVAIRDEVCEN

(Continued)

ACTIVITY NAVAL AIR DEVELOPMENT CENTER

UIC N62269

SITE NUMBER 4

SECTION III. DETAILED DISPOSAL INFORMATION (CONTINUED)

7. Describe the site's hydrogeology, including information on terrain, soils, water table depth, groundwater quality, nearby surface waters, etc.

The site is located in an area which has a number of springs which form the head waters of an unnamed tributary of the Neshaminy Creek. Depth of water table is 1 to 5 feet. Ground water quality in the area is good. The soils naturally occurring at the site are of the Duncannon Series.

8. Briefly describe animal and plant life surrounding the site, including any peculiarities (e.g., dying plants).

This site is covered with tall grasses.

9. Do personnel live or work near the site? Please explain.

The site is less than 200 feet from several civilian residences.

(Continued)

ACTIVITY NAVAL AIR DEVELOPMENT CENTER

UIC N62269

SITE NUMBER 4

SECTION III. DETAILED DISPOSAL INFORMATION (CONTINUED)

10. Have there been any incidents or complaints concerning this site? Explain.

The site was closed because of complaints concerning leaving trash and odors.

11. How close is the site to the activity's boundaries?

The site is located less than 100 ft. from station boundaries.

12. Additional comments

ACTIVITY NAVAL AIR DEVELOPMENT CENTER

UIC N62269

SITE NUMBER 5

SECTION III. DETAILED DISPOSAL INFORMATION

This section should be completed only if active or past disposal sites were identified in section II. Section III should be completed for each site. As an example, say your activity has three sites. Make three copies of section III and complete them. Assign a number to each site (1, 2, and 3) and enter it in the upper right-hand corner.

1. Is this disposal site currently in operation or has it been closed?

This site has been closed

Years of operation: From 1955 To 1970

2. What is/was the name of the site (e.g., slurry pit)?

Landfill site

3. Where is/was the site located (provide a description and give activity map coordinates)?

This site is located on the airfield side of the Center, south of the runway at map coordintes J-15

4. Describe how the site is/was operated.

Trenches were dug using a bulldozer. The trenches were 12X70X8 ft. Trenches were occasionaly covered. In general trenches were open for a period of 12 to 15 months. There were 6 to 8 trenches dug at this site.

(Continued)

ACTIVITY NAVAL R DEVELOPMENT CENTER

UIC N62269

SITE NUMBER 5

SECTION III. DETAILED DISPOSAL INFORMATION (CONTINUED)

5. If the site was closed, briefly describe the closure procedures.

Site was closed by placement of 2 ft of clean fill over entire site, grading and seeding.

6. As well as possible, describe the wastes that entered the site.

Type of Waste	Quantity	Origin
Demolition wastes	Unk	NAVAIRDEVCEN
Paint	"	"
Solvents	"	"
Scrap metal	"	"
Aircraft Paints	"	"
Cans	3	"
Asphalt (tack coat)	30 drums	"

(Continued)

ACTIVITY NAVAL AIR DEVELOPMENT CENTER

UIC N62269

SITE NUMBER 5

SECTION III. DETAILED DISPOSAL INFORMATION (CONTINUED)

7. Describe the site's hydrogeology, including information on terrain, soils, water table depth, groundwater quality, nearby surface waters, etc.

The soils in the area are Doylesville and Lawrenceville which are characterized by a high water table and slopes of 0 to 8%. The site is within 700 ft of springs which find the head/waters of an unnamed tributary of the Pennypack Creek.

8. Briefly describe animal and plant life surrounding the site, including any peculiarities (e.g., dying plants).

The site is covered with tall grasses

9. Do personnel live or work near the site? Please explain.

The site is within 100 ft of 8 enlisted family housing units and approximately 700 ft from the Center Inertial Navigation Facility.

(Continued)

ACTIVITY NAVAL AIR DEVELOPMENT CENTER

UIC N62269

SITE NUMBER 5

SECTION III. DETAILED DISPOSAL INFORMATION (CONTINUED)

10. Have there been any incidents or complaints concerning this site? Explain.

There have been no complaints about this site.

11. How close is the site to the activity's boundaries?

The site is 400 ft from the nearest station boundary.

12. Additional comments

ACTIVITY NAVAL AIR DEVELOPMENT CENTER

UIC N62269

SITE NUMBER 6

SECTION III. DETAILED DISPOSAL INFORMATION

This section should be completed only if active or past disposal sites were identified in section II. Section III should be completed for each site. As an example, say your activity has three sites. Make three copies of section III and complete them. Assign a number to each site (1, 2, and 3) and enter it in the upper right-hand corner.

1. Is this disposal site currently in operation or has it been closed?

This site has been closed

Years of operation: From 1950 To 1955

2. What is/was the name of the site (e.g., slurry pit)?

Sludge Pit

3. Where is/was the site located (provide a description and give activity map coordinates)?

This site is located on the airfield side of the activity in now open fields at grid coordinants K-14

4. Describe how the site is/was operated.

A trench 12' x 100' x 8' was dug using a bulldozer. The industrial sludge coke was hauled in by truck, placed in the pit and backfilled. Operation was completed in short period of time. Two trenches were used in this manner.

(Continued)

ACTIVITY NAVAL AIR DEVELOPMENT CENTER

UIC N62269

SITE NUMBER 6

SECTION III. DETAILED DISPOSAL INFORMATION (CONTINUED)

5. If the site was closed, briefly describe the closure procedures.

The pits were covered with 2 ft of soil, graded and seeded.

6. As well as possible, describe the wastes that entered the site.

Type of Waste	Quantity	Origin
Industrial Waste Sludge Cake	700 Cy	NAVAIRDEVCEN Waste Plant

(Continued)

ACTIVITY NAVAL AIR DEVELOPMENT CENTER

UIC N62269

SITE NUMBER 6

SECTION III. DETAILED DISPOSAL INFORMATION (CONTINUED)

7. Describe the site's hydrogeology, including information on terrain, soils, water table depth, groundwater quality, nearby surface waters, etc.

Site is located on a rolling terrain, near the head waters of the Pennypack Creek. Ground water quality in the area is good. Depth of water table is 10 to 12 ft. The soils in the area are of the Lawrenceville and Duncannon Series.

8. Briefly describe animal and plant life surrounding the site, including any peculiarities (e.g., dying plants).

Site and area surrounding it are covered with tall grasses. Area is inhabited with wildlife common to the surrounding area.

9. Do personnel live or work near the site? Please explain.

The site is within 500 ft of enlisted family housing quarters, 500 to 700 ft from the Center Inertial Navigation Facility and 800 ft from the quarters of the Chief Staff Officer.

(Continued)

ACTIVITY NAVAL AIR DEVELOPMENT CENTER

UIC N62269

SITE NUMBER 6

SECTION III. DETAILED DISPOSAL INFORMATION (CONTINUED)

10. Have there been any incidents or complaints concerning this site? Explain.

There have been no complaints or incidents concerning this site.

11. How close is the site to the activity's boundaries?

The site is 800 ft from the station boundary.

12. Additional comments

ACTIVITY NAVAL AIR DEVELOPMENT CENTER

UIC N62269

SITE NUMBER 7

SECTION III. DETAILED DISPOSAL INFORMATION

This section should be completed only if active or past disposal sites were identified in section II. Section III should be completed for each site. As an example, say your activity has three sites. Make three copies of section III and complete them. Assign a number to each site (1, 2, and 3) and enter it in the upper right-hand corner.

1. **Is this disposal site currently in operation or has it been closed?**

   This site is currently open.

   Years of operation: From 1960 To Present

2. What is/was the name of the site (e.g., slurry pit)?

   Dump

3. Where is/was the site located (provide a description and give activity map coordinates)?

   This site is located on the airfield side of the activity south of the runway and map coordinates J-14.

4. **Describe how the site is/was operated.**

   Pits are dug by backhoe as needed. Refuse and wastes are placed and site is backfilled and covered.

(Continued)

ACTIVITY NAVAL AIR DEVELOPMENT CENTER

UIC N62269

SITE NUMBER 7

SECTION III. DETAILED DISPOSAL INFORMATION (CONTINUED)

5. If the site was closed, briefly describe the closure procedures.

Site has been used until this year. No dumping has occurred within the past four months.

6. As well as possible, describe the wastes that entered the site.

Type of Waste	Quantity	Origin
Paint	Unk	NAVAIRDEVCEN
Solvent	"	"
Demolition Waste	"	"
Oil	"	"
Flammable Waste	"	"
Grease Trap Waste	"	"

(Continued)

ACTIVITY NAVAL AIR DEVELOPMENT CENTER

UIC N62269

SITE NUMBER 7

SECTION III. DETAILED DISPOSAL INFORMATION (CONTINUED)

7. Describe the site's hydrogeology, including information on terrain, soils, water table depth, groundwater quality, nearby surface waters, etc.

Soils in the area of the site are of the Duncannon and Lawrenceville Series.

8. Briefly describe animal and plant life surrounding the site, including any peculiarities (e.g., dying plants).

The area plant life is tall grasses and trees, samplings and young trees up to 10 ft in height. Wildlife found is that common to the area.

9. Do personnel live or work near the site? Please explain.

The site is within 900 ft of the Chief Staff Officer's Quarters with 400 ft of enlisted family quarters and 1000 ft of the Inertial Navigation Facility.

(Continued)

ACTIVITY NAVAL AIR DEVELOPMENT CENTER

UIC N62269

SITE NUMBER 7

SECTION III. DETAILED DISPOSAL INFORMATION (CONTINUED)

10. **Have there been any incidents or complaints concerning this site? Explain.**

There have been no complaints concerning this site.

11. **How close is the site to the activity's boundaries?**

The site is approximately 900 ft from the nearest station boundary.

12. **Additional comments**

ACTIVITY NAVAL AIR DEVELOPMENT CENTER

UIC N62269

SITE NUMBER 8

SECTION III. DETAILED DISPOSAL INFORMATION

This section should be completed only if active or past disposal sites were identified in section II. Section III should be completed for each site. As an example, say your activity has three sites. Make three copies of section III and complete them. Assign a number to each site (1, 2, and 3) and enter it in the upper right-hand corner.

1. **Is this disposal site currently in operation or has it been closed?**

   This site is currently open.

   Years of operation: From 1961 To Present

2. What is/was the name of the site (e.g., slurry pit)?

   Fire training area

3. Where is/was the site located (provide a description and give activity map coordinates)?

   This site is located on the runway side of the Center north of the active runway on the abandoned runway.

4. **Describe how the site is/was operated.** The site is located on an abandoned runway. An earth berm approximately 6 feet in height and 75 feet on a side confine the site to the east, north and west. The south side is open to permit access. The area within the berm is covered with approximately 6 to 9 inches of water. Aircraft skeletons are placed within the berm. Contaminated fuels are floated on the water and burned. Firefighting training is accomplished in fire extinquishing and crew rescue techniques.

(Continued)

ACTIVITY NAVAL AIR DEVELOPMENT CENTER

UIC N62269

SITE NUMBER 8

SECTION III. DETAILED DISPOSAL INFORMATION (CONTINUED)

5. If the site was closed, briefly describe the closure procedures.

This site is open.

6. As well as possible, describe the wastes that entered the site.

Type of Waste	Quantity	Origin
Contaminated aviation fuels	3000 gals/yr	NAVAIRDEVCEN Fuel farm

(Continued)

ACTIVITY NAVAL AI EVELOPMENT CENTER

UIC N62269

SITE NUMBER 8

SECTION III. DETAILED DISPOSAL INFORMATION (CONTINUED)

7. Describe the site's hydrogeology, including information on terrain, soils, water table depth, groundwater quality, nearby surface waters, etc.

The soil in the area of the site of the Duncannon, Lawrenceville Series slopes range from 3 to 8%. Depth to ground water is 12 to 15 ft. There are no nearby surface water sources.

8. Briefly describe animal and plant life surrounding the site, including any peculiarities (e.g., dying plants).

Area surrounding the site outside of the runway pavements is covered with tall grasses.

9. Do personnel live or work near the site? Please explain.

The site is approximately 900 ft from the Commanding Officers Quarters and 1200 ft from Bachelor Enlisted and Married Officers Quarters.

(Continued)

ACTIVITY NAVAL AIR DEVELOPMENT CENTER

UIC N62269

SITE NUMBER 8

SECTION III. DETAILED DISPOSAL INFORMATION (CONTINUED)

10. Have there been any incidents or complaints concerning this site? Explain.

Their have been no complaints concerning this site.

11. How close is the site to the activity's boundaries?

This site is approximately 700 ft from the nearest station boundary.

12. Additional comments

(6)

DEPARTMENT OF THE NAVY
NAVAL AIR DEVELOPMENT CENTER
WARMINSTER, PA. 18974

8303
4568
9 JUN 1981

US EPA Region 3
Sites Notification
Philadelphia, PA 19106

Gentlemen:

As required by the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) of 1980, enclosure (1) is forwarded.

Sincerely,

R. S. TYLER
LCDR, CEC, USN
Public Works Officer
By direction of the Commander

Encl:
(1) Notification of Hazardous Waste Sites

Copy to:
NORTHNAVFACENGCOM (Code 114)
Naval Energy and Environmental Support Activity (Code 212)

EPA Notification of Hazardous Waste Si

United States
Environmental Protection
Agency
Washington DC 20460

This initial notification information is required by Section 103(c) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 and must be mailed by June 9, 1981.

Please type or print in ink. If you need additional space, use separate sheets of paper. Indicate the letter of the item which applies.

A Person Required to Notify:
Enter the name and address of the person or organization required to notify.

Name NAVAL AIR DEVELOPMENT CENTER
Street STREET AND JACKSONVILLE ROADS
City WARMINSTER State PA Zip Code 18974

B Site Location:
Enter the common name (if known) and actual location of the site.

Name of Site NAVAL AIR DEVELOPMENT CENTER
Street STREET AND JACKSONVILLE ROAD
City WARMINSTER County BUCKS State PA Zip Code 18974

C Person to Contact:
Enter the name, title (if applicable), and business telephone number of the person to contact regarding information submitted on this form.

Name (Last, First and Title) THOMAS AMES ENVIRONMENTAL
Phone 215-441-3113 PROGRAM MANAGER

D Dates of Waste Handling:
Enter the years that you estimate waste treatment, storage, or disposal began and ended at the site.

From (Year) 1940 To (Year) 1955

E Waste Type: Choose the option you prefer to complete

Option 1: Select general waste types and source categories. If you do not know the general waste types or sources, you are encouraged to describe the site in Item I—Description of Site.

General Type of Waste:
Place an X in the appropriate boxes. The categories listed overlap. Check each applicable category.

1. ☐ Organics
2. ☒ Inorganics
3. ☒ Solvents
4. ☐ Pesticides
5. ☐ Heavy metals
6. ☒ Acids
7. ☒ Bases
8. ☐ PCBs
9. ☐ Mixed Municipal Waste
10. ☐ Unknown
11. ☒ Other (Specify) FIRING RANGE WASTE

Source of Waste:
Place an X in the appropriate boxes.

1. ☐ Mining
2. ☒ Construction
3. ☐ Textiles
4. ☐ Fertilizer
5. ☐ Paper/Printing
6. ☐ Leather Tanning
7. ☐ Iron/Steel Foundry
8. ☐ Chemical, General
9. ☐ Plating/Polishing
10. ☐ Military/Ammunition
11. ☐ Electrical Conductors
12. ☐ Transformers
13. ☐ Utility Companies
14. ☒ Sanitary Refuse
15. ☐ Photofinish
16. ☐ Lab Hospital
17. ☐ Unknown
18. ☒ Other (Specify) NAVAL RESEARCH & DEVELOPMENT

Option 2: This option is available to persons familiar with the Resource Conservation and Recovery Act (RCRA) Section 3001 regulations (40 CFR Part 261).

Specific Type of Waste:
EPA has assigned a four-digit number to each hazardous waste listed in the regulations under Section 3001 of RCRA. Enter the appropriate four-digit number in the boxes provided. A copy of the list of hazardous wastes and codes can be obtained by contacting the EPA Region serving the State in which the site is located.

Form Approved
OMB No. 2060-0138

Notification of Hazardous Waste Site — **Side Two**

F Waste Quantity

Place an X in the appropriate boxes to indicate the facility types found at the site.

In the "total facility waste amount" space give the estimated combined quantity (volume) of hazardous wastes at the site using cubic feet or gallons.

In the "total facility area" space, give the estimated area size which the facilities occupy using square feet or acres.

Facility Type

1. ☐ Piles
2. ☐ Land Treatment
3. ☒ Landfill
4. ☐ Tanks
5. ☐ Impoundment
6. ☐ Underground Injection
7. ☐ Drums, Above Ground
8. ☐ Drums, Below Ground
9. ☐ Other (Specify) _____

Total Facility Waste Amount

cubic feet UNKNOWN

gallons UNKNOWN

Total Facility Area

square feet 2000

acres _____

G Known, Suspected or Likely Releases to the Environment:

Place an X in the appropriate boxes to indicate any known, suspected, or likely releases of wastes to the environment. ☐ Known ☐ Suspected ☐ Likely ☒ None

Note: Items H and I are optional. Completing these items will assist EPA and State and local governments in locating and assessi g hazardous waste sites. Although completing the items is not required, you are encouraged to do so

H Sketch Map of Site Location: (Optional)

Sketch a map showing streets, highways, routes or other prominent landmarks near the site. Place an X on the map to indicate the site location. Draw an arrow showing the direction north. You may substitute a publishing map showing the site location.

MAP ENCLOSED (SITE #1)

I Description of Site: (Optional)

Describe the history and present conditions of the site. Give directions to the site and describe any nearby wells, springs, lakes, or housing. Include such information as how waste was disposed and where the waste came from. Provide any other information or comments which may help describe the site conditions.

Site was located at a severe embankment of a ravine caused by erosion action of a stream. Material was dumped over the bank and burned. Site was closed in 1955 by using the area as a disposal site for excess earth generated by grading for extension of aircraft runway.

Present Condition: Site is covered with tall grasses

J Signature and Title:

The person or authorized representative (such as plant managers, superintendents, trustees or attorneys) of persons required to notify must sign the form and provide a mailing address (if different than address in item A). For other persons providing notification, the signature is optional. Check the boxes which best describe the relationship to the site of the person required to notify. If you are not required to notify check "Other"

Name THOMAS AMES

Street _____

City _____ State _____ Zip Code _____

Signature Thomas C. Ames Date 6/2/81

ENVIRONMENTAL PROGRAM MANAGER

☒ Owner, Present
☐ Owner, Past
☐ Transporter
☐ Operator, Present
☐ Operator, Past
☐ Other

[FR Doc. 81-11500 Filed 4-14-81; 8:45 am]
BILLING CODE 6560-22-C

EPA Notification of Hazardous Waste Si

United States
Environmental Protection
Agency
Washington DC 20460

This initial notification information is required by Section 103(c) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 and must be mailed by June 9, 1981.

Please type or print in ink. If you need additional space, use separate sheets of paper. Indicate the letter of the item which applies.

A Person Required to Notify:
Enter the name and address of the person or organization required to notify.

Name: NAVAL AIR DEVELOPMENT CENTER
Street: STREET AND JACKSONVILLE ROADS
City: WARMINSTER State: PA Zip Code: 18974

B Site Location:
Enter the common name (if known) and actual location of the site.

Name of Site: NAVAL AIR DEVELOPMENT CENTER
Street: STREET AND JACKSONVILLE ROADS
City: WARMINSTER County: BUCKS State: PA Zip Code: 18974

C Person to Contact:
Enter the name, title (if applicable), and business telephone number of the person to contact regarding information submitted on this form.

Name (Last, First and Title): THOMAS AMES ENVIRONMENTAL PROGRAM MANAGER
Phone: 215-441-3113

D Dates of Waste Handling:
Enter the years that you estimate waste treatment, storage, or disposal began and ended at the site.

From (Year): 1965 To (Year): 1970

E Waste Type: Choose the option you prefer to complete

Option I: Select general waste types and source categories. If you do not know the general waste types or sources, you are encouraged to describe the site in Item I—Description of Site.

General Type of Waste:
Place an X in the appropriate boxes. The categories listed overlap. Check each applicable category.

1. ☐ Organics
2. ☐ Inorganics
3. ☐ Solvents
4. ☐ Pesticides
5. ☐ Heavy metals
6. ☐ Acids
7. ☐ Bases
8. ☐ PCBs
9. ☐ Mixed Municipal Waste
10. ☐ Unknown
11. ☒ Other (Specify) INDUSTRIAL WASTE SLUDGE CAKE

Source of Waste:
Place an X in the appropriate boxes.

1. ☐ Mining
2. ☐ Construction
3. ☐ Textiles
4. ☐ Fertilizer
5. ☐ Paper/Printing
6. ☐ Leather Tanning
7. ☐ Iron/Steel Foundry
8. ☒ Chemical, General
9. ☐ Plating/Polishing
10. ☐ Military Ammunition
11. ☐ Electrical Conductors
12. ☐ Transformers
13. ☐ Utility Companies
14. ☐ Sanitary Refuse
15. ☒ Photofinish
16. ☐ Lab/Hospital
17. ☐ Unknown
18. ☒ Other (Specify) NAVAL RESEARCH

Option 2: This option is available to persons familiar with the Resource Conservation and Recovery Act (RCRA) Section 3001 regulations (40 CFR Part 261).

Specific Type of Waste:
EPA has assigned a four-digit number to each hazardous waste listed in the regulations under Section 3001 of RCRA. Enter the appropriate four-digit number in the boxes provided. A copy of the list of hazardous wastes and codes can be obtained by contacting the EPA Region serving the State in which the site is located.

Form Approved
OMB No. 2000-0134

Notification of Hazardous Waste Site **Side Two**

F Waste Quantity

Place an X in the appropriate boxes to indicate the facility types found at the site.

In the "total facility waste amount" space give the estimated combined quantity (volume) of hazardous wastes at the site using cubic feet or gallons.

In the "total facility area" space, give the estimated area size which the facilities occupy using square feet or acres.

Facility Type

1. ☐ Piles
2. ☐ Land Treatment
3. ☒ Landfill
4. ☐ Tanks
5. ☐ Impoundment
6. ☐ Underground Injection
7. ☐ Drums, Above Ground
8. ☐ Drums, Below Ground
9. ☐ Other (Specify) _____

Total Facility Waste Amount

cubic feet 37,800

gallons

Total Facility Area

square feet 2400

acres

G Known, Suspected or Likely Releases to the Environment:

Place an X in the appropriate boxes to indicate any known, suspected, or likely releases of wastes to the environment. ☐ Known ☐ Suspected ☐ Likely ☒ None

Note: Items H and I are optional. Completing these items will assist EPA and State and local governments in locating and assessing hazardous waste sites. Although completing the items is not required, you are encouraged to do so

H Sketch Map of Site Location: (Optional)

Sketch a map showing streets, highways, routes or other prominent landmarks near the site. Place an X on the map to indicate the site location. Draw an arrow showing the direction north. You may substitute a publishing map showing the site location.

MAP ENCLOSED (SITE #2)

I Description of Site: (Optional)

Describe the history and present conditions of the site. Give directions to the site and describe any nearby wells, springs, lakes, or housing. Include such information as how waste was disposed and where the waste came from. Provide any other information or comments which may help describe the site conditions.

Site was a sludge pit consisting of a 200 ft x 12 ft x 8 ft trench dug by dozer. Industrial waste sludge cake was deposited in trench. Site was closed in 1970 with 2 ft of earth cover, then graded and seeded.

Present Condition: Site is covered with tall grasses.

J Signature and Title:

The person or authorized representative (such as plant managers, superintendents, trustees or attorneys) of persons required to notify must sign the form and provide a mailing address (if different than address in item A). For other persons providing notification, the signature is optional. Check the boxes which best describe the relationship to the site of the person required to notify. If you are not required to notify check "Other"

Name THOMAS AMES

Street

City State Zip Code

Signature Thomas C Ames Date 6/2/81

ENVIRONMENT PROGRAM MANAGER

☒ Owner, Present
☐ Owner, Past
☐ Transporter
☐ Operator, Present
☐ Operator, Past
☐ Other

[FR Doc. 81-11500 Filed 4-14-81; 8:45 am]

BILLING CODE 6560-29-C

EPA Notification of Hazardous Waste Site

United States Environmental Protection Agency
Washington DC 20460

This initial notification information is required by Section 103(c) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 and must be mailed by June 9, 1981.

Please type or print in ink. If you need additional space, use separate sheets of paper. Indicate the letter of the item which applies.

A Person Required to Notify:
Enter the name and address of the person or organization required to notify.

Name NAVAL AIR DEVELOPMENT CENTER
Street STREET AND JACKSONVILLE ROADS
City WARMINSTER State PA Zip Code 18974

B Site Location:
Enter the common name (if known) and actual location of the site.

Name of Site NAVAL AIR DEVELOPMENT CENTER
Street STREET AND JACKSONVILLE ROADS
City WARMINSTER County BUCKS State PA Zip Code 18974

C Person to Contact:
Enter the name, title (if applicable), and business telephone number of the person to contact regarding information submitted on this form.

Name (Last, First and Title) THOMAS AMES ENVIRONMENTAL PROGRAM MANAGER
Phone 215-441-3113

D Dates of Waste Handling:
Enter the years that you estimate waste treatment, storage, or disposal began and ended at the site.

From (Year) 1955 To (Year) 1965

E Waste Type: Choose the option you prefer to complete

Option 1: Select general waste types and source categories. If you do not know the general waste types or sources, you are encouraged to describe the site in Item I—Description of Site.

General Type of Waste:
Place an X in the appropriate boxes. The categories listed overlap. Check each applicable category.

1. ☐ Organics
2. ☐ Inorganics
3. ☒ Solvents
4. ☐ Pesticides
5. ☐ Heavy metals
6. ☒ Acids
7. ☒ Bases
8. ☐ PCBs
9. ☒ Mixed Municipal Waste
10. ☐ Unknown
11. ☒ Other (Specify) PAINT

Source of Waste:
Place an X in the appropriate boxes.

1. ☐ Mining
2. ☐ Construction
3. ☐ Textiles
4. ☐ Fertilizer
5. ☐ Paper/Printing
6. ☐ Leather Tanning
7. ☐ Iron/Steel Foundry
8. ☐ Chemical, General
9. ☐ Plating/Polishing
10. ☐ Military Ammunition
11. ☐ Electrical Conductors
12. ☐ Transformers
13. ☐ Utility Companies
14. ☒ Sanitary Refuse
15. ☐ Photofinish
16. ☐ Lab Hospital
17. ☐ Unknown
18. ☐ Other (Specify)

Option 2: This option is available to persons familiar with the Resource Conservation and Recovery Act (RCRA) Section 3001 regulations (40 CFR Part 261).

Specific Type of Waste:
EPA has assigned a four-digit number to each hazardous waste listed in the regulations under Section 3001 of RCRA. Enter the appropriate four-digit number in the boxes provided. A copy of the list of hazardous wastes and codes can be obtained by contacting the EPA Region serving the State in which the site is located.

Form Approved
OMB No. 2060-0134

Notification of Hazardous Waste Site — Side Two

F Waste Quantity

Place an X in the appropriate boxes to indicate the facility types found at the site.

In the "total facility waste amount" space give the estimated combined quantity (volume) of hazardous wastes at the site using cubic feet or gallons.

In the "total facility area" space, give the estimated area size which the facilities occupy using square feet or acres.

Facility Type

1. ☐ Piles
2. ☐ Land Treatment
3. ☒ Landfill
4. ☐ Tanks
5. ☐ Impoundment
6. ☐ Underground Injection
7. ☐ Drums, Above Ground
8. ☐ Drums, Below Ground
9. ☐ Other (Specify) _____

Total Facility Waste Amount

cubic feet UNKNOWN

gallons UNKNOWN

Total Facility Area

square feet 600

acres _____

G Known, Suspected or Likely Releases to the Environment:

Place an X in the appropriate boxes to indicate any known, suspected, or likely releases of wastes to the environment. ☐ Known ☐ Suspected ☐ Likely ☒ None

Note: Items H and I are optional. Completing these items will assist EPA and State and local governments in locating and assessing hazardous waste sites. Although completing the items is not required, you are encouraged to do so

H Sketch Map of Site Location: (Optional)

Sketch a map showing streets, highways, routes or other prominent landmarks near the site. Place an X on the map to indicate the site location. Draw an arrow showing the direction north. You may substitute a publishing map showing the site location.

MAP ENCLOSED (SITE #3)

I Description of Site: (Optional)

Describe the history and present conditions of the site. Give directions to the site and describe any nearby wells, springs, lakes, or housing. Include such information as how waste was disposed and where the waste came from. Provide any other information or comments which may help describe the site conditions.

A pit 20 ft × 30 ft × 10 ft with sloped bottom was dug and a large metal screen enclosure was placed over it. Defense and waste materials were dumped into pit and burned. Residue was removed periodically and trucked to sanitary landfill on Center. Site was closed in 1965 when screen was removed and pit backfilled.
Present Conditions: Vegetation is generally scrub brush.

J Signature and Title:

The person or authorized representative (such as plant managers, superintendents, trustees or attorneys) of persons required to notify must sign the form and provide a mailing address (if different than address in item A). For other persons providing notification, the signature is optional. Check the boxes which best describe the relationship to the site of the person required to notify. If you are not required to notify check "Other"

Name THOMAS C. AMES

Street _____

City _____ State _____ Zip Code _____

Signature Thomas C. Ames Date 6/2/81

ENVIRONMENTAL PROGRAM MANAGER

☒ Owner, Present
☐ Owner, Past
☐ Transporter
☐ Operator, Present
☐ Operator, Past
☐ Other

[FR Doc. 81-11500 Filed 4-14-81; 8:45 am]

BILLING CODE 6560-29-C

EPA Notification of Hazardous Waste Si

United States Environmental Protection Agency Washington DC 20460

This initial notification information is required by Section 103(c) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 and must be mailed by June 9, 1981.

Please type or print in ink. If you need additional space, use separate sheets of paper. Indicate the letter of the item which applies.

A Person Required to Notify:
Enter the name and address of the person or organization required to notify.

Name NAVAL AIR DEVELOPMENT CENTER
Street STREET AND JACKSONVILLE ROADS
City WARMINSTER State PA Zip Code 18974

B Site Location:
Enter the common name (if known) and actual location of the site.

Name of Site NAVAL AIR DEVELOPMENT CENTER
Street STREET AND JACKSONVILLE ROADS
City WARMINSTER County BUCKS State PA Zip Code 18974

C Person to Contact:
Enter the name, title (if applicable), and business telephone number of the person to contact regarding information submitted on this form.

Name (Last, First and Title) THOMAS AMES ENVIRONMENTAL PROGRAM MANAGER
Phone 215-441-3113

D Dates of Waste Handling:
Enter the years that you estimate waste treatment, storage, or disposal began and ended at the site.

From (Year) 1966 To (Year) 1970

E Waste Type: Choose the option you prefer to complete

Option 1: Select general waste types and source categories. If you do not know the general waste types or sources, you are encouraged to describe the site in Item I—Description of Site.

General Type of Waste:
Place an X in the appropriate boxes. The categories listed overlap. Check each applicable category.

1. ☐ Organics
2. ☐ Inorganics
3. ☒ Solvents
4. ☐ Pesticides
5. ☒ Heavy metals
6. ☐ Acids
7. ☐ Bases
8. ☐ PCBs
9. ☒ Mixed Municipal Waste
10. ☐ Unknown
11. ☒ Other (Specify) PAINTS

Source of Waste:
Place an X in the appropriate boxes.

1. ☐ Mining
2. ☐ Construction
3. ☐ Textiles
4. ☐ Fertilizer
5. ☐ Paper/Printing
6. ☐ Leather Tanning
7. ☐ Iron Steel Foundry
8. ☐ Chemical, General
9. ☐ Plating/Polishing
10. ☐ Military/Ammunition
11. ☐ Electrical Conductors
12. ☐ Transformers
13. ☐ Utility Companies
14. ☒ Sanitary Refuse
15. ☐ Photofinish
16. ☐ Lab Hospital
17. ☐ Unknown
18. ☐ Other (Specify)

Option 2: This option is available to persons familiar with the Resource Conservation and Recovery Act (RCRA) Section 3001 regulations (40 CFR Part 261).

Specific Type of Waste:
EPA has assigned a four-digit number to each hazardous waste listed in the regulations under Section 3001 of RCRA. Enter the appropriate four-digit number in the boxes provided. A copy of the list of hazardous wastes and codes can be obtained by contacting the EPA Region serving the State in which the site is located.

Form Approved
OMB No. 2060-0138

Notification of Hazardous Waste Site — **Side Two**

F Waste Quantity

Place an X in the appropriate boxes to indicate the facility types found at the site.

In the "total facility waste amount" space give the estimated combined quantity (volume) of hazardous wastes at the site using cubic feet or gallons.

In the "total facility area" space, give the estimated area size which the facilities occupy using square feet or acres.

Facility Type

1. ☐ Piles
2. ☐ Land Treatment
3. ☒ Landfill
4. ☐ Tanks
5. ☐ Impoundment
6. ☐ Underground Injection
7. ☐ Drums, Above Ground
8. ☐ Drums, Below Ground
9. ☐ Other (Specify) _____

Total Facility Waste Amount

cubic feet UNKNOWN

gallons _____

Total Facility Area

square feet 84,000

acres _____

G Known, Suspected or Likely Releases to the Environment:

Place an X in the appropriate boxes to indicate any known, suspected, or likely releases of wastes to the environment.

☐ Known ☐ Suspected ☐ Likely ☒ None

Note: Items H and I are optional. Completing these items will assist EPA and State and local governments in locating and assessing hazardous waste sites. Although completing the items is not required, you are encouraged to do so

H Sketch Map of Site Location: (Optional)

Sketch a map showing streets, highways, routes or other prominent landmarks near the site. Place an X on the map to indicate the site location. Draw an arrow showing the direction north. You may substitute a publishing map showing the site location.

MAP ENCLOSED (SITE #4)

I Description of Site: (Optional)

Describe the history and present conditions of the site. Give directions to the site and describe any nearby wells, springs, lakes, or housing. Include such information as how waste was disposed and where the waste came from. Provide any other information or comments which may help describe the site conditions.

Site was operated as a sanitary landfill. Trenches 12 ft x 1000 ft x 8 ft were dug. Refuse was placed in 4 ft lifts and compacted. Lifts were covered with 2 ft of earth fill. A total of 7 trenches were dug and filled. Each trench received refuse for approx. 6 or 7 months. Site was closed in 1970 when 2 ft of earth fill was placed, graded and seeded. Present Condition: Site is covered with tall grasses.

J Signature and Title:

The person or authorized representative (such as plant managers, superintendents, trustees or attorneys) of persons required to notify must sign the form and provide a mailing address (if different than address in item A). For other persons providing notification, the signature is optional. Check the boxes which best describe the relationship to the site of the person required to notify. If you are not required to notify check "Other"

Name THOMAS C. AMES

Street _____

City _____ State _____ Zip Code _____

Signature Thomas C. Ames Date 6/2/81

ENVIRONMENTAL PROGRAM MANAGER

☒ Owner, Present
☐ Owner, Past
☐ Transporter
☐ Operator, Present
☐ Operator, Past
☐ Other

[FR Doc. 81-11500 Filed 4-14-81; 8:45 am]

BILLING CODE 6560-29-C

EPA Notification of Hazardous Waste S

United States
Environmental Protection
Agency
Washington DC 20460

This initial notification information is required by Section 103(c) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 and must be mailed by June 9, 1981.

Please type or print in ink. If you need additional space, use separate sheets of paper. Indicate the letter of the item which applies.

A Person Required to Notify:
Enter the name and address of the person or organization required to notify.

Name NAVAL AIR DEVELOPMENT CENTER
Street STREET AND JACKSONVILLE ROADS
City WARMINSTER State PA Zip Code 18974

B Site Location:
Enter the common name (if known) and actual location of the site.

Name of Site NAVAL AIR DEVELOPMENT CENTER
Street STREET AND JACKSONVILLE ROADS
City WARMINSTER County BUCKS State PA Zip Code 18974

C Person to Contact:
Enter the name, title (if applicable), and business telephone number of the person to contact regarding information submitted on this form.

Name (Last, First and Title) THOMAS AMES ENVIRONMENTAL PROGRAM MANAGER
Phone 215-441-3113

D Dates of Waste Handling:
Enter the years that you estimate waste treatment, storage, or disposal began and ended at the site.

From (Year) 1955 To (Year) 1970

E Waste Type: Choose the option you prefer to complete

Option 1: Select general waste types and source categories. If you do not know the general waste types or sources, you are encouraged to describe the site in Item I—Description of Site.

General Type of Waste:
Place an X in the appropriate boxes. The categories listed overlap. Check each applicable category.

1. ☐ Organics
2. ☒ Inorganics
3. ☒ Solvents
4. ☐ Pesticides
5. ☒ Heavy metals
6. ☐ Acids
7. ☐ Bases
8. ☐ PCBs
9. ☐ Mixed Municipal Waste
10. ☐ Unknown
11. ☒ Other (Specify) PAINT

Source of Waste:
Place an X in the appropriate boxes.

1. ☐ Mining
2. ☐ Construction
3. ☐ Textiles
4. ☐ Fertilizer
5. ☐ Paper/Printing
6. ☐ Leather Tanning
7. ☐ Iron/Steel Foundry
8. ☐ Chemical, General
9. ☐ Plating/Polishing
10. ☐ Military/Ammunition
11. ☐ Electrical Conductors
12. ☐ Transformers
13. ☐ Utility Companies
14. ☒ Sanitary Refuse
15. ☐ Photofi...
16. ☐ Lab Hospital
17. ☐ Unknown
18. ☐ Other (Specify)

Option 2: This option is available to persons familiar with the Resource Conservation and Recovery Act (RCRA) Section 3001 regulations (40 CFR Part 261).

Specific Type of Waste:
EPA has assigned a four-digit number to each hazardous waste listed in the regulations under Section 3001 of RCRA. Enter the appropriate four-digit number in the boxes provided. A copy of the list of hazardous wastes and codes can be obtained by contacting the EPA Region serving the State in which the site is located.

Form Approved
OMB No. 2060-0134

Notification of Hazardous Waste Site — **Side Two**

F Waste Quantity

Place an X in the appropriate boxes to indicate the facility types found at the site.

In the "total facility waste amount" space give the estimated combined quantity (volume) of hazardous wastes at the site using cubic feet or gallons.

In the "total facility area" space, give the estimated area size which the facilities occupy using square feet or acres.

Facility Type

1. ☐ Piles
2. ☐ Land Treatment
3. ☒ Landfill
4. ☐ Tanks
5. ☐ Impoundment
6. ☐ Underground Injection
7. ☐ Drums, Above Ground
8. ☐ Drums, Below Ground
9. ☐ Other (Specify) _____

Total Facility Waste Amount

cubic feet UNKNOWN

gallons _____

Total Facility Area

square feet 6720

acres _____

G Known, Suspected or Likely Releases to the Environment:

Place an X in the appropriate boxes to indicate any known, suspected, or likely releases of wastes to the environment.

☐ Known ☐ Suspected ☐ Likely ☒ None

Note: Items H and I are optional. Completing these items will assist EPA and State and local governments in locating and assessi hazardous waste sites. Although completing the items is not required, you are encouraged to do so

H Sketch Map of Site Location: (Optional)

Sketch a map showing streets, highways, routes or other prominent landmarks near the site. Place an X on the map to indicate the site location. Draw an arrow showing the direction north. You may substitute a publishing map showing the site location.

MAP ENCLOSED (SITE #5)

I Description of Site: (Optional)

Describe the history and present conditions of the site. Give directions to the site and describe any nearby wells, springs, lakes, or housing. Include such information as how waste was disposed and where the waste came from. Provide any other information or comments which may help describe the site conditions.

Site was a landfill consisting of trenches 12 ft x 70 ft x 8 ft. Trenches were occasionally covered In general trenches were open for a period of 12 to 15 months. There were 6 to 8 trenches Site was closed in 1970, when 2 ft of earth fill was placed over area and seeded.

Present Condition: Site is covered with tall grasses

J Signature and Title:

The person or authorized representative (such as plant managers, superintendents, trustees or attorneys) of persons required to notify must sign the form and provide a mailing address (if different than address in item A). For other persons providing notification, the signature is optional. Check the boxes which best describe the relationship to the site of the person required to notify. If you are not required to notify check "Other"

Name THOMAS C. AMES

Street _____

City _____ State _____ Zip Code _____

Signature Thomas C. Ames Date 6/2/81

ENVIRONMENTAL PROGRAM MANAGER

☒ Owner, Present
☐ Owner, Past
☐ Transporter
☐ Operator, Present
☐ Operator, Past
☐ Other

[FR Doc. 81-11500 Filed 4-14-81; 8:45 am]

BILLING CODE 6560-22-C

EPA Notification of Hazardous Waste Site

United States Environmental Protection Agency Washington DC 20460

This initial notification information is required by Section 103(c) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 and must be mailed by June 9, 1981.

Please type or print in ink. If you need additional space, use separate sheets of paper. Indicate the letter of the item which applies.

A Person Required to Notify:
Enter the name and address of the person or organization required to notify.

Name: NAVAL AIR DEVELOPMENT CENTER
Street: STREET AND JACKSONVILLE ROADS
City: WARMINSTER State: PA Zip Code: 18974

B Site Location:
Enter the common name (if known) and actual location of the site.

Name of Site: NAVAL AIR DEVELOPMENT CENTER
Street: STREET AND JACKSONVILLE ROADS
City: WARMINSTER County: BUCKS State: PA Zip Code: 18974

C Person to Contact:
Enter the name, title (if applicable), and business telephone number of the person to contact regarding information submitted on this form.

Name (Last, First and Title): THOMAS AMES ENVIRONMENT PROGRAM MANAGER
Phone: 215-441-3113

D Dates of Waste Handling:
Enter the years that you estimate waste treatment, storage, or disposal began and ended at the site.

From (Year): 1950 To (Year): 1955

E Waste Type: Choose the option you prefer to complete

Option 1: Select general waste types and source categories. If you do not know the general waste types or sources, you are encouraged to describe the site in Item I—Description of Site.

General Type of Waste:
Place an X in the appropriate boxes. The categories listed overlap. Check each applicable category.

1. ☐ Organics
2. ☐ Inorganics
3. ☐ Solvents
4. ☐ Pesticides
5. ☐ Heavy metals
6. ☐ Acids
7. ☐ Bases
8. ☐ PCBs
9. ☐ Mixed Municipal Waste
10. ☐ Unknown
11. ☒ Other (Specify) INDUSTRIAL WASTE SLUDGE CAKE

Source of Waste:
Place an X in the appropriate boxes.

1. ☐ Mining
2. ☐ Construction
3. ☐ Textiles
4. ☐ Fertilizer
5. ☐ Paper/Printing
6. ☐ Leather Tanning
7. ☐ Iron/Steel Foundry
8. ☐ Chemical, General
9. ☐ Plating/Polishing
10. ☐ Military/Ammunition
11. ☐ Electrical Conductors
12. ☐ Transformers
13. ☐ Utility Companies
14. ☐ Sanitary Refuse
15. ☐ Photofinish
16. ☐ Lab Hospital
17. ☐ Unknown
18. ☒ Other (Specify) NAVAL RESEARCH & DEVELOPMENT FACILITY

Option 2: This option is available to persons familiar with the Resource Conservation and Recovery Act (RCRA) Section 3001 regulations (40 CFR Part 261).

Specific Type of Waste:
EPA has assigned a four-digit number to each hazardous waste listed in the regulations under Section 3001 of RCRA. Enter the appropriate four-digit number in the boxes provided. A copy of the list of hazardous wastes and codes can be obtained by contacting the EPA Region serving the State in which the site is located.

Form Approved OMB No. 2000-0114

Notification of Hazardous Waste Site **Side Two**

F Waste Quantity

Place an X in the appropriate boxes to indicate the facility types found at the site.

In the "total facility waste amount" space give the estimated combined quantity (volume) of hazardous wastes at the site using cubic feet or gallons.

In the "total facility area" space, give the estimated area size which the facilities occupy using square feet or acres.

Facility Type

1. ☐ Piles
2. ☐ Land Treatment
3. ☒ Landfill
4. ☐ Tanks
5. ☐ Impoundment
6. ☐ Underground Injection
7. ☐ Drums, Above Ground
8. ☐ Drums, Below Ground
9. ☐ Other (Specify) _____

Total Facility Waste Amount

cubic feet 18,900

gallons _____

Total Facility Area

square feet 2400

acres _____

G Known, Suspected or Likely Releases to the Environment:

Place an X in the appropriate boxes to indicate any known, suspected, or likely releases of wastes to the environment.

☐ Known ☐ Suspected ☐ Likely ☒ None

Note: Items H and I are optional. Completing these items will assist EPA and State and local governments in locating and assessing hazardous waste sites. Although completing the items is not required, you are encouraged to do so

H Sketch Map of Site Location: (Optional)

Sketch a map showing streets, highways, routes or other prominent landmarks near the site. Place an X on the map to indicate the site location. Draw an arrow showing the direction north. You may substitute a publishing map showing the site location.

MAP ENCLOSED (SITE #7)

I Description of Site: (Optional)

Describe the history and present conditions of the site. Give directions to the site and describe any nearby wells, springs, lakes, or housing. Include such information as how waste was disposed and where the waste came from. Provide any other information or comments which may help describe the site conditions.

Site was a sludge pit consisting of a trench 12 ft x 100 ft x 8 ft. Industrial waste sludge cake was placed into pit and backfilled. Two trenches were in operation during this period. Site was closed in 1955 when 2 ft of soil was placed over entire site and seeded

Present Condition: Site is covered with tall grasses.

J Signature and Title:

The person or authorized representative (such as plant managers, superintendents, trustees or attorneys) of persons required to notify must sign the form and provide a mailing address (if different than address in item A). For other persons providing notification, the signature is optional. Check the boxes which best describe the relationship to the site of the person required to notify. If you are not required to notify check "Other"

Name THOMAS C. AMES

Street _____

City _____ State _____ Zip Code _____

Signature Thomas C. Ames Date 6/2/81

ENVIRONMENTAL PROGRAM MANAGER

☒ Owner, Present
☐ Owner, Past
☐ Transporter
☐ Operator, Present
☐ Operator, Past
☐ Other

[FR Doc. 81-11500 Filed 4-14-81; 8:45 am]

BILLING CODE 6560-22-C

EPA Notification of Hazardous Waste Site

United States Environmental Protection Agency Washington DC 20460

This initial notification information is required by Section 103(c) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 and must be mailed by June 9, 1981.

Please type or print in ink. If you need additional space, use separate sheets of paper. Indicate the letter of the item which applies.

A Person Required to Notify:
Enter the name and address of the person or organization required to notify.

Name NAVAL AIR DEVELOPMENT CENTER
Street STREET AND JACKSONVILLE ROADS
City WARMINSTER State PA Zip Code 18974

B Site Location:
Enter the common name (if known) and actual location of the site.

Name of Site NAVAL AIR DEVELOPMENT CENTER
Street STREET AND JACKSONVILLE ROADS
City WARMINSTER County BUCKS State PA Zip Code 18974

C Person to Contact:
Enter the name, title (if applicable), and business telephone number of the person to contact regarding information submitted on this form.

Name (Last, First and Title) THOMAS AMES ENVIRONMENTAL PROGRAM MANAGER
Phone 215-441-3113

D Dates of Waste Handling:
Enter the years that you estimate waste treatment, storage, or disposal began and ended at the site.

From (Year) 1960 To (Year) 1980

E Waste Type: Choose the option you prefer to complete

Option 1: Select general waste types and source categories. If you do not know the general waste types or sources, you are encouraged to describe the site in Item I—Description of Site.

General Type of Waste:
Place an X in the appropriate boxes. The categories listed overlap. Check each applicable category.

1. ☒ Organics
2. ☐ Inorganics
3. ☒ Solvents
4. ☐ Pesticides
5. ☐ Heavy metals
6. ☐ Acids
7. ☐ Bases
8. ☐ PCBs
9. ☐ Mixed Municipal Waste
10. ☐ Unknown
11. ☐ Other (Specify) PAINT

Source of Waste:
Place an X in the appropriate boxes.

1. ☐ Mining
2. ☐ Construction
3. ☐ Textiles
4. ☐ Fertilizer
5. ☐ Paper/Printing
6. ☐ Leather Tanning
7. ☐ Iron/Steel Foundry
8. ☐ Chemical, General
9. ☐ Plating/Polishing
10. ☐ Military/Ammunition
11. ☐ Electrical Conductors
12. ☐ Transformers
13. ☐ Utility Companies
14. ☒ Sanitary Refuse
15. ☐ Photofinish
16. ☐ Lab/Hospital
17. ☐ Unknown
18. ☐ Other (Specify)

Option 2: This option is available to persons familiar with the Resource Conservation and Recovery Act (RCRA) Section 3001 regulations (40 CFR Part 261).

Specific Type of Waste:
EPA has assigned a four-digit number to each hazardous waste listed in the regulations under Section 3001 of RCRA. Enter the appropriate four-digit number in the boxes provided. A copy of the list of hazardous wastes and codes can be obtained by contacting the EPA Region serving the State in which the site is located.

Notification of Hazardous Waste Site **Side Two**

F Waste Quantity

Place an X in the appropriate boxes to indicate the facility types found at the site.

In the "total facility waste amount" space give the estimated combined quantity (volume) of hazardous wastes at the site using cubic feet or gallons.

In the "total facility area" space, give the estimated area size which the facilities occupy using square feet or acres.

Facility Type

1. ☐ Piles
2. ☐ Land Treatment
3. ☒ Landfill
4. ☐ Tanks
5. ☐ Impoundment
6. ☐ Underground Injection
7. ☐ Drums, Above Ground
8. ☐ Drums, Below Ground
9. ☐ Other (Specify) _____

Total Facility Waste Amount

cubic feet UNKNOWN

gallons UNKNOWN

Total Facility Area

square feet _____

acres _____

G Known, Suspected or Likely Releases to the Environment:

Place an X in the appropriate boxes to indicate any known, suspected, or likely releases of wastes to the environment.

☐ Known ☐ Suspected ☐ Likely ☒ None

Note: Items H and I are optional. Completing these items will assist EPA and State and local governments in locating and assessing hazardous waste sites. Although completing the items is not required, you are encouraged to do so

H Sketch Map of Site Location: (Optional)

Sketch a map showing streets, highways, routes or other prominent landmarks near the site. Place an X on the map to indicate the site location. Draw an arrow showing the direction north. You may substitute a publishing map showing the site location.

MAP ENCLOSED (SITE #6)

I Description of Site: (Optional)

Describe the history and present conditions of the site. Give directions to the site and describe any nearby wells, springs, lakes, or housing. Include such information as how waste was disposed and where the waste came from. Provide any other information or comments which may help describe the site conditions.

Site is a landfill. Pits were dug as required. Refuse and wastes were placed in pits and covered with earth fill.

Present Condition: Site is covered with rough vegetation.

Signature and Title:

The person or authorized representative (such as plant managers, superintendents, trustees or attorneys) of persons required to notify must sign the form and provide a mailing address (if different than address in item A). For other persons providing notification the signature is optional. Check the boxes which best describe the relationship to the site of the person required to notify. If you are not required to notify check "Other"

Name THOMAS C. AMES

Street _____

City _____ State _____ Zip Code _____

Signature Thomas C. Ames Date 6/2/81

ENVIRONMENTAL PROGRAM MANAGER

☒ Owner, Present
☐ Owner, Past
☐ Transporter
☐ Operator, Present
☐ Operator, Past
☐ Other

[FR Doc. 81-11500 Filed 4-14-81; 8:45 am]

BILLING CODE 6560-29-C

ORIGINAL (Red)

3.3

PA-188

EPA	POTENTIAL HAZARDOUS WASTE SITE FINAL STRATEGY DETERMINATION	REGION 3	SITE NUMBER PA-1140

File this form in the regional Hazardous Waste Log File and submit a copy to: U.S. Environmental Protection Agency; Site Tracking System; Hazardous Waste Enforcement Task Force (EN-335); 401 M St., SW; Washington, DC 20460.

I. SITE IDENTIFICATION

A. SITE NAME	B. STREET	
NADC	Jacksonville & Street Roads	
C. CITY	D. STATE	E. ZIP CODE
WARMINISTER	PA	

II. FINAL DETERMINATION

Indicate the recommended action(s) and agency(ies) that should be involved by marking 'X' in the appropriate boxes.

RECOMMENDATION	MARK 'X'	ACTION AGENCY: EPA	STATE	LOCAL	PRIVATE
A. NO ACTION NEEDED	X				
B. REMEDIAL ACTION NEEDED, BUT NO RESOURCES AVAILABLE (If yes, complete Section III.)					
C. REMEDIAL ACTION (If yes, complete Section IV.)					
D. ENFORCEMENT ACTION (If yes, specify in Part E whether the case will be primarily managed by the EPA or the State and what type of enforcement action is anticipated.)					

E. RATIONALE FOR FINAL STRATEGY DETERMINATION

No offsite contamination discovered. Records research shows unlikely possibility of aquifer contamination potential.

F. IF A CASE DEVELOPMENT PLAN HAS BEEN PREPARED, SPECIFY THE DATE PREPARED (mo., day, & yr.)

G. IF AN ENFORCEMENT CASE HAS BEEN FILED, SPECIFY THE DATE FILED (mo., day, & yr.)

H. PREPARER INFORMATION

1. NAME	2. TELEPHONE NUMBER	3. DATE (mo., day, & yr.)
Robin Aitken	215 597 8977	June 24, 1981

III. REMEDIAL ACTIONS TO BE TAKEN WHEN RESOURCES BECOME AVAILABLE

List all remedial actions, such as excavation, removal, etc. to be taken as soon as resources become available. See instructions for a list of Key Words for each of the actions to be used in the spaces below. Provide an estimate of the approximate cost of the remedy.

A. REMEDIAL ACTION	B. ESTIMATED COST	C. REMARKS
	$	
	$	
	$	
	$	
	$	
	$	
	$	
	$	
D. TOTAL ESTIMATED COST	$	

SENT AUG 6 1981

EPA Form T2070-5 (10-79)

Continue On Reverse

7934

ORIGINAL
(Red)

PA189

EPA	POTENTIAL HAZARDOUS WASTE SITE FINAL STRATEGY DETERMINATION	REGION III	SITE NUMBER PA1160

File this form in the regional Hazardous Waste Log File and submit a copy to: U.S. Environmental Protection Agency, Site Tracking System; Hazardous Waste Enforcement Task Force (EN-335), 401 M St., SW, Washington, DC 20460.

I. SITE IDENTIFICATION

A. SITE NAME	B. STREET	
Warminster		
C. CITY	**D. STATE**	**E. ZIP CODE**
Warminster	PA	

II. FINAL DETERMINATION

Indicate the recommended action(s) and agency(ies) that should be involved by marking 'X' in the appropriate boxes.

RECOMMENDATION	MARK 'X'	ACTION AGENCY: EPA	STATE	LOCAL	PRIVATE
A. NO ACTION NEEDED	X				
B. REMEDIAL ACTION NEEDED, BUT NO RESOURCES AVAILABLE (If yes, complete Section III.)					
C. REMEDIAL ACTION (If yes, complete Section IV.)					
D. ENFORCEMENT ACTION (If yes, specify in Part E whether the case will be primarily managed by the EPA or the State and what type of enforcement action is anticipated.)					

E. RATIONALE FOR FINAL STRATEGY DETERMINATION

The concerns for this case are being addressed by Case PA 274

(ABAR)

F. IF A CASE DEVELOPMENT PLAN HAS BEEN PREPARED, SPECIFY THE DATE PREPARED (mo., day, & yr.)	G. IF AN ENFORCEMENT CASE HAS BEEN FILED, SPECIFY THE DATE FILED (mo., day, & yr.)

H. PREPARER INFORMATION

1. NAME	2. TELEPHONE NUMBER	3. DATE (mo., day, & yr.)
Robin Aitken	215/597-8997	7/7/81

III. REMEDIAL ACTIONS TO BE TAKEN WHEN RESOURCES BECOME AVAILABLE

List all remedial actions, such as excavation, removal, etc. to be taken as soon as resources become available. See instructions for a list of Key Words for each of the actions to be used in the spaces below. Provide an estimate of the approximate cost of the remedy.

A. REMEDIAL ACTION	B. ESTIMATED COST	C. REMARKS
	$	
	$	
	$	
	$	
	$	
	$	
	$	
	$	

ORIGINAL
(Red)

D.E.R.
COMMONWEALTH OF PENNSYLVANIA

SUBJECT: U.S. Naval Air Development Center, CERCLIS # PA 768
Warminster Township
Bucks County

TO: U.S. Naval Air Development Center File
Central Office
CERCLIS # PA 768

THRU: Douglas Lorenzen, Section Chief Emergency Response
Division of Emergency and Remedial Response
and
Donald Becker, Section Chief
Remedial Response
Division of Emergency and Remedial Response

FROM: Thomas Sheehan
Project Officer
Division of Emergency and Remedial Response
Ridley Creek State Park

I conducted a site visit on October 10, 1986 and met with the following U.S. NADC personnel:

Tom Ames, Deputy of Public Works
Ron Springfield, Energy and Environmental Project Officer
Frank Kurdziel, Chemist

Visual inspection of sites 1 thru 9 found the following:

Sites 1,2,3,4,5,6, and 7 have been closed; covered with dirt and vegetated. Groundwater monitoring wells have been installed in these areas and are sampled/analyzed quarterly for pH, TOC, TOX, specific conductance, Cr (total), Cu, Ni, Zn. Also in the area of sites 1,2, and 3, the facility is in the process of closing two concrete lined (used unlined in past) surface impoundments under RCRA. Waste was considered hazardous under 25 PA Code 75.261 because waste from treatment of Cd plating baths was put into surface impoundments. Facility stopped electroplating in early 1980's and waste now going to impoundments is residual waste. Waste in impoundments is still being handled (shipped to permitted/interim status TSD) as hazardous waste until impoundments are officially closed. Facility has intentions of lining the impoundments and using for residual waste after official RCRA closure. Additional monitoring wells have been installed in this area for RCRA closure of surface impoundments and monitored quarterly for E.P. Toxic parameters, coliform, Cl^-, Fe, Mg, Total Solids, phenol, TOC, TOX, specific conductance, gross alpha and gross beta.

Site 9 appears to be only a dirt stockpile.

Site 8 is still active as fire training area. At time of visit

7934 COPIER

ORIGINAL
(Red)

there was oily material/water in the diked area and the whole area had odor of fuel oil. On the topographically downgradient side this area, there were several spots where oily and/or contaminated looking water was coming out of the ground and running on the surface. NADC personnel indicated that this area is not cleaned up after use; residue from training fire is left in diked area. There is one groundwater monitoring well in this area that is monitored quarterly for the same parameted as sites 1 thru 7. The following actions for site 8 are recommended:

- excavation and proper/legal disposal of residue and contaminated soil

- cease using this area in present form; for use to continue, the area should be lined to protect groundwater and surface water.

cc: D. Lorenzen
D. Becker
Bruce Beitler, DER Region 1
U.S. EPA, Region 3

APPENDIX B
ANALYTICAL DATA

SITES 6 AND 7
SURFACE SOIL DATA

TABLE 1

ANALYTICAL RESULTS FOR SURFACE SOIL - Site 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-SS-06-03		S6-SS-06-04		S6-SS-06-05		S6-SS-06-07		S6-SS-06-08		S6-SS-06-09		S6-SS-06-10		S6-SS-06-11		S6-SS-06-12	
LOCATION:	S6-SS-06-03		S6-SS-06-04		S6-SS-06-05		S6-SS-06-07		S6-SS-06-08		S6-SS-06-09		S6-SS-06-10		S6-SS-06-11		S6-SS-06-12	
DATA SOURCE:	Surface Soil		Surface Soil		Surface Soil		Surface Soil		Surface Soil		Surface Soil		Surface Soil		Surface Soil		Surface Soil	
SAMPLE DATE:																		
INORGANICS	**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**	
aluminum	13800		12200		16900		16600		14000		14200		15400		14100		17300	
antimony	6.1	R	5.7	R	6.6	R	6.3	R	5.9	R	6.6	R	6	R	5.6	R	6.6	R
arsenic	7.5	L	4.8	L	5.7	L	6.1	L	5.4	L	5.1	L	5.1	L	5.1	L	5.6	L
barium	161		48.2		103		58.3		80.6		141		61.6		51.1		56.5	
beryllium	1.3		0.98		1.3		0.92		0.95		1.2		0.85		0.69		0.82	
cadmium	5.9		0.79	U	0.6	U	0.57	U	2	U	2.6	U	3.7	U	1.1	U	1.1	U
calcium	2750		936		671		771		737		1610		1410		4620		936	
chromium	25		13.6		17.5		23.4		18.3		19.6		129		81.3		133	
cobalt	12.5		11		10		10		8.3		8.7		10.4		6.5		12.7	
copper	316		40.6		7.3		11.9		30.3		140		23.4		15.5		17	
cyanide	1.2	U	1.2	U	1.2	U	1.2	U	1.2	U	1.1	U	3.9		1.1	U	1.1	U
iron	27400		18200		16400		23500		17000		19400		23600		17900		23700	
lead	278		9.1		16.3		11.8		20.8		171		22.5		12.2		13.8	
magnesium	3010		1870		1820		2530		1960		2290		2090		2430		2290	
manganese	958		450		944		362		448		762		379		265		442	
mercury	0.05	U	0.06	U	0.05	U	0.05	U	0.1		0.12		0.19		0.09		0.05	
nickel	19.6		9.9	U	12.1		14.2		10.2	U	16.6		12.5		7.4	U	11.3	U
potassium	973		546		537		840		706		828		861		650		749	
selenium	0.74	U	0.69	U	0.8	U	0.77	U	0.71	U	0.8	U	0.72	U	0.68	U	0.8	U
silver	11.4	K	0.69	U	0.8	U	0.77	U	0.71	U	1.9	K	10.1	K	0.68	U	1.9	K
sodium	132	U	54.3	U	70.3	U	63.9	U	63.8	U	87.5	U	69.1	U	68.8	U	64.9	U
thallium	0.92	U	0.87	U	1	U	0.96	U	0.89	U	1	U	0.9	U	0.85	U	1	U
vanadium	35.1		25.5		28.8		37.4		27		32.9		28.3		28.9		33.1	
zinc	360	K	30	K	40.8	K	40.6	K	47.8	K	153	K	52.5	K	30.8	K	35.7	K

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- UR -- Non-detected result is considered unusable due to exceedance of technical quality control criteria.
- L -- Positive result is considered biased low due to exceedance of technical quality control criteria.
- K -- Positive result is considered biased high due to exceedance of technical quality control criteria.
- B -- Positive result is considered to be an artifact of blank contamination, and should not be considered present.
- R -- Positive result is considered unusable due to exceedance of technical quality control criteria.

TABLE 1

ANALYTICAL RESULTS FOR SURFACE SOIL - Site 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-SS-06-03	S6-SS-06-04	S6-SS-06-05	S6-SS-06-07	S6-SS-06-08	S6-SS-06-09	S6-SS-06-10	S6-SS-06-11	S6-SS-06-12
LOCATION:	S6-SS-06-03	S6-SS-06-04	S6-SS-06-05	S6-SS-06-07	S6-SS-06-08	S6-SS-06-09	S6-SS-06-10	S6-SS-06-11	S6-SS-06-12
DATA SOURCE:	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil
SAMPLE DATE:									
SEMIVOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
1,2,4-trichlorobenzene	410 U	400 U	420 U	390 U	400 U	410 U	410 U	380 U	400 U
1,2-dichlorobenzene	410 U	400 U	420 U	390 U	400 U	410 U	410 U	380 U	400 U
1,3-dichlorobenzene	410 U	400 U	420 U	390 U	400 U	410 U	410 U	380 U	400 U
1,4-dichlorobenzene	410 U	400 U	420 U	390 U	400 U	410 U	410 U	380 U	400 U
2,2'-oxybis(1-chloropropane)	410 U	400 U	420 U	390 U	400 U	410 U	410 U	380 U	400 U
2,4,5-trichlorophenol	980 U	970 U	1000 U	940 U	960 U	990 U	1000 U	930 U	960 U
2,4,6-trichlorophenol	410 U	400 U	420 U	390 U	400 U	410 U	410 U	380 U	400 U
2,4-dichlorophenol	410 U	400 U	420 U	390 U	400 U	410 U	410 U	380 U	400 U
2,4-dimethylphenol	410 U	400 U	420 U	390 U	400 U	410 U	410 U	380 U	400 U
2,4-dinitrophenol	980 U	970 U	1000 U	940 U	960 U	990 U	1000 U	930 U	960 U
2,4-dinitrotoluene	410 U	400 U	420 U	390 U	400 U	410 U	410 U	380 U	400 U
2,6-dinitrotoluene	410 U	400 U	420 U	390 U	400 U	410 U	410 U	380 U	400 U
2-chlorophenol	410 U	400 U	420 U	390 U	400 U	410 U	410 U	380 U	400 U
2-methylnaphthalene	410 U	400 U	420 U	390 U	400 U	410 U	410 U	380 U	400 U
2-methylphenol	410 U	400 U	420 U	390 U	400 U	410 U	410 U	380 U	400 U
2-nitroaniline	980 U	970 U	1000 U	940 U	960 U	990 U	1000 U	930 U	960 U
2-nitrophenol	410 U	400 U	420 U	390 U	400 U	410 U	410 U	380 U	400 U
3,3'-dichlorobenzidine	410 U	400 U	420 U	390 U	400 U	410 U	410 U	380 U	400 U
3-nitroaniline	980 U	970 U	1000 U	940 U	960 U	990 U	1000 U	930 U	960 U
4,6-dinitro-2-methylphenol	980 U	970 U	1000 U	940 U	960 U	990 U	1000 U	930 U	960 U
4-bromophenyl phenyl ether	410 U	400 U	420 U	390 U	400 U	410 U	410 U	380 U	400 U
4-chloro-3-methylphenol	410 U	400 U	420 U	390 U	400 U	410 U	410 U	380 U	400 U
4-chloroaniline	410 U	400 U	420 U	390 U	400 U	410 U	410 U	380 U	400 U
4-chlorophenyl phenyl ether	410 U	400 U	420 U	390 U	400 U	410 U	410 U	380 U	400 U

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TABLE 1

ANALYTICAL RESULTS FOR SURFACE SOIL - Site 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-SS-06-03		S6-SS-06-04		S6-SS-06-05		S6-SS-06-07		S6-SS-06-08		S6-SS-06-09		S6-SS-06-10		S6-SS-06-11		S6-SS-06-12	
LOCATION:	S6-SS-06-03		S6-SS-06-04		S6-SS-06-05		S6-SS-06-07		S6-SS-06-08		S6-SS-06-09		S6-SS-06-10		S6-SS-06-11		S6-SS-06-12	
DATA SOURCE:	Surface Soil		Surface Soil		Surface Soil		Surface Soil		Surface Soil		Surface Soil		Surface Soil		Surface Soil		Surface Soil	
SAMPLE DATE:																		
SEMIVOLATILES	ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg	
4-methylphenol	410	U	400	U	420	U	390	U	400	U	410	U	410	U	380	U	400	U
4-nitroaniline	980	U	970	U	1000	U	940	U	960	U	990	U	1000	U	930	U	960	U
4-nitrophenol	980	U	970	U	1000	U	940	U	960	U	990	U	1000	U	930	U	960	U
N-nitroso-di-n-propylamine	410	U	400	U	420	U	390	U	400	U	410	U	410	U	380	U	400	U
N-nitrosodiphenylamine	410	U	400	U	420	U	390	U	400	U	410	U	410	U	380	U	400	U
acenaphthene	410	U	400	U	420	U	390	U	400	U	410	U	410	U	380	U	400	U
acenaphthylene	410	U	400	U	420	U	390	U	400	U	410	U	410	U	380	U	400	U
anthracene	410	U	400	U	420	U	390	U	400	U	410	U	410	U	380	U	400	U
benz(a)anthracene	42	J	400	U	420	U	390	U	400	U	410	U	410	U	380	U	400	U
benzo(a)pyrene	410	U	400	U	45	J	390	U	400	U	410	U	410	U	380	U	400	U
benzo(b)fluoranthene	61	J	400	U	54	J	390	U	400	U	410	U	410	U	380	U	400	U
benzo(g,h,i)perylene	410	U	400	U	48	J	390	U	400	U	410	U	410	U	41	J	400	U
benzo(k)fluoranthene	410	U	400	U	420	U	390	U	400	U	410	U	410	U	380	U	400	U
beta-chloronaphthalene	410	U	400	U	420	U	390	U	400	U	410	U	410	U	380	U	400	U
bis(2-chloroethoxy)methane	410	U	400	U	420	U	390	U	400	U	410	U	410	U	380	U	400	U
bis(2-chloroethyl)ether	410	U	400	U	420	U	390	U	400	U	410	U	410	U	380	U	400	U
bis(2-ethylhexyl)phthalate	410	U	400	U	420	U	390	U	400	U	410	U	410	U	380	U	46	U
butylbenzylphthalate	410	U	400	U	420	U	390	U	400	U	49	J	410	U	380	U	400	U
carbazole	410	U	400	U	420	U	390	U	400	U	410	U	410	U	380	U	400	U
chrysene	53	J	400	U	420	U	390	U	400	U	410	U	410	U	380	U	400	U
di-n-butylphthalate	410	U	400	U	420	U	390	U	400	U	410	U	410	U	380	U	400	U
di-n-octylphthalate	410	U	400	U	420	U	390	U	400	U	410	U	410	U	380	U	400	U
dibenz(a,h)anthracene	410	U	400	U	420	U	390	U	400	U	410	U	410	U	380	U	400	U
dibenzofuran	410	U	400	U	420	U	390	U	400	U	410	U	410	U	380	U	400	U
diethylphthalate	410	U	400	U	420	U	390	U	400	U	410	U	410	U	380	U	400	U

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TABLE 1

ANALYTICAL RESULTS FOR SURFACE SOIL - Site 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-SS-06-03	S6-SS-06-04	S6-SS-06-05	S6-SS-06-07	S6-SS-06-08	S6-SS-06-09	S6-SS-06-10	S6-SS-06-11	S6-SS-06-12
LOCATION:	S6-SS-06-03	S6-SS-06-04	S6-SS-06-05	S6-SS-06-07	S6-SS-06-08	S6-SS-06-09	S6-SS-06-10	S6-SS-06-11	S6-SS-06-12
DATA SOURCE:	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil
SAMPLE DATE:									
SEMIVOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
dimethylphthalate	410 U	400 U	420 U	390 U	400 U	410 U	410 U	380 U	400 U
fluoranthene	95 J	400 U	420 U	390 U	400 U	410 U	410 U	380 U	400 U
fluorene	410 U	400 U	420 U	390 U	400 U	410 U	410 U	380 U	400 U
hexachlorobenzene	410 U	400 U	420 U	390 U	400 U	410 U	410 U	380 U	400 U
hexachlorobutadiene	410 U	400 U	420 U	390 U	400 U	410 U	410 U	380 U	400 U
hexachlorocyclopentadiene	410 U	400 U	420 U	390 U	400 U	410 U	410 U	380 U	400 U
hexachloroethane	410 U	400 U	420 U	390 U	400 U	410 U	410 U	380 U	400 U
indeno(1,2,3-cd)pyrene	410 U	400 U	49 J	390 U	400 U	410 U	410 U	380 U	400 U
isophorone	410 U	400 U	420 U	390 U	400 U	410 U	410 U	380 U	400 U
naphthalene	410 U	400 U	420 U	390 U	400 U	410 U	410 U	380 U	400 U
nitrobenzene	410 U	400 U	420 U	390 U	400 U	410 U	410 U	380 U	400 U
pentachlorophenol	980 U	970 U	1000 U	940 U	960 U	990 U	1000 U	930 U	960 U
phenanthrene	53 J	400 U	420 U	390 U	400 U	410 U	410 U	380 U	400 U
phenol	410 U	400 U	420 U	390 U	400 U	410 U	410 U	380 U	400 U
pyrene	73 J	400 U	420 U	390 U	400 U	410 U	410 U	380 U	400 U
VOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
1,1,1-trichloroethane	11 U	12 U	13 U	12 U	12 U	13 U	13 U	12 U	12 U
1,1,2,2-tetrachloroethane	11 U	12 U	13 U	12 U	12 U	13 U	13 U	12 U	12 U
1,1,2-trichloroethane	11 U	12 U	13 U	12 U	12 U	13 U	13 U	12 U	12 U
1,1-dichloroethane	11 U	12 U	13 U	12 U	12 U	13 U	13 U	12 U	12 U
1,1-dichloroethene	11 U	12 U	13 U	12 U	12 U	13 U	13 U	12 U	12 U
1,2-dichloroethane	11 U	12 U	13 U	12 U	12 U	13 U	13 U	12 U	12 U
1,2-dichloroethene (total)	11 U	12 U	13 U	12 U	12 U	13 U	13 U	12 U	12 U
1,2-dichloropropane	11 U	12 U	13 U	12 U	12 U	13 U	13 U	12 U	12 U
2-butanone	11 U	12 U	13 U	12 U	12 U	13 U	13 U	12 U	12 U

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TABLE 1

ANALYTICAL RESULTS FOR SURFACE SOIL - Site 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-SS-06-03	S6-SS-06-04	S6-SS-06-05	S6-SS-06-07	S6-SS-06-08	S6-SS-06-09	S6-SS-06-10	S6-SS-06-11	S6-SS-06-12
LOCATION:	S6-SS-06-03	S6-SS-06-04	S6-SS-06-05	S6-SS-06-07	S6-SS-06-08	S6-SS-06-09	S6-SS-06-10	S6-SS-06-11	S6-SS-06-12
DATA SOURCE:	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil
SAMPLE DATE:									
VOLATILES	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
2-hexanone	11 U	12 U	16 U	12 U	12 U	13 U	13 U	12 U	12 U
4-methyl-2-pentanone	11 U	12 U	8 U	12 U	12 U	13 U	13 U	12 U	12 U
acetone	11 U	12 U	38 U	12 U	14 U	13 U	13 U	12 U	12 U
benzene	11 U	12 U	13 U	12 U	12 U	13 U	13 U	12 U	12 U
bromodichloromethane	11 U	12 U	13 U	12 U	12 U	13 U	13 U	12 U	12 U
bromoform	11 U	12 U	13 U	12 U	12 U	13 U	13 U	12 U	12 U
bromomethane	11 U	12 U	13 U	12 U	12 U	13 U	13 U	12 U	12 U
carbon disulfide	11 U	12 U	13 U	12 U	12 U	13 U	13 U	12 U	12 U
carbon tetrachloride	11 U	12 U	13 U	12 U	12 U	13 U	13 U	12 U	12 U
chlorobenzene	11 U	12 U	13 U	12 U	12 U	13 U	13 U	12 U	12 U
chloroethane	11 U	12 U	13 U	12 U	12 U	13 U	13 U	12 U	12 U
chloroform	11 U	12 U	13 U	12 U	12 U	13 U	13 U	12 U	12 U
chloromethane	11 U	12 U	13 U	12 U	12 U	13 U	13 U	12 U	12 U
cis-1,3-dichloropropene	11 U	12 U	13 U	12 U	12 U	13 U	13 U	12 U	12 U
dibromochloromethane	11 U	12 U	13 U	12 U	12 U	13 U	13 U	12 U	12 U
ethylbenzene	11 U	12 U	13 U	12 U	12 U	13 U	13 U	12 U	12 U
methylene chloride	11 U	2 U	27 U	12 U	18 U	2 U	13 U	9 U	6 U
styrene	11 U	12 U	13 U	12 U	12 U	13 U	13 U	12 U	12 U
tetrachloroethene	11 U	12 U	13 U	12 U	12 U	13 U	13 U	12 U	12 U
toluene	15 J	12 U	5 J	12 U	12 U	13 U	1 J	12 U	2 J
trans-1,3-dichloropropene	11 U	12 U	13 U	12 U	12 U	13 U	13 U	12 U	12 U
trichloroethene	2 J	1 J	2 J	12 U	12 U	13 U	13 U	2 J	1 J
vinyl chloride	11 U	12 U	13 U	12 U	12 U	13 U	13 U	12 U	12 U
xylene (total)	11 U	12 U	13 U	12 U	12 U	13 U	13 U	12 U	12 U

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- UR -- Non-detected result is considered unusable due to exceedance of technical quality control criteria.
- L -- Positive result is considered biased low due to exceedance of technical quality control criteria.
- K -- Positive result is considered biased high due to exceedance of technical quality control criteria.
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TABLE 1

ANALYTICAL RESULTS FOR SURFACE SOIL - Site 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-SS-06-03		S6-SS-06-04		S6-SS-06-05		S6-SS-06-07		S6-SS-06-08		S6-SS-06-09		S6-SS-06-10		S6-SS-06-11		S6-SS-06-12	
LOCATION:	S6-SS-06-03		S6-SS-06-04		S6-SS-06-05		S6-SS-06-07		S6-SS-06-08		S6-SS-06-09		S6-SS-06-10		S6-SS-06-11		S6-SS-06-12	
DATA SOURCE:	Surface Soil		Surface Soil		Surface Soil		Surface Soil		Surface Soil		Surface Soil		Surface Soil		Surface Soil		Surface Soil	
SAMPLE DATE:																		
PESTICIDES/PCBS	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
4,4'-DDD	4	R	4	U	4.2	U	3.9	U	4	U	4.1	U	4.1	U	7.7	J	4	U
4,4'-DDE	4.1	U	4	U	4.2	U	3.9	U	4	U	4.1	U	4.1	U	3.8	U	4	U
4,4'-DDT	5.3	R	4	U	4.2	U	3.9	U	4	U	5.5	J	4.1	U	6.5		4	U
Aroclor-1016	41	U	40	U	42	U	39	U	40	U	41	U	41	U	38	U	40	U
Aroclor-1221	82	U	81	U	86	U	79	U	81	U	83	U	84	U	78	U	81	U
Aroclor-1232	41	U	40	U	42	U	39	U	40	U	41	U	41	U	38	U	40	U
Aroclor-1242	41	U	40	U	42	U	39	U	40	U	41	U	41	U	38	U	40	U
Aroclor-1248	41	U	40	U	42	U	39	U	40	U	41	U	41	U	38	U	40	U
Aroclor-1254	490		40	U	42	U	39	U	40	U	41	U	41	U	38	U	40	U
Aroclor-1260	41	U	40	U	42	U	39	U	40	U	41	U	41	U	38	U	40	U
aldrin	2.1	U	2.1	U	2.2	U	2	U	2	U	2.1	U	2.1	U	2	U	2	U
alpha-BHC	2.1	U	2.1	U	2.2	U	2	U	2	U	2.1	U	2.1	U	2	U	2	U
alpha-chlordane	8.2		2.1	U	2.2	U	2	U	2	U	2.1	U	2.1	U	2	U	2	U
beta-BHC	2.1	U	2.1	U	2.2	U	2	U	2	U	2.1	U	2.1	U	2	U	2	U
delta-BHC	2.1	U	2.1	U	2.2	U	2	U	2	U	2.1	U	2.1	U	2	U	2	U
dieldrin	4.1	U	4	U	4.2	U	3.9	U	4	U	4.1	U	4.1	U	3.8	U	4	U
endosulfan I	2.1	U	2.1	U	2.2	U	2	U	2	U	2.1	U	2.1	U	2	U	2	U
endosulfan II	4.1	U	4	U	4.2	U	3.9	U	4	U	4.1	U	4.1	U	3.8	U	4	U
endosulfan sulfate	4.1	U	4	U	4.2	U	3.9	U	4	U	4.1	U	4.1	U	3.8	U	4	U
endrin	14	J	4	U	4.2	U	3.9	U	4	U	4.1	U	4.1	U	3.8	U	4	U
endrin aldehyde	4.1	U	4	U	4.2	U	3.9	U	4	U	4.1	U	4.1	U	3.8	U	4	U
endrin ketone	4.1	U	4	U	4.2	U	3.9	U	4	U	4.1	U	4.1	U	3.8	U	4	U
gamma-BHC (Lindane)	2.1	U	2.1	U	2.2	U	2	U	2	U	2.1	U	2.1	U	2	U	2	U
gamma-chlordane	2.1	U	2.1	U	2.2	U	2	U	2	U	2.1	U	2.1	U	2	U	2	U

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ANALYTICAL RESULTS FOR SURFACE SOIL - Site 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-SS-06-03		S6-SS-06-04		S6-SS-06-05		S6-SS-06-07		S6-SS-06-08		S6-SS-06-09		S6-SS-06-10		S6-SS-06-11		S6-SS-06-12	
LOCATION:	S6-SS-06-03		S6-SS-06-04		S6-SS-06-05		S6-SS-06-07		S6-SS-06-08		S6-SS-06-09		S6-SS-06-10		S6-SS-06-11		S6-SS-06-12	
DATA SOURCE:	Surface Soil		Surface Soil		Surface Soil		Surface Soil		Surface Soil		Surface Soil		Surface Soil		Surface Soil		Surface Soil	
SAMPLE DATE:																		
PESTICIDES/PCBS	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
heptachlor	2.1	U	2.1	U	2.2	U	2	U	2	U	2.1	U	2.1	U	2	U	2	U
heptachlor epoxide	2.1	U	2.1	U	2.2	U	2	U	2	U	2.1	U	2.1	U	2	U	2	U
methoxychlor	21	U	21	U	22	U	20	U	20	U	21	U	21	U	20	U	20	U
toxaphene	210	U	210	U	220	U	200	U	200	U	210	U	210	U	200	U	200	U

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NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-SS-06-13	S6-SS-06-15	S6-SS-06-16	S6-SS-06-17	S6-SS-06-18	S6-SS-06-19	S6-SS-06-20	S6-SS-06-21	S6-SS-100
LOCATION:	S6-SS-06-13	S6-SS-06-15	S6-SS-06-16	S6-SS-06-17	S6-SS-06-18	S6-SS-06-19	S6-SS-06-20	S6-SS-06-21	S6-SS-100
DATA SOURCE:	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil
SAMPLE DATE:									02/20/97
INORGANICS	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**
aluminum	13900	13500	14100	17800	15200	22100	13900	14100	8820
antimony	6 R	5.9 R	6.5 R	6.1 R	6.7 U	7.2 U	5.6 U	6 R	5.1 L
arsenic	5.7 L	5.1 L	5.5 L	7.3 L	4.8 L	6	5.8	4.6 L	15.1 J
barium	55.5	32	68.7	42.1	39.9	124	44.7	62.1	100
beryllium	0.68	0.47	0.87	0.77	0.51	1.9	0.49	1.1	1
cadmium	0.69 U	0.54 U	0.59 U	0.7 U	0.68 U	0.98 U	0.68 U	0.54 U	16
calcium	879	713	787	824	740	877	774	1150	39800
chromium	20.2	18	15.2	27.5	22.6	22.6	23.7	14.5	2760
cobalt	8.1	7.3	8.2	9.6	6.2	9.7	5.1	20.9	18.4
copper	7.6	8.7	7.4	11.6 L	8.7	8.6	9	17.6	110 L
cyanide	1.2 U	1.2 U	1.1 U	1.2 U	1.2 U	1.2 U	1.1 U	1.1 U	n/a
iron	20600	20700	17800	26000	21000	18100	20900	19400	56300
lead	10.9	8.3	10.2	9.9	9.5	13.3	10.3	9.3	34.6 J
magnesium	1890	1790	1710	2270	1920	1690	1850	1900	14400
manganese	304	202	378	284	141	3040	123	1250	577
mercury	0.11	0.05 U	0.05 U	0.05 U	0.05 U	0.06	0.05 U	0.05 U	1.6
nickel	8 U	9.1 U	9.2 U	10.8 U	8.6 U	14.1	8.3 U	13.8	20.1
potassium	492	475	421	635	480	487	403	571	769
selenium	0.73 U	0.71 U	0.79 U	0.73 U	0.81 U	0.87 U	0.68 U	0.72 U	5.5 U
silver	0.73 U	0.71 U	0.79 U	0.73 U	0.81 U	0.87 U	0.68 U	0.72 U	51.7
sodium	68.6 U	51.4 U	67.2 U	65.3 U	47.9 U	54.4 U	62 U	63.5 U	100
thallium	0.91 U	0.89 U	0.99 U	0.92 U	1 U	1.1 U	0.85 U	0.9 U	15.1 K
vanadium	31.7	33.6	27.5	41.7	36.2	31.6	35.7	24.7	19 K
zinc	28 K	26.3 K	26.4 K	33.2 K	25	35.2	27.6	29.3 K	120 J

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NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-SS-06-13	S6-SS-06-15	S6-SS-06-16	S6-SS-06-17	S6-SS-06-18	S6-SS-06-19	S6-SS-06-20	S6-SS-06-21	S6-SS-100
LOCATION:	S6-SS-06-13	S6-SS-06-15	S6-SS-06-16	S6-SS-06-17	S6-SS-06-18	S6-SS-06-19	S6-SS-06-20	S6-SS-06-21	S6-SS-100
DATA SOURCE:	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil
SAMPLE DATE:									02/20/97
SEMIVOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
1,2,3-trichlorobenzene	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	7 U
1,2,4-trichlorobenzene	390 U	370 U	400 U	410 U	400 U	450 U	400 U	410 U	7 U
1,2,4-trimethylbenzene	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	7 U
1,2-dichlorobenzene	390 U	370 U	400 U	410 U	400 U	450 U	400 U	410 U	7 U
1,3,5-trimethylbenzene	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	7 U
1,3-dichlorobenzene	390 U	370 U	400 U	410 U	400 U	450 U	400 U	410 U	7 U
1,4-dichlorobenzene	390 U	370 U	400 U	410 U	400 U	450 U	400 U	410 U	7 U
2,2'-oxybis(1-chloropropane)	390 U	370 U	400 U	410 U	400 U	450 U	400 U	410 U	450 U
2,4,5-trichlorophenol	950 U	890 U	960 U	980 U	970 U	1100 U	970 U	990 U	450 U
2,4,6-trichlorophenol	390 U	370 U	400 U	410 U	400 U	450 U	400 U	410 U	450 U
2,4-dichlorophenol	390 U	370 U	400 U	410 U	400 U	450 U	400 U	410 U	450 U
2,4-dimethylphenol	390 U	370 U	400 U	410 U	400 U	450 U	400 U	410 U	450 U
2,4-dinitrophenol	950 U	890 U	960 U	980 U	970 U	1100 U	970 U	990 U	450 U
2,4-dinitrotoluene	390 U	370 U	400 U	410 U	400 U	450 U	400 U	410 U	450 U
2,6-dinitrotoluene	390 U	370 U	400 U	410 U	400 U	450 U	400 U	410 U	450 U
2-chlorophenol	390 U	370 U	400 U	410 U	400 U	450 U	400 U	410 U	450 U
2-methylnaphthalene	390 U	370 U	400 U	410 U	400 U	450 U	400 U	410 U	450 U
2-methylphenol	390 U	370 U	400 U	410 U	400 U	450 U	400 U	410 U	450 U
2-nitroaniline	950 U	890 U	960 U	980 U	970 U	1100 U	970 U	990 U	450 U
2-nitrophenol	390 U	370 U	400 U	410 U	400 U	450 U	400 U	410 U	450 U
3,3'-dichlorobenzidine	390 U	370 U	400 U	410 U	400 U	450 U	400 U	410 U	450 U
3-nitroaniline	950 U	890 U	960 U	980 U	970 U	1100 U	970 U	990 U	450 U
4,6-dinitro-2-methylphenol	950 U	890 U	960 U	980 U	970 U	1100 U	970 U	990 U	450 U
4-bromophenyl phenyl ether	390 U	370 U	400 U	410 U	400 U	450 U	400 U	410 U	450 U

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SAMPLE NUMBER:	S6-SS-06-13	S6-SS-06-15	S6-SS-06-16	S6-SS-06-17	S6-SS-06-18	S6-SS-06-19	S6-SS-06-20	S6-SS-06-21	S6-SS-100
LOCATION:	S6-SS-06-13	S6-SS-06-15	S6-SS-06-16	S6-SS-06-17	S6-SS-06-18	S6-SS-06-19	S6-SS-06-20	S6-SS-06-21	S6-SS-100
DATA SOURCE:	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil
SAMPLE DATE:									02/20/97
SEMIVOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
4-chloro-3-methylphenol	390 U	370 U	400 U	410 U	400 U	450 U	400 U	410 U	450 U
4-chloroaniline	390 U	370 U	400 U	410 U	400 U	450 U	400 U	410 U	450 U
4-chlorophenyl phenyl ether	390 U	370 U	400 U	410 U	400 U	450 U	400 U	410 U	450 U
4-methylphenol	390 U	370 U	400 U	410 U	400 U	450 U	400 U	410 U	450 U
4-nitroaniline	950 U	890 U	960 U	980 U	970 U	1100 U	970 U	990 U	450 U
4-nitrophenol	950 U	890 U	960 U	980 U	970 U	1100 U	970 U	990 U	450 U
N-nitroso-di-n-propylamine	390 U	370 U	400 U	410 U	400 U	450 U	400 U	410 U	450 U
N-nitrosodiphenylamine	390 U	370 U	400 U	410 U	400 U	450 U	400 U	410 U	450 U
acenaphthene	390 U	370 U	400 U	410 U	400 U	450 U	400 U	410 U	450 U
acenaphthylene	390 U	370 U	400 U	410 U	400 U	450 U	400 U	410 U	450 U
anthracene	390 U	370 U	400 U	410 U	400 U	450 U	400 U	410 U	100 J
benz(a)anthracene	390 U	370 U	400 U	410 U	400 U	450 U	400 U	410 U	460
benzo(a)pyrene	390 U	370 U	400 U	410 U	400 U	450 U	400 U	410 U	590
benzo(b)fluoranthene	390 U	370 U	400 U	410 U	400 U	450 U	400 U	410 U	620
benzo(g,h,i)perylene	390 U	370 U	400 U	410 U	400 U	450 U	400 U	410 U	240 J
benzo(k)fluoranthene	390 U	370 U	400 U	410 U	400 U	450 U	400 U	410 U	460
benzoic acid	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	240 J
benzyl alcohol	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	450 U
beta-chloronaphthalene	390 U	370 U	400 U	410 U	400 U	450 U	400 U	410 U	450 U
bis(2-chloroethoxy)methane	390 U	370 U	400 U	410 U	400 U	450 U	400 U	410 U	450 U
bis(2-chloroethyl)ether	390 U	370 U	400 U	410 U	400 U	450 U	400 U	410 U	450 U
bis(2-ethylhexyl)phthalate	50 U	370 U	400 U	410 U	400 U	450 U	400 U	410 U	170 B
butylbenzylphthalate	390 U	370 U	400 U	410 U	400 U	450 U	400 U	410 U	450 U
carbazole	390 U	370 U	400 U	410 U	400 U	450 U	400 U	410 U	n/a
chrysene	390 U	370 U	400 U	410 U	400 U	450 U	400 U	410 U	470

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K -- Positive result is considered biased high due to exceedance of technical quality control criteria.
B -- Positive result is considered to be an artifact of blank contamination, and should not be considered present.
R -- Positive result is considered unusable due to exceedance of technical quality control criteria.

TABLE 1

ANALYTICAL RESULTS FOR SURFACE SOIL - Site 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-SS-06-13	S6-SS-06-15	S6-SS-06-16	S6-SS-06-17	S6-SS-06-18	S6-SS-06-19	S6-SS-06-20	S6-SS-06-21	S6-SS-100
LOCATION:	S6-SS-06-13	S6-SS-06-15	S6-SS-06-16	S6-SS-06-17	S6-SS-06-18	S6-SS-06-19	S6-SS-06-20	S6-SS-06-21	S6-SS-100
DATA SOURCE:	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil
SAMPLE DATE:									02/20/97
SEMIVOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
di-n-butylphthalate	390 U	370 U	400 U	410 U	400 U	450 U	400 U	410 U	450 U
di-n-octylphthalate	390 U	370 U	400 U	410 U	400 U	450 U	400 U	410 U	450 U
dibenz(a,h)anthracene	390 U	370 U	400 U	410 U	400 U	450 U	400 U	410 U	68 J
dibenzofuran	390 U	370 U	400 U	410 U	400 U	450 U	400 U	410 U	450 U
diethylphthalate	390 U	370 U	400 U	410 U	400 U	450 U	400 U	410 U	450 U
dimethylphthalate	390 U	370 U	400 U	410 U	400 U	450 U	400 U	410 U	450 U
fluoranthene	390 U	370 U	400 U	410 U	400 U	450 U	400 U	410 U	810
fluorene	390 U	370 U	400 U	410 U	400 U	450 U	400 U	410 U	450 U
hexachlorobenzene	390 U	370 U	400 U	410 U	400 U	450 U	400 U	410 U	450 U
hexachlorobutadiene	390 U	370 U	400 U	410 U	400 U	450 U	400 U	410 U	7 U
hexachlorocyclopentadiene	390 U	370 U	400 U	410 U	400 U	450 U	400 U	410 U	450 U
hexachloroethane	390 U	370 U	400 U	410 U	400 U	450 U	400 U	410 U	450 U
indeno(1,2,3-cd)pyrene	390 U	370 U	400 U	410 U	400 U	450 U	400 U	410 U	260 J
isophorone	390 U	370 U	400 U	410 U	400 U	450 U	400 U	410 U	450 U
naphthalene	390 U	370 U	400 U	410 U	400 U	450 U	400 U	410 U	7 U
nitrobenzene	390 U	370 U	400 U	410 U	400 U	450 U	400 U	410 U	450 U
pentachlorophenol	950 U	890 U	960 U	980 U	970 U	1100 U	970 U	990 U	450 U
phenanthrene	390 U	370 U	400 U	410 U	400 U	450 U	400 U	410 U	420 J
phenol	390 U	370 U	400 U	410 U	400 U	450 U	400 U	410 U	450 U
pyrene	390 U	370 U	400 U	410 U	400 U	450 U	400 U	410 U	820
VOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
1,1,1,2-tetrachloroethane	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	7 U
1,1,1-trichloroethane	12 U	12 U	12 U	12 U	12 U	12 U	12 U	12 U	7 U
1,1,2,2-tetrachloroethane	12 U	12 U	12 U	12 U	12 U	12 U	12 U	12 U	7 U
1,1,2-trichloroethane	12 U	12 U	12 U	12 U	12 U	12 U	12 U	12 U	7 U

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- UL -- Non-detected result is considered biased low due to exceedance of technical quality control criteria.
- UR -- Non-detected result is considered unusable due to exceedance of technical quality control criteria.
- L -- Positive result is considered biased low due to exceedance of technical quality control criteria.
- K -- Positive result is considered biased high due to exceedance of technical quality control criteria.
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TABLE 1

ANALYTICAL RESULTS FOR SURFACE SOIL - Site 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-SS-06-13	S6-SS-06-15	S6-SS-06-16	S6-SS-06-17	S6-SS-06-18	S6-SS-06-19	S6-SS-06-20	S6-SS-06-21	S6-SS-100
LOCATION:	S6-SS-06-13	S6-SS-06-15	S6-SS-06-16	S6-SS-06-17	S6-SS-06-18	S6-SS-06-19	S6-SS-06-20	S6-SS-06-21	S6-SS-100
DATA SOURCE:	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil
SAMPLE DATE:									02/20/97
VOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
1,1-dichloroethane	12 U	12 U	12 U	12 U	12 U	12 U	12 U	12 U	7 U
1,1-dichloroethene	12 U	12 U	12 U	12 U	12 U	12 U	12 U	12 U	7 U
1,1-dichloropropene	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	7 U
1,2,3-trichloropropane	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	7 U
1,2-dibromo-3-chloropropane	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	14 U
1,2-dibromoethane	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	7 U
1,2-dichloroethane	12 U	12 U	12 U	12 U	12 U	12 U	12 U	12 U	7 U
1,2-dichloroethene (total)	12 U	12 U	12 U	12 U	12 U	12 U	12 U	12 U	7 U
1,2-dichloropropane	12 U	12 U	12 U	12 U	12 U	12 U	12 U	12 U	7 U
1,3-dichloropropane	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	7 U
2,2-dichloropropane	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	7 U
2-butanone	12 U	12 U	12 U	12 U	12 U	12 U	12 U	12 U	68 U
2-hexanone	12 U	12 U	12 U	12 U	12 U	12 U	12 U	12 U	27 U
4-chlorotoluene	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	7 U
4-methyl-2-pentanone	12 U	12 U	12 U	12 U	12 U	12 U	12 U	12 U	27 U
acetone	12 U	12 U	12 U	12 U	12 U	5 U	12 U	4 U	68 U
benzene	12 U	12 U	12 U	12 U	12 U	12 U	12 U	12 U	7 U
bromobenzene	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	7 U
bromochloromethane	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	7 U
bromodichloromethane	12 U	12 U	12 U	12 U	12 U	12 U	12 U	12 U	7 U
bromoform	12 U	12 U	12 U	12 U	12 U	12 U	12 U	12 U	7 U
bromomethane	12 U	12 U	12 U	3 J	12 U	12 U	12 U	12 U	14 U
carbon disulfide	12 U	12 U	12 U	12 U	12 U	12 U	12 U	12 U	7 U
carbon tetrachloride	12 U	12 U	12 U	12 U	12 U	12 U	12 U	12 U	7 U
chlorobenzene	12 U	12 U	12 U	12 U	12 U	12 U	12 U	12 U	7 U

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TABLE 1

ANALYTICAL RESULTS FOR SURFACE SOIL - Site 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-SS-06-13	S6-SS-06-15	S6-SS-06-16	S6-SS-06-17	S6-SS-06-18	S6-SS-06-19	S6-SS-06-20	S6-SS-06-21	S6-SS-100
LOCATION:	S6-SS-06-13	S6-SS-06-15	S6-SS-06-16	S6-SS-06-17	S6-SS-06-18	S6-SS-06-19	S6-SS-06-20	S6-SS-06-21	S6-SS-100
DATA SOURCE:	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil
SAMPLE DATE:									02/20/97
VOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
chloroethane	12 U	12 U	12 U	12 U	12 U	12 U	12 U	12 U	14 U
chloroform	12 U	12 U	12 U	12 U	12 U	12 U	12 U	12 U	7 U
chloromethane	12 U	12 U	12 U	12 U	12 U	12 U	12 U	12 U	14 U
cis-1,3-dichloropropene	12 U	12 U	12 U	12 U	12 U	12 U	12 U	12 U	7 U
dibromochloromethane	12 U	12 U	12 U	12 U	12 U	12 U	12 U	12 U	7 U
dichlorodifluoromethane	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	14 U
ethylbenzene	12 U	12 U	12 U	12 U	12 U	12 U	12 U	12 U	7 U
isopropylbenzene	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	7 U
methylene bromide	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	7 U
methylene chloride	6 U	12 U	12 U	12 U	12 U	1 U	12 U	12 U	7 U
n-butylbenzene	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	7 U
n-propylbenzene	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	7 U
o-chlorotoluene	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	7 U
p-isopropyltoluene	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	7 U
sec-butylbenzene	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	7 U
styrene	12 U	12 U	12 U	12 U	12 U	12 U	12 U	12 U	7 U
tert-butylbenzene	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	7 U
tetrachloroethene	12 U	12 U	12 U	12 U	12 U	12 U	12 U	12 U	7 U
toluene	3 J	12 U	6 J	12 U	12 U	2 J	2 J	2 J	7 U
trans-1,3-dichloropropene	12 U	12 U	12 U	12 U	12 U	12 U	12 U	12 U	7 U
trichloroethene	1 J	12 U	4 J	2 J	12 U	12 U	12 U	1 J	7 U
trichlorofluoromethane	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	14 U
vinyl chloride	12 U	12 U	12 U	12 U	12 U	12 U	12 U	12 U	14 U
xylene (total)	12 U	12 U	12 U	12 U	12 U	12 U	12 U	12 U	7 U

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TABLE 1

ANALYTICAL RESULTS FOR SURFACE SOIL - Site 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-SS-06-13		S6-SS-06-15		S6-SS-06-16		S6-SS-06-17		S6-SS-06-18		S6-SS-06-19		S6-SS-06-20		S6-SS-06-21		S6-SS-100	
LOCATION:	S6-SS-06-13		S6-SS-06-15		S6-SS-06-16		S6-SS-06-17		S6-SS-06-18		S6-SS-06-19		S6-SS-06-20		S6-SS-06-21		S6-SS-100	
DATA SOURCE:	Surface Soil		Surface Soil		Surface Soil		Surface Soil		Surface Soil		Surface Soil		Surface Soil		Surface Soil		Surface Soil	
SAMPLE DATE:																	02/20/97	
PESTICIDES/PCBS	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
4,4'-DDD	3.9	U	3.7	U	4	U	4.1	U	4	U	4.5	U	4	U	4.1	U	n/a	
4,4'-DDE	3.9	U	3.7	U	4	U	4.1	U	4	U	4.5	U	4	U	4.1	U	n/a	
4,4'-DDT	3.9	U	3.7	U	4	U	4.1	U	4	U	4.5	U	4	U	4.1	U	n/a	
Aroclor-1016	39	U	37	U	40	U	41	U	40	U	45	U	40	U	41	U	45	U
Aroclor-1221	79	U	74	U	80	U	82	U	81	U	92	U	81	U	83	U	92	U
Aroclor-1232	39	U	37	U	40	U	41	U	40	U	45	U	40	U	41	U	45	U
Aroclor-1242	39	U	37	U	40	U	41	U	40	U	45	U	40	U	41	U	45	U
Aroclor-1248	39	U	37	U	40	U	41	U	40	U	45	U	40	U	41	U	45	U
Aroclor-1254	39	U	37	U	40	U	41	U	40	U	45	U	40	U	41	U	180	J
Aroclor-1260	39	U	37	U	40	U	41	U	40	U	45	U	40	U	41	U	91	J
aldrin	2	U	1.9	U	2	U	2.1	U	2.1	U	2.3	U	2.1	U	2.1	U	n/a	
alpha-BHC	2	U	1.9	U	2	U	2.1	U	2.1	U	2.3	U	2.1	U	2.1	U	n/a	
alpha-chlordane	2	U	1.9	U	2	U	2.1	U	2.1	U	2.3	U	2.1	U	2.1	U	n/a	
beta-BHC	2	U	1.9	U	2	U	2.1	U	2.1	U	2.3	U	2.1	U	2.1	U	n/a	
delta-BHC	2	U	1.9	U	2	U	2.1	U	2.1	U	2.3	U	2.1	U	2.1	U	n/a	
dieldrin	3.9	U	3.7	U	4	U	4.1	U	4	U	4.5	U	4	U	4.1	U	n/a	
endosulfan I	2	U	1.9	U	2	U	2.1	U	2.1	U	2.3	U	2.1	U	2.1	U	n/a	
endosulfan II	3.9	U	3.7	U	4	U	4.1	U	4	U	4.5	U	4	U	4.1	U	n/a	
endosulfan sulfate	3.9	U	3.7	U	4	U	4.1	U	4	U	4.5	U	4	U	4.1	U	n/a	
endrin	3.9	U	3.7	U	4	U	4.1	U	4	U	4.5	U	4	U	4.1	U	n/a	
endrin aldehyde	3.9	U	3.7	U	4	U	4.1	U	4	U	4.5	U	4	U	4.1	U	n/a	
endrin ketone	3.9	U	3.7	U	4	U	4.1	U	4	U	4.5	U	4	U	4.1	U	n/a	
gamma-BHC (Lindane)	2	U	1.9	U	2	U	2.1	U	2.1	U	2.3	U	2.1	U	2.1	U	n/a	
gamma-chlordane	2	U	1.9	U	2	U	2.1	U	2.1	U	2.3	U	2.1	U	2.1	U	n/a	

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TABLE 1

ANALYTICAL RESULTS FOR SURFACE SOIL - Site 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-SS-06-13		S6-SS-06-15		S6-SS-06-16		S6-SS-06-17		S6-SS-06-18		S6-SS-06-19		S6-SS-06-20		S6-SS-06-21		S6-SS-100
LOCATION:	S6-SS-06-13		S6-SS-06-15		S6-SS-06-16		S6-SS-06-17		S6-SS-06-18		S6-SS-06-19		S6-SS-06-20		S6-SS-06-21		S6-SS-100
DATA SOURCE:	Surface Soil		Surface Soil		Surface Soil		Surface Soil		Surface Soil		Surface Soil		Surface Soil		Surface Soil		Surface Soil
SAMPLE DATE:																	02/20/97
PESTICIDES/PCBS	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**
heptachlor	2	U	1.9	U	2	U	2.1	U	2.1	U	2.3	U	2.1	U	2.1	U	n/a
heptachlor epoxide	2	U	1.9	U	2	U	2.1	U	2.1	U	2.3	U	2.1	U	2.1	U	n/a
methoxychlor	20	U	19	U	20	U	21	U	21	U	23	U	21	U	21	U	n/a
toxaphene	200	U	190	U	200	U	210	U	210	U	230	U	210	U	210	U	n/a

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TABLE 1

ANALYTICAL RESULTS FOR SURFACE SOIL - Site 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-SS-101		S6-SS-102		S6-SS-103		S6-SS-104		S6-SS-105		S6-SS-106		S6-SS-106-DUP		S6-SS-108		S6-SS-109	
LOCATION:	S6-SS-101		S6-SS-102		S6-SS-103		S6-SS-104		S6-SS-105		S6-SS-106		S6-SS-106		S6-SS-108		S6-SS-109	
DATA SOURCE:	Surface Soil		Surface Soil		Surface Soil		Surface Soil		Surface Soil		Surface Soil		Surface Soil		Surface Soil		Surface Soil	
SAMPLE DATE:	02/20/97		02/20/97		02/26/97		02/26/97		02/26/97		02/27/97		02/27/97		02/27/97		02/27/97	
INORGANICS	**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**	
aluminum	14100		9530		9060		9310		11900		14000		15400		14400		13500	
antimony	2.6	UL	2.5	UL	2.5	UL	2.6	UL	2.5	UL	2.4	UR	2.4	UR	2.4	UR	2.4	UR
arsenic	14.7	J	9	J	12	K	8	K	12.8	K	13.9	K	13.1	K	14.8	K	13.3	K
barium	55.7		30.2		67.3		46.3		96.1		63.6		63.4		49.7		38	
beryllium	0.79		0.75		1		0.7		1.5		0.84		0.85		0.81		0.76	
cadmium	0.65	U	0.62	U	0.63	U	0.65	U	0.63	U	0.6	UJ	0.6	UJ	0.6	UJ	0.6	UJ
calcium	957		506		3560	J	1840	J	863	J	861	J	825	J	659	J	529	J
chromium	21.9		13.2		14.3	J	13.7		40.6	J	21.9		23.4		20		18.6	
cobalt	9.1		9.4		6.7	J	8.5		9.6	J	8.4		8.7		9.1		9.5	
copper	30.2	L	11	L	14		18.5		10.9		10	J	10.6	J	12.4	J	12.5	J
iron	24300		16900		13200		16500	J	15700		22200		22200		21900		21900	
lead	22.1	J	10.5	J	23.6		12.9		28.2		13.2	L	15.2	L	13.8	L	10.1	L
magnesium	2050		1430		3020	J	1710		1390	J	1860		1900		1950		2230	
manganese	322		221		490	J	389	J	931	J	408		355		323		354	
mercury	0.13	U	0.12	U	0.13	U	0.13	U	0.13	U	0.12	U	0.12	U	0.12	U	0.12	U
nickel	12.9		10.9		9.7	K	10.8	K	12.1	K	12.4		12.9		12		13.2	
potassium	770		440		556		839		363		426		557		693		696	
selenium	5.2	U	4.9	U	5	U	5.2	U	5.1	U	4.8	U	4.8	U	4.8	U	4.8	U
silver	1.8	K	0.62	U	0.63	U	0.77	K	2.2	J	1.1	J	1.2	J	1.1	J	1.1	J
sodium	86.1		88.2		111		101		83.2		48.1		60		49.1		51.9	
thallium	5.5	K	6.4	K	3.8	UJ	3.9	UJ	3.8	UJ	7.8	K	7.6	K	5.1	K	6.8	K
vanadium	37.1		24.7		22.4		24.1		26.4		36.7		37.7		36.5		36.5	
zinc	54	J	24.9	J	38.6	J	57.9	J	44.1	J	42.2	J	40.4	J	38.4	J	33.5	J

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TABLE 1

ANALYTICAL RESULTS FOR SURFACE SOIL - Site 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-SS-101		S6-SS-102		S6-SS-103		S6-SS-104		S6-SS-105		S6-SS-106		S6-SS-106-DUP		S6-SS-108		S6-SS-109	
LOCATION:	S6-SS-101		S6-SS-102		S6-SS-103		S6-SS-104		S6-SS-105		S6-SS-106		S6-SS-106		S6-SS-108		S6-SS-109	
DATA SOURCE:	Surface Soil		Surface Soil		Surface Soil		Surface Soil		Surface Soil		Surface Soil		Surface Soil		Surface Soil		Surface Soil	
SAMPLE DATE:	02/20/97		02/20/97		02/26/97		02/26/97		02/26/97		02/27/97		02/27/97		02/27/97		02/27/97	
SEMIVOLATILES	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1,2,3-trichlorobenzene	6	U	6	U	6	U	7	U	6	U	6	U	6	U	6	U	6	U
1,2,4-trichlorobenzene	6	U	6	U	6	U	7	U	6	U	6	U	6	U	6	U	6	U
1,2,4-trimethylbenzene	6	U	6	U	6	U	7	U	6	U	6	U	6	U	6	U	6	U
1,2-dichlorobenzene	6	U	6	U	6	U	7	U	6	U	6	U	6	U	6	U	6	U
1,3,5-trimethylbenzene	6	U	6	U	6	U	7	U	6	U	6	U	6	U	6	U	6	U
1,3-dichlorobenzene	6	U	6	U	6	U	7	U	6	U	6	U	6	U	6	U	6	U
1,4-dichlorobenzene	6	U	6	U	6	U	7	U	6	U	6	U	6	U	6	U	6	U
2,2'-oxybis(1-chloropropane)	430	U	410	U	420	U	430	U	420	U	390	U	400	U	390	U	390	U
2,4,5-trichlorophenol	430	U	410	U	420	U	430	U	420	U	390	U	400	U	390	U	390	U
2,4,6-trichlorophenol	430	U	410	U	420	U	430	U	420	U	390	U	400	U	390	U	390	U
2,4-dichlorophenol	430	U	410	U	420	U	430	U	420	U	390	U	400	U	390	U	390	U
2,4-dimethylphenol	430	U	410	U	420	U	430	U	420	U	390	U	400	U	390	U	390	U
2,4-dinitrophenol	430	U	410	U	420	U	430	U	420	U	390	U	400	U	390	U	390	U
2,4-dinitrotoluene	430	U	410	U	420	U	430	U	420	U	390	U	400	U	390	U	390	U
2,6-dinitrotoluene	430	U	410	U	420	U	430	U	420	U	390	U	400	U	390	U	390	U
2-chlorophenol	430	U	410	U	420	U	430	U	420	U	390	U	400	U	390	U	390	U
2-methylnaphthalene	430	U	410	U	420	U	430	U	420	U	390	U	400	U	390	U	390	U
2-methylphenol	430	U	410	U	420	U	430	U	420	U	390	U	400	U	390	U	390	U
2-nitroaniline	430	U	410	U	420	U	430	U	420	U	390	U	400	U	390	U	390	U
2-nitrophenol	430	U	410	U	420	U	430	U	420	U	390	U	400	U	390	U	390	U
3,3'-dichlorobenzidine	430	U	410	U	420	U	430	U	420	U	390	U	400	U	390	U	390	U
3-nitroaniline	430	U	410	U	420	U	430	U	420	U	390	U	400	U	390	U	390	U
4,6-dinitro-2-methylphenol	430	U	410	U	420	U	430	U	420	U	390	U	400	U	390	U	390	U
4-bromophenyl phenyl ether	430	U	410	U	420	U	430	U	420	U	390	U	400	U	390	U	390	U

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TABLE 1

ANALYTICAL RESULTS FOR SURFACE SOIL - Site 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-SS-101	S6-SS-102	S6-SS-103	S6-SS-104	S6-SS-105	S6-SS-106	S6-SS-106-DUP	S6-SS-108	S6-SS-109
LOCATION:	S6-SS-101	S6-SS-102	S6-SS-103	S6-SS-104	S6-SS-105	S6-SS-106	S6-SS-106	S6-SS-108	S6-SS-109
DATA SOURCE:	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil
SAMPLE DATE:	02/20/97	02/20/97	02/26/97	02/26/97	02/26/97	02/27/97	02/27/97	02/27/97	02/27/97
SEMIVOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
4-chloro-3-methylphenol	430 U	410 U	420 U	430 U	420 U	390 U	400 U	390 U	390 U
4-chloroaniline	430 U	410 U	420 U	430 U	420 U	390 U	400 U	390 U	390 U
4-chlorophenyl phenyl ether	430 U	410 U	420 U	430 U	420 U	390 U	400 U	390 U	390 U
4-methylphenol	430 U	410 U	420 U	430 U	420 U	390 U	400 U	390 U	390 U
4-nitroaniline	430 U	410 U	420 U	430 U	420 U	390 U	400 U	390 U	390 U
4-nitrophenol	430 U	410 U	420 U	430 U	420 U	390 U	400 U	390 U	390 U
N-nitroso-di-n-propylamine	430 U	410 U	420 U	430 U	420 U	390 U	400 U	390 U	390 U
N-nitrosodiphenylamine	430 U	410 U	420 U	430 U	420 U	390 U	400 U	390 U	390 U
acenaphthene	430 U	410 U	420 U	430 U	420 U	390 U	400 U	390 U	390 U
acenaphthylene	430 U	410 U	420 U	430 U	420 U	390 U	400 U	390 U	390 U
anthracene	430 U	410 U	420 U	430 U	420 U	390 U	400 U	390 U	390 U
benz(a)anthracene	430 U	410 U	230 J	430 U	420 U	390 U	400 U	390 U	390 U
benzo(a)pyrene	430 U	410 U	330 J	430 U	420 U	390 U	400 U	390 U	390 U
benzo(b)fluoranthene	430 U	410 U	260 J	430 U	420 U	390 U	400 U	390 U	390 U
benzo(g,h,i)perylene	430 U	410 U	170 J	430 U	420 U	390 U	400 U	390 U	390 U
benzo(k)fluoranthene	430 U	410 U	400 J	430 U	420 U	390 U	400 U	390 U	390 U
benzoic acid	240 J	220 J	420 U	430 U	420 U	390 U	400 U	390 U	390 U
benzyl alcohol	430 U	410 U	420 U	430 U	420 U	390 U	400 U	390 U	390 U
beta-chloronaphthalene	430 U	410 U	420 U	430 U	420 U	390 U	400 U	390 U	390 U
bis(2-chloroethoxy)methane	430 U	410 U	420 U	430 U	420 U	390 U	400 U	390 U	390 U
bis(2-chloroethyl)ether	430 U	410 U	420 U	430 U	420 U	390 U	400 U	390 U	390 U
bis(2-ethylhexyl)phthalate	110 B	110 B	420 U	430 U	420 U	390 U	400 U	390 U	390 U
butylbenzylphthalate	430 U	410 U	420 U	430 U	420 U	390 U	400 U	390 U	390 U
chrysene	430 U	410 U	250 J	430 U	420 U	390 U	400 U	390 U	390 U
di-n-butylphthalate	430 U	410 U	420 U	430 U	420 U	390 U	400 U	390 U	390 U

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TABLE 1

ANALYTICAL RESULTS FOR SURFACE SOIL - Site 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-SS-101	S6-SS-102	S6-SS-103	S6-SS-104	S6-SS-105	S6-SS-106	S6-SS-106-DUP	S6-SS-108	S6-SS-109
LOCATION:	S6-SS-101	S6-SS-102	S6-SS-103	S6-SS-104	S6-SS-105	S6-SS-106	S6-SS-106	S6-SS-108	S6-SS-109
DATA SOURCE:	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil
SAMPLE DATE:	02/20/97	02/20/97	02/26/97	02/26/97	02/26/97	02/27/97	02/27/97	02/27/97	02/27/97
SEMIVOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
di-n-octylphthalate	430 U	410 U	420 U	430 U	420 U	390 U	400 U	390 U	390 U
dibenz(a,h)anthracene	430 U	410 U	44 J	430 U	420 U	390 U	400 U	390 U	390 U
dibenzofuran	430 U	410 U	420 U	430 U	420 U	390 U	400 U	390 U	390 U
diethylphthalate	430 U	410 U	420 U	430 U	420 U	390 U	400 U	390 U	390 U
dimethylphthalate	430 U	410 U	420 U	430 U	420 U	390 U	400 U	390 U	390 U
fluoranthene	430 U	410 U	390 J	40 J	420 U	390 U	400 U	390 U	390 U
fluorene	430 U	410 U	420 U	430 U	420 U	390 U	400 U	390 U	390 U
hexachlorobenzene	430 U	410 U	420 U	430 U	420 U	390 U	400 U	390 U	390 U
hexachlorobutadiene	6 U	6 U	6 U	7 U	6 U	6 U	6 U	6 U	6 U
hexachlorocyclopentadiene	430 U	410 U	420 U	430 U	420 U	390 U	400 U	390 U	390 U
hexachloroethane	430 U	410 U	420 U	430 U	420 U	390 U	400 U	390 U	390 U
indeno(1,2,3-cd)pyrene	430 U	410 U	180 J	430 U	420 U	390 U	400 U	390 U	390 U
isophorone	430 U	410 U	420 U	430 U	420 U	390 U	400 U	390 U	390 U
naphthalene	6 U	6 U	6 U	7 U	6 U	6 U	6 U	6 U	6 U
nitrobenzene	430 U	410 U	420 U	430 U	420 U	390 U	400 U	390 U	390 U
pentachlorophenol	430 U	410 U	420 U	430 U	420 U	390 U	400 U	390 U	390 U
phenanthrene	430 U	410 U	75 J	430 U	420 U	390 U	400 U	390 U	390 U
phenol	430 U	410 U	420 U	430 U	420 U	390 U	400 U	390 U	390 U
pyrene	430 U	410 U	350 J	430 U	420 U	390 U	400 U	390 U	390 U
VOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
1,1,1,2-tetrachloroethane	6 U	6 U	6 U	7 U	6 U	6 U	6 U	6 U	6 U
1,1,1-trichloroethane	6 U	6 U	6 U	7 U	6 U	6 U	6 U	6 U	6 U
1,1,2,2-tetrachloroethane	6 U	6 U	6 U	7 U	6 U	6 U	6 U	6 U	6 U
1,1,2-trichloroethane	6 U	6 U	6 U	7 U	6 U	6 U	6 U	6 U	6 U
1,1-dichloroethane	6 U	6 U	6 U	7 U	6 U	6 U	6 U	6 U	6 U

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ANALYTICAL RESULTS FOR SURFACE SOIL - Site 06

NAWC, WARMINSTER, PENNSYLVANIA

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LOCATION:	S6-SS-101	S6-SS-102	S6-SS-103	S6-SS-104	S6-SS-105	S6-SS-106	S6-SS-106	S6-SS-108	S6-SS-109
DATA SOURCE:	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil	Surface Soil
SAMPLE DATE:	02/20/97	02/20/97	02/26/97	02/26/97	02/26/97	02/27/97	02/27/97	02/27/97	02/27/97
VOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
1,1-dichloroethene	6 U	6 U	6 U	7 U	6 U	6 U	6 U	6 U	6 U
1,1-dichloropropene	6 U	6 U	6 U	7 U	6 U	6 U	6 U	6 U	6 U
1,2,3-trichloropropane	6 U	6 U	6 U	7 U	6 U	6 U	6 U	6 U	6 U
1,2-dibromo-3-chloropropane	13 U	12 U	13 U	13 U	13 U	12 U	12 U	12 U	12 U
1,2-dibromoethane	6 U	6 U	6 U	7 U	6 U	6 U	6 U	6 U	6 U
1,2-dichloroethane	6 U	6 U	6 U	7 U	6 U	6 U	6 U	6 U	6 U
1,2-dichloroethene (total)	6 U	6 U	6 U	7 U	6 U	6 U	6 U	6 U	6 U
1,2-dichloropropane	6 U	6 U	6 U	7 U	6 U	6 U	6 U	6 U	6 U
1,3-dichloropropane	6 U	6 U	6 U	7 U	6 U	6 U	6 U	6 U	6 U
2,2-dichloropropane	6 U	6 U	6 U	7 U	6 U	6 U	6 U	6 U	6 U
2-butanone	65 U	62 U	63 U	65 U	64 U	60 U	60 U	60 U	60 U
2-hexanone	26 U	25 U	25 U	26 U	25 U	24 U	24 U	24 U	24 U
4-chlorotoluene	6 U	6 U	6 U	7 U	6 U	6 U	6 U	6 U	6 U
4-methyl-2-pentanone	26 U	25 U	25 U	26 U	25 U	24 U	24 U	24 U	24 U
acetone	65 U	62 U	63 U	65 U	64 U	60 U	60 UJ	60 U	60 UJ
benzene	6 U	6 U	6 U	7 U	6 U	6 U	6 U	6 U	6 U
bromobenzene	6 U	6 U	6 U	7 U	6 U	6 U	6 U	6 U	6 U
bromochloromethane	6 U	6 U	6 U	7 U	6 U	6 U	6 U	6 U	6 U
bromodichloromethane	6 U	6 U	6 U	7 U	6 U	6 U	6 U	6 U	6 U
bromoform	6 U	6 U	6 U	7 U	6 U	6 U	6 U	6 U	6 U
bromomethane	13 U	12 U	13 U	13 U	13 U	12 U	12 U	12 U	12 U
carbon disulfide	6 U	6 U	6 U	7 U	6 U	6 U	6 U	6 U	6 U
carbon tetrachloride	6 U	6 U	6 U	7 U	6 U	6 U	6 U	6 U	6 U
chlorobenzene	6 U	6 U	6 U	7 U	6 U	6 U	6 U	6 U	6 U
chloroethane	13 U	12 U	13 U	13 U	13 U	12 U	12 U	12 U	12 U

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ANALYTICAL RESULTS FOR SURFACE SOIL - Site 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-SS-101		S6-SS-102		S6-SS-103		S6-SS-104		S6-SS-105		S6-SS-106		S6-SS-106-DUP		S6-SS-108		S6-SS-109	
LOCATION:	S6-SS-101		S6-SS-102		S6-SS-103		S6-SS-104		S6-SS-105		S6-SS-106		S6-SS-106		S6-SS-108		S6-SS-109	
DATA SOURCE:	Surface Soil		Surface Soil		Surface Soil		Surface Soil		Surface Soil		Surface Soil		Surface Soil		Surface Soil		Surface Soil	
SAMPLE DATE:	02/20/97		02/20/97		02/26/97		02/26/97		02/26/97		02/27/97		02/27/97		02/27/97		02/27/97	
VOLATILES	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
chloroform	6	U	6	U	6	U	7	U	6	U	6	U	6	U	6	U	6	U
chloromethane	13	U	12	U	13	U	13	U	13	U	12	U	12	U	12	U	12	U
cis-1,3-dichloropropene	6	U	6	U	6	U	7	U	6	U	6	U	6	U	6	U	6	U
dibromochloromethane	6	U	6	U	6	U	7	U	6	U	6	U	6	U	6	U	6	U
dichlorodifluoromethane	13	U	12	U	13	U	13	U	13	U	12	U	12	U	12	U	12	U
ethylbenzene	6	U	6	U	6	U	7	U	6	U	6	U	6	U	6	U	6	U
isopropylbenzene	6	U	6	U	6	U	7	U	6	U	6	U	6	U	6	U	6	U
methylene bromide	6	U	6	U	6	U	7	U	6	U	6	U	6	U	6	U	6	U
methylene chloride	12	B	9	B	5	B	7	U	5	B	5	J	6	U	6		6	U
n-butylbenzene	6	U	6	U	6	U	7	U	6	U	6	U	6	U	6	U	6	U
n-propylbenzene	6	U	6	U	6	U	7	U	6	U	6	U	6	U	6	U	6	U
o-chlorotoluene	6	U	6	U	6	U	7	U	6	U	6	U	6	U	6	U	6	U
p-isopropyltoluene	6	U	6	U	6	U	7	U	6	U	6	U	6	U	6	U	6	U
sec-butylbenzene	6	U	6	U	6	U	7	U	6	U	6	U	6	U	6	U	6	U
styrene	6	U	6	U	6	U	7	U	6	U	6	U	6	U	6	U	6	U
tert-butylbenzene	6	U	6	U	6	U	7	U	6	U	6	U	6	U	6	U	6	U
tetrachloroethene	6	U	6	U	6	U	7	U	6	U	6	U	6	U	6	U	6	U
toluene	6	U	6	U	6	U	7	U	6	U	1	J	6	U	2	J	6	U
trans-1,3-dichloropropene	6	U	6	U	6	U	7	U	6	U	6	U	6	U	6	U	6	U
trichloroethene	6	U	6	U	6	U	7	U	6	U	6	U	6	U	6	U	6	U
trichlorofluoromethane	13	U	12	U	13	U	13	U	13	U	12	U	12	U	12	U	12	U
vinyl chloride	13	U	12	U	13	U	13	U	13	U	12	U	12	U	12	U	12	U
xylene (total)	6	U	6	U	6	U	7	U	6	U	6	U	6	U	6	U	6	U

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TABLE 1

ANALYTICAL RESULTS FOR SURFACE SOIL - Site 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-SS-101		S6-SS-102		S6-SS-103		S6-SS-104		S6-SS-105		S6-SS-106		S6-SS-106-DUP		S6-SS-108		S6-SS-109	
LOCATION:	S6-SS-101		S6-SS-102		S6-SS-103		S6-SS-104		S6-SS-105		S6-SS-106		S6-SS-106		S6-SS-108		S6-SS-109	
DATA SOURCE:	Surface Soil		Surface Soil		Surface Soil		Surface Soil		Surface Soil		Surface Soil		Surface Soil		Surface Soil		Surface Soil	
SAMPLE DATE:	02/20/97		02/20/97		02/26/97		02/26/97		02/26/97		02/27/97		02/27/97		02/27/97		02/27/97	
PESTICIDES/PCBS	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
Aroclor-1016	43	U	41	U	42	U	43	U	42	U	39	U	40	U	39	U	39	U
Aroclor-1221	87	U	83	U	84	U	87	U	85	U	80	U	81	U	80	U	80	U
Aroclor-1232	43	U	41	U	42	U	43	U	42	U	39	U	40	U	39	U	39	U
Aroclor-1242	43	U	41	U	42	U	43	U	42	U	39	U	40	U	39	U	39	U
Aroclor-1248	43	U	41	U	42	U	43	U	42	U	39	U	40	U	39	U	39	U
Aroclor-1254	410		41	U	42	U	43	U	42	U	39	U	40	U	39	U	39	U
Aroclor-1260	43	U	41	U	13	J	43	U	29	J	39	U	40	U	39	U	39	U

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TABLE 1

ANALYTICAL RESULTS FOR SURFACE SOIL - Site 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-SS-110		S6-SS-110-DUP		S6-SS-112		S6-SS-113		---	---	---	---	---
LOCATION:	S6-SS-110		S6-SS-110		S6-SS-112		S6-SS-113		---	---	---	---	---
DATA SOURCE:	Surface Soil		Surface Soil		Surface Soil		Surface Soil						
SAMPLE DATE:	02/27/97		02/27/97		02/27/97		02/27/97						
INORGANICS	**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**						
aluminum	11700		12000		5940		10200						
antimony	2.5	UR	2.5	UR	5.1	L	2.5	UR					
arsenic	14.2	K	12.8	K	9.6	K	14	K					
barium	58.1		59.2		1030		64.8						
beryllium	0.65		0.68		0.39		0.8						
cadmium	2.3	J	4.3	J	18.9	J	5.8	J					
calcium	5790	J	7470	J	40000	J	20700	J					
chromium	454		508		1050		384						
cobalt	9.2		11.3		9.3		11						
copper	27.1	J	37.4	J	867	J	42.9	J					
iron	28400		33300		28600		31600						
lead	25.5	L	31.8	L	240		35.2	L					
magnesium	1800		1900		1930		7280						
manganese	234		287		708		490						
mercury	0.19		0.21		25.6		0.2						
nickel	13.4		17		29.9		22.5						
potassium	356		422		265	U	632						
selenium	5	U	5.1	U	7.1	U	5	U					
silver	18.2	J	23	J	123	J	30.3	J					
sodium	56.4		56.8		130		95.5						
thallium	7	K	7.8	K	8	K	8.6	K					
vanadium	33		34	K	13.4	K	29.6	K					
zinc	125	J	123	J	1840	J	97.5	J					

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TABLE 1

ANALYTICAL RESULTS FOR SURFACE SOIL - Site 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-SS-110		S6-SS-110-DUP		S6-SS-112		S6-SS-113		---	---	---	---	---
LOCATION:	S6-SS-110		S6-SS-110		S6-SS-112		S6-SS-113		---	---	---	---	---
DATA SOURCE:	Surface Soil		Surface Soil		Surface Soil		Surface Soil						
SAMPLE DATE:	02/27/97		02/27/97		02/27/97		02/27/97						
SEMIVOLATILES	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**						
1,2,3-trichlorobenzene	6	U	6	U	9	UJ	6	U					
1,2,4-trichlorobenzene	6	U	6	U	9	UJ	6	U					
1,2,4-trimethylbenzene	6	U	6	U	9	UJ	6	U					
1,2-dichlorobenzene	6	U	6	U	9	UJ	6	U					
1,3,5-trimethylbenzene	6	U	6	U	9	UJ	6	U					
1,3-dichlorobenzene	6	U	6	U	9	UJ	6	U					
1,4-dichlorobenzene	6	U	6	U	9	UJ	6	U					
2,2'-oxybis(1-chloropropane)	420	U	420	U	2900	U	420	U					
2,4,5-trichlorophenol	420	U	420	U	2900	U	420	U					
2,4,6-trichlorophenol	420	U	420	U	2900	U	420	U					
2,4-dichlorophenol	420	U	420	U	2900	U	420	U					
2,4-dimethylphenol	420	U	420	U	2900	U	420	U					
2,4-dinitrophenol	420	U	420	U	2900	U	420	U					
2,4-dinitrotoluene	420	U	420	U	2900	U	420	U					
2,6-dinitrotoluene	420	U	420	U	2900	U	420	U					
2-chlorophenol	420	U	420	U	2900	U	420	U					
2-methylnaphthalene	420	U	420	U	1100	J	420	U					
2-methylphenol	420	U	420	U	2900	U	420	U					
2-nitroaniline	420	U	420	U	2900	U	420	U					
2-nitrophenol	420	U	420	U	2900	U	420	U					
3,3'-dichlorobenzidine	420	U	420	U	2900	U	420	U					
3-nitroaniline	420	U	420	U	2900	U	420	U					
4,6-dinitro-2-methylphenol	420	U	420	U	2900	U	420	U					
4-bromophenyl phenyl ether	420	U	420	U	2900	U	420	U					

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SAMPLE NUMBER:	S6-SS-110	S6-SS-110-DUP	S6-SS-112	S6-SS-113	---	---	---	---	---
LOCATION:	S6-SS-110	S6-SS-110	S6-SS-112	S6-SS-113	---	---	---	---	---
DATA SOURCE:	Surface Soil	Surface Soil	Surface Soil	Surface Soil					
SAMPLE DATE:	02/27/97	02/27/97	02/27/97	02/27/97					
SEMIVOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**					
4-chloro-3-methylphenol	420 U	420 U	2900 U	420 U					
4-chloroaniline	420 U	420 U	2900 U	420 U					
4-chlorophenyl phenyl ether	420 U	420 U	2900 U	420 U					
4-methylphenol	420 U	420 U	2900 U	420 U					
4-nitroaniline	420 U	420 U	2900 U	420 U					
4-nitrophenol	420 U	420 U	2900 U	420 U					
N-nitroso-di-n-propylamine	420 U	420 U	2900 U	420 U					
N-nitrosodiphenylamine	420 U	420 U	2900 U	420 U					
acenaphthene	420 U	420 U	4100	420 U					
acenaphthylene	420 U	420 U	2900 U	420 U					
anthracene	420 U	420 U	6000	420 U					
benz(a)anthracene	420 U	420 U	13000	110 J					
benzo(a)pyrene	420 U	420 U	11000	130 J					
benzo(b)fluoranthene	420 U	420 U	13000	120 J					
benzo(g,h,i)perylene	420 U	420 U	3700	59 J					
benzo(k)fluoranthene	420 U	420 U	7900	360 J					
benzoic acid	420 U	420 U	2900 UJ	420 U					
benzyl alcohol	420 U	420 U	2900 U	420 U					
beta-chloronaphthalene	420 U	420 U	2900 U	420 U					
bis(2-chloroethoxy)methane	420 U	420 U	2900 U	420 U					
bis(2-chloroethyl)ether	420 U	420 U	2900 U	420 U					
bis(2-ethylhexyl)phthalate	420 U	420 U	2700 J	420 U					
butylbenzylphthalate	420 U	420 U	700 J	420 U					
chrysene	420 U	420 U	14000	110 J					
di-n-butylphthalate	420 U	420 U	2900 U	420 U					

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NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-SS-110		S6-SS-110-DUP		S6-SS-112		S6-SS-113		---	---	---	---	---
LOCATION:	S6-SS-110		S6-SS-110		S6-SS-112		S6-SS-113		---	---	---	---	---
DATA SOURCE:	Surface Soil		Surface Soil		Surface Soil		Surface Soil						
SAMPLE DATE:	02/27/97		02/27/97		02/27/97		02/27/97						
SEMIVOLATILES	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**						
di-n-octylphthalate	420	U	420	U	2900	U	420	U					
dibenz(a,h)anthracene	420	U	420	U	1200	J	420	U					
dibenzofuran	420	U	420	U	2100	J	420	U					
diethylphthalate	420	U	420	U	2900	U	420	U					
dimethylphthalate	420	U	420	U	2900	U	420	U					
fluoranthene	420	U	36	J	28000		140	J					
fluorene	420	U	420	U	2800	J	420	U					
hexachlorobenzene	420	U	420	U	2900	U	420	U					
hexachlorobutadiene	6	U	6	U	9	UJ	6	U					
hexachlorocyclopentadiene	420	U	420	U	2900	U	420	U					
hexachloroethane	420	U	420	U	2900	U	420	U					
indeno(1,2,3-cd)pyrene	420	U	420	U	4600		66	J					
isophorone	420	U	420	U	2900	U	420	U					
naphthalene	6	U	6	U	9	UJ	6	U					
nitrobenzene	420	U	420	U	2900	U	420	U					
pentachlorophenol	420	U	420	U	2900	U	420	U					
phenanthrene	420	U	420	U	28000		420	U					
phenol	420	U	420	U	2900	U	420	U					
pyrene	420	U	420	U	25000		140	J					
VOLATILES	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**						
1,1,1,2-tetrachloroethane	6	U	6	U	9	UJ	6	U					
1,1,1-trichloroethane	6	U	6	U	9	UJ	6	U					
1,1,2,2-tetrachloroethane	6	U	6	U	9	UJ	6	U					
1,1,2-trichloroethane	6	U	6	U	9	UJ	6	U					
1,1-dichloroethane	6	U	6	U	9	UJ	6	U					

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NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-SS-110		S6-SS-110-DUP		S6-SS-112		S6-SS-113		---	---	---	---	---
LOCATION:	S6-SS-110		S6-SS-110		S6-SS-112		S6-SS-113		---	---	---	---	---
DATA SOURCE:	Surface Soil		Surface Soil		Surface Soil		Surface Soil						
SAMPLE DATE:	02/27/97		02/27/97		02/27/97		02/27/97						
VOLATILES	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**						
1,1-dichloroethene	6	U	6	U	9	UJ	6	U					
1,1-dichloropropene	6	U	6	U	9	UJ	6	U					
1,2,3-trichloropropane	6	U	6	U	9	UJ	6	U					
1,2-dibromo-3-chloropropane	13	U	13	U	18	UJ	13	U					
1,2-dibromoethane	6	U	6	U	9	UJ	6	U					
1,2-dichloroethane	6	U	6	U	9	UJ	6	U					
1,2-dichloroethene (total)	6	U	6	U	9	UJ	6	U					
1,2-dichloropropane	6	U	6	U	9	UJ	6	U					
1,3-dichloropropane	6	U	6	U	9	UJ	6	U					
2,2-dichloropropane	6	U	6	U	9	UJ	6	U					
2-butanone	63	U	63	U	88	UJ	63	U					
2-hexanone	25	U	25	U	35	UJ	25	U					
4-chlorotoluene	6	U	6	U	9	UJ	6	U					
4-methyl-2-pentanone	25	U	25	U	35	UJ	25	U					
acetone	63	UJ	63	UJ	88	UJ	63	UJ					
benzene	6	U	6	U	9	UJ	6	U					
bromobenzene	6	U	6	U	9	UJ	6	U					
bromochloromethane	6	U	6	U	9	UJ	6	U					
bromodichloromethane	6	U	6	U	9	UJ	6	U					
bromoform	6	U	6	U	9	UJ	6	U					
bromomethane	13	U	13	U	18	UJ	13	U					
carbon disulfide	6	U	6	U	9	UJ	6	U					
carbon tetrachloride	6	U	6	U	9	UJ	6	U					
chlorobenzene	6	U	6	U	9	UJ	6	U					
chloroethane	13	U	13	U	18	UJ	13	U					

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NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-SS-110		S6-SS-110-DUP		S6-SS-112		S6-SS-113		---	---	---	---	---
LOCATION:	S6-SS-110		S6-SS-110		S6-SS-112		S6-SS-113		---	---	---	---	---
DATA SOURCE:	Surface Soil		Surface Soil		Surface Soil		Surface Soil						
SAMPLE DATE:	02/27/97		02/27/97		02/27/97		02/27/97						
VOLATILES	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**						
chloroform	6	U	6	U	9	UJ	6	U					
chloromethane	13	U	13	U	18	UJ	13	U					
cis-1,3-dichloropropene	6	U	6	U	9	UJ	6	U					
dibromochloromethane	6	U	6	U	9	UJ	6	U					
dichlorodifluoromethane	13	U	13	U	18	UJ	13	U					
ethylbenzene	6	U	6	U	9	UJ	6	U					
isopropylbenzene	6	U	6	U	9	UJ	6	U					
methylene bromide	6	U	6	U	9	UJ	6	U					
methylene chloride	6	U	6	U	9	UJ	6	U					
n-butylbenzene	6	U	6	U	9	UJ	6	U					
n-propylbenzene	6	U	6	U	9	UJ	6	U					
o-chlorotoluene	6	U	6	U	9	UJ	6	U					
p-isopropyltoluene	6	U	6	U	9	UJ	6	U					
sec-butylbenzene	6	U	6	U	9	UJ	6	U					
styrene	6	U	6	U	9	UJ	6	U					
tert-butylbenzene	6	U	6	U	9	UJ	6	U					
tetrachloroethene	6	U	6	U	9	UJ	6	U					
toluene	6	U	6	U	9	UJ	6	U					
trans-1,3-dichloropropene	6	U	6	U	9	UJ	6	U					
trichloroethene	6	U	6	U	9	UJ	6	U					
trichlorofluoromethane	13	U	13	U	18	UJ	13	U					
vinyl chloride	13	U	13	U	18	UJ	13	U					
xylene (total)	6	U	6	U	9	UJ	6	U					

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ANALYTICAL RESULTS FOR SURFACE SOIL - Site 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-SS-110		S6-SS-110-DUP		S6-SS-112		S6-SS-113		---	---	---	---	---
LOCATION:	S6-SS-110		S6-SS-110		S6-SS-112		S6-SS-113		---	---	---	---	---
DATA SOURCE:	Surface Soil		Surface Soil		Surface Soil		Surface Soil						
SAMPLE DATE:	02/27/97		02/27/97		02/27/97		02/27/97						
PESTICIDES/PCBS	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**						
Aroclor-1016	42	U	42	U	290	U	42	U					
Aroclor-1221	84	U	85	U	590	U	84	U					
Aroclor-1232	42	U	42	U	290	U	42	U					
Aroclor-1242	42	U	42	U	290	U	42	U					
Aroclor-1248	42	U	42	U	290	U	42	U					
Aroclor-1254	42	U	42	U	290	U	42	U					
Aroclor-1260	84		89		1000	K	66	K					

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SITES 6 AND 7
SUBSURFACE SOIL DATA

TABLE 2

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-SB-2702		S6-SB-2705		S6-SB-2802		S6-SB-2804		S6-TP08-01		S6-SB-3303		S6-SB-3403		S6-SB-06-01		S6-SB-06-02	
LOCATION:	S6-SB-2702		S6-SB-2705		S6-SB-2802		S6-SB-2804		S6-TP08-01		S6-SB-3303		S6-SB-3403		S6-SB-06-01		S6-SB-06-02	
DATA SOURCE:	Depression		Depression		Depression		Depression		Depression		Mound		Mound		Not Assoc.		Not Assoc.	
SAMPLE DATE:	02/26/97		02/26/97		02/26/97		02/26/97				02/26/97		02/26/97					
INORGANICS	**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**	
aluminum	12300		14200		13600		10400		3940		8550		9500		15000		12000	
antimony	2.4	UL	2.4	UL	2.5	UL	2.3	UL	164		2.2	UL	2.4	UL	10.2	U	9.9	U
arsenic	10	K	9.9	K	12.4	K	4	K	3.5		7.3	K	6.6	K	7.1	J	3.9	U
barium	93.7		60.1		38.2		24.8		384		43		50.8		46.1	U	62.8	U
beryllium	1.6		1.7		0.85		0.61		0.33	U	1.2		1.5		1	U	1.2	U
cadmium	0.61	U	0.6	U	0.63	U	0.58	U	38.2		0.56	U	0.6	U	1.9	U	2	U
calcium	938	J	1200	J	1080	J	465	J	116000		42700	J	54900	J	3650	U	38500	
chromium	14.5	J	12	J	52.9	J	8	J	7140		13.3		12.8		23.1	K	20.4	K
cobalt	8.4	J	15.1	J	8.6	J	8	J	50	L	7.9		8.6		9.8	U	9.1	U
copper	10.5		26.8		13		5.3		534		16.6		15.6		13.3	U	17	U
cyanide	n/a		n/a		n/a		n/a		n/a		n/a		n/a		1.4	U	1.8	U
iron	15200		17200		23700		9580		230000		16700	J	17500	J	22200		20000	
lead	25.1		10.2		13.7		3.3	K	104		8.7		11.9		19		15.8	
magnesium	1590	J	2580	J	2160	J	646	J	3490		26300		29500		3630	U	23700	
manganese	814	J	561	J	250	J	409	J	849		459	J	614	J	338		504	
mercury	0.12	U	0.12	U	0.13	U	0.12	U	5.2		0.11	U	0.12	U	0.12	U	0.1	U
nickel	11.9	K	16.4	K	12.9	K	8	K	108		13.5	K	13.8	K	11		10.9	
potassium	566		1330		621		215		207		796		591		895		988	
selenium	4.9	U	4.8	U	5	U	4.6	U	1.3	U	4.5	U	4.8	U	1	U	0.98	U
silver	0.63	J	0.67	J	2.5	J	0.58	U	330		0.69	K	0.65	K	2.1	U	2	U
sodium	75.7		81		90.6		89.8		83.3	U	97		116		649	U	552	U
thallium	3.7	UJ	3.6	UJ	3.8	UJ	3.5	UJ	1.3	U	3.4	UJ	3.6	UJ	0.42	U	0.39	U
vanadium	23.4		19.8		37.3		13.4		0.67	U	25.8		25.9		31.8		29.1	
zinc	44	J	38	J	35.2	J	13.1	J	360		50	J	45.4	J	34.7	U	48.1	U

NOTES:

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- U -- Value is a non-detected result as reported by the laboratory.
- UJ -- Non-detected result is considered estimated due to exceedance of technical quality control criteria.
- UL -- Non-detected result is considered biased low due to exceedance of technical quality control criteria.
- UR -- Non-detected result is considered unusable due to exceedance of technical quality control criteria.
- L -- Positive result is considered biased low due to exceedance of technical quality control criteria.
- K -- Positive result is considered biased high due to exceedance of technical quality control criteria.
- B -- Positive result is considered to be an artifact of blank contamination, and should not be considered present.
- R -- Positive result is considered unusable due to exceedance of technical quality control criteria.

TABLE 2

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-SB-2702	S6-SB-2705	S6-SB-2802	S6-SB-2804	S6-TP08-01	S6-SB-3303	S6-SB-3403	S6-SB-06-01	S6-SB-06-02
LOCATION:	S6-SB-2702	S6-SB-2705	S6-SB-2802	S6-SB-2804	S6-TP08-01	S6-SB-3303	S6-SB-3403	S6-SB-06-01	S6-SB-06-02
DATA SOURCE:	Depression	Depression	Depression	Depression	Depression	Mound	Mound	Not Assoc.	Not Assoc.
SAMPLE DATE:	02/26/97	02/26/97	02/26/97	02/26/97		02/26/97	02/26/97		
SEMIVOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
1,2,3-trichlorobenzene	6 U	6 U	6 U	6 U	n/a	6 U	6 U	n/a	n/a
1,2,4-trichlorobenzene	6 U	6 U	6 U	6 U	n/a	6 U	6 U	380 U	370 U
1,2,4-trimethylbenzene	6 U	6 U	6 U	6 U	n/a	6 U	6 U	n/a	n/a
1,2-dichlorobenzene	6 U	6 U	6 U	6 U	n/a	6 U	6 U	380 U	370 U
1,3,5-trimethylbenzene	6 U	6 U	6 U	6 U	n/a	6 U	6 U	n/a	n/a
1,3-dichlorobenzene	6 U	6 U	6 U	6 U	n/a	6 U	6 U	380 U	370 U
1,4-dichlorobenzene	6 U	6 U	6 U	6 U	n/a	6 U	6 U	380 U	370 U
2,2'-oxybis(1-chloropropane)	400 U	390 U	410 U	380 U	n/a	370 U	400 U	380 U	370 U
2,4,5-trichlorophenol	400 U	390 U	410 U	380 U	n/a	370 U	400 U	920 U	900 U
2,4,6-trichlorophenol	400 U	390 U	410 U	380 U	n/a	370 U	400 U	380 U	370 U
2,4-dichlorophenol	400 U	390 U	410 U	380 U	n/a	370 U	400 U	380 U	370 U
2,4-dimethylphenol	400 U	390 U	410 U	380 U	n/a	370 U	400 U	380 U	370 U
2,4-dinitrophenol	400 U	390 U	410 U	380 U	n/a	370 U	400 U	920 U	900 U
2,4-dinitrotoluene	400 U	390 U	410 U	380 U	n/a	370 U	400 U	380 U	370 U
2,6-dinitrotoluene	400 U	390 U	410 U	380 U	n/a	370 U	400 U	380 U	370 U
2-chlorophenol	400 U	390 U	410 U	380 U	n/a	370 U	400 U	380 U	370 U
2-methylnaphthalene	400 U	390 U	410 U	380 U	n/a	370 U	400 U	380 U	370 U
2-methylphenol	400 U	390 U	410 U	380 U	n/a	370 U	400 U	380 U	370 U
2-nitroaniline	400 U	390 U	410 U	380 U	n/a	370 U	400 U	920 U	900 U
2-nitrophenol	400 U	390 U	410 U	380 U	n/a	370 U	400 U	380 U	370 U
3,3'-dichlorobenzidine	400 U	390 U	410 U	380 U	n/a	370 U	400 U	380 U	370 U
3-nitroaniline	400 U	390 U	410 U	380 U	n/a	370 U	400 U	920 U	900 U
4,6-dinitro-2-methylphenol	400 U	390 U	410 U	380 U	n/a	370 U	400 U	920 U	900 U
4-bromophenyl phenyl ether	400 U	390 U	410 U	380 U	n/a	370 U	400 U	380 U	370 U

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UJ -- Non-detected result is considered estimated due to exceedance of technical quality control criteria.
UL -- Non-detected result is considered biased low due to exceedance of technical quality control criteria.
UR -- Non-detected result is considered unusable due to exceedance of technical quality control criteria.
L -- Positive result is considered biased low due to exceedance of technical quality control criteria.
K -- Positive result is considered biased high due to exceedance of technical quality control criteria.
B -- Positive result is considered to be an artifact of blank contamination, and should not be considered present.
R -- Positive result is considered unusable due to exceedance of technical quality control criteria.

TABLE 2

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-SB-2702	S6-SB-2705	S6-SB-2802	S6-SB-2804	S6-TP08-01	S6-SB-3303	S6-SB-3403	S6-SB-06-01	S6-SB-06-02
LOCATION:	S6-SB-2702	S6-SB-2705	S6-SB-2802	S6-SB-2804	S6-TP08-01	S6-SB-3303	S6-SB-3403	S6-SB-06-01	S6-SB-06-02
DATA SOURCE:	Depression	Depression	Depression	Depression	Depression	Mound	Mound	Not Assoc.	Not Assoc.
SAMPLE DATE:	02/26/97	02/26/97	02/26/97	02/26/97		02/26/97	02/26/97		
SEMIVOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
4-chloro-3-methylphenol	400 U	390 U	410 U	380 U	n/a	370 U	400 U	380 U	370 U
4-chloroaniline	400 U	390 U	410 U	380 U	n/a	370 U	400 U	380 U	370 U
4-chlorophenyl phenyl ether	400 U	390 U	410 U	380 U	n/a	370 U	400 U	380 U	370 U
4-methylphenol	400 U	390 U	410 U	380 U	n/a	370 U	400 U	380 U	370 U
4-nitroaniline	400 U	390 U	410 U	380 U	n/a	370 U	400 U	920 U	900 U
4-nitrophenol	400 U	390 U	410 U	380 U	n/a	370 U	400 U	920 U	900 U
N-nitroso-di-n-propylamine	400 U	390 U	410 U	380 U	n/a	370 U	400 U	380 U	370 U
N-nitrosodiphenylamine	400 U	390 U	410 U	380 U	n/a	370 U	400 U	380 U	370 U
acenaphthene	400 U	390 U	410 U	380 U	n/a	370 U	400 U	380 U	370 U
acenaphthylene	400 U	390 U	410 U	380 U	n/a	370 U	400 U	380 U	370 U
anthracene	400 U	390 U	410 U	380 U	n/a	79 J	400 U	380 U	370 U
benz(a)anthracene	400 U	390 U	410 U	380 U	n/a	470	240 J	380 U	48 J
benzo(a)pyrene	400 U	390 U	410 U	380 U	n/a	620 J	300 J	380 U	75 J
benzo(b)fluoranthene	400 U	390 U	410 U	380 U	n/a	760 J	340 J	380 U	82 J
benzo(g,h,i)perylene	400 U	390 U	410 U	380 U	n/a	210 J	120 J	380 U	370 U
benzo(k)fluoranthene	400 U	390 U	410 U	380 U	n/a	480 J	280 J	380 U	370 U
benzoic acid	400 U	390 U	410 U	380 U	n/a	370 U	400 U	n/a	n/a
benzyl alcohol	400 U	390 U	410 U	380 U	n/a	370 U	400 U	n/a	n/a
beta-chloronaphthalene	400 U	390 U	410 U	380 U	n/a	370 U	400 U	380 U	370 U
bis(2-chloroethoxy)methane	400 U	390 U	410 U	380 U	n/a	370 U	400 U	380 U	370 U
bis(2-chloroethyl)ether	400 U	390 U	410 U	380 U	n/a	370 U	400 U	380 U	370 U
bis(2-ethylhexyl)phthalate	400 U	390 U	410 U	380 U	n/a	370 U	400 U	380 U	370 U
butylbenzylphthalate	400 U	390 U	410 U	380 U	n/a	370 U	400 U	380 U	370 U
carbazole	n/a	n/a	n/a	n/a	n/a	n/a	n/a	380 U	370 U
chrysene	400 U	390 U	410 U	380 U	n/a	460	250 J	380 U	59 J

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- UR -- Non-detected result is considered unusable due to exceedance of technical quality control criteria.
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- B -- Positive result is considered to be an artifact of blank contamination, and should not be considered present.
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TABLE 2

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-SB-2702	S6-SB-2705	S6-SB-2802	S6-SB-2804	S6-TP08-01	S6-SB-3303	S6-SB-3403	S6-SB-06-01	S6-SB-06-02
LOCATION:	S6-SB-2702	S6-SB-2705	S6-SB-2802	S6-SB-2804	S6-TP08-01	S6-SB-3303	S6-SB-3403	S6-SB-06-01	S6-SB-06-02
DATA SOURCE:	Depression	Depression	Depression	Depression	Depression	Mound	Mound	Not Assoc.	Not Assoc.
SAMPLE DATE:	02/26/97	02/26/97	02/26/97	02/26/97		02/26/97	02/26/97		
SEMIVOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
di-n-butylphthalate	400 U	109 J	410 U	380 U	n/a	370 U	400 U	380 U	370 U
di-n-octylphthalate	400 U	390 U	410 U	380 U	n/a	370 UJ	400 U	380 U	370 U
dibenz(a,h)anthracene	400 U	390 U	410 U	380 U	n/a	66 J	400 U	380 U	370 U
dibenzofuran	400 U	390 U	410 U	380 U	n/a	370 U	400 U	380 U	370 U
diethylphthalate	400 U	390 U	410 U	380 U	n/a	370 U	400 U	380 U	370 U
dimethylphthalate	400 U	390 U	410 U	380 U	n/a	370 U	400 U	380 U	370 U
fluoranthene	400 U	390 U	410 U	380 U	n/a	790	310 J	380 U	57 J
fluorene	400 U	390 U	410 U	380 U	n/a	370 U	400 U	380 U	370 U
hexachlorobenzene	400 U	390 U	410 U	380 U	n/a	370 U	400 U	380 U	370 U
hexachlorobutadiene	6 U	6 U	6 U	6 U	n/a	6 U	6 U	380 U	370 U
hexachlorocyclopentadiene	400 U	390 U	410 U	380 U	n/a	370 U	400 U	380 U	370 U
hexachloroethane	400 U	390 U	410 U	380 U	n/a	370 U	400 U	380 U	370 U
indeno(1,2,3-cd)pyrene	400 U	390 U	410 U	380 U	n/a	190 J	130 J	380 U	370 U
isophorone	400 U	390 U	410 U	380 U	n/a	370 U	400 U	380 U	370 U
naphthalene	6 U	6 U	6 U	6 U	n/a	6 U	6 U	380 U	370 U
nitrobenzene	400 U	390 U	410 U	380 U	n/a	370 U	400 U	380 U	370 U
pentachlorophenol	400 U	390 U	410 U	380 U	n/a	370 U	400 U	920 U	900 U
phenanthrene	400 U	390 U	410 U	380 U	n/a	220 J	92 J	380 U	370 U
phenol	400 U	390 U	410 U	380 U	n/a	370 U	400 U	380 U	370 U
pyrene	400 U	390 U	410 U	380 U	n/a	900	360 J	380 U	73 J
VOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
1,1,1,2-tetrachloroethane	6 U	6 U	6 U	6 U	n/a	6 U	6 U	n/a	n/a
1,1,1-trichloroethane	6 U	6 U	6 U	6 U	18 U	6 U	6 U	11 U	11 U
1,1,2,2-tetrachloroethane	6 U	6 U	6 U	6 U	18 U	6 U	6 U	11 U	11 U
1,1,2-trichloroethane	6 U	6 U	6 U	6 U	18 U	6 U	6 U	11 U	11 U

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- UL -- Non-detected result is considered biased low due to exceedance of technical quality control criteria.
- UR -- Non-detected result is considered unusable due to exceedance of technical quality control criteria.
- L -- Positive result is considered biased low due to exceedance of technical quality control criteria.
- K -- Positive result is considered biased high due to exceedance of technical quality control criteria.
- B -- Positive result is considered to be an artifact of blank contamination, and should not be considered present.
- R -- Positive result is considered unusable due to exceedance of technical quality control criteria.

TABLE 2

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-SB-2702	S6-SB-2705	S6-SB-2802	S6-SB-2804	S6-TP08-01	S6-SB-3303	S6-SB-3403	S6-SB-06-01	S6-SB-06-02
LOCATION:	S6-SB-2702	S6-SB-2705	S6-SB-2802	S6-SB-2804	S6-TP08-01	S6-SB-3303	S6-SB-3403	S6-SB-06-01	S6-SB-06-02
DATA SOURCE:	Depression	Depression	Depression	Depression	Depression	Mound	Mound	Not Assoc.	Not Assoc.
SAMPLE DATE:	02/26/97	02/26/97	02/26/97	02/26/97		02/26/97	02/26/97		
VOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
1,1-dichloroethane	6 U	6 U	6 U	6 U	18 U	6 U	6 U	11 U	11 U
1,1-dichloroethene	6 U	6 U	6 U	6 U	18 U	6 U	6 U	11 U	11 U
1,1-dichloropropene	6 U	6 U	6 U	6 U	n/a	6 U	6 U	n/a	n/a
1,2,3-trichloropropane	6 U	6 U	6 U	6 U	n/a	6 U	6 U	n/a	n/a
1,2-dibromo-3-chloropropane	12 U	12 U	13 U	12 U	n/a	11 U	12 U	n/a	n/a
1,2-dibromoethane	6 U	6 U	6 U	6 U	n/a	6 U	6 U	n/a	n/a
1,2-dichloroethane	6 U	6 U	6 U	6 U	18 U	6 U	6 U	11 U	11 U
1,2-dichloroethene (total)	6 U	6 U	6 U	6 U	18 U	6 U	6 U	11 U	11 U
1,2-dichloropropane	6 U	6 U	6 U	6 U	18 U	6 U	6 U	11 U	11 U
1,3-dichloropropane	6 U	6 U	6 U	6 U	n/a	6 U	6 U	n/a	n/a
2,2-dichloropropane	6 U	6 U	6 U	6 U	n/a	6 U	6 U	n/a	n/a
2-butanone	61 U	60 U	63 U	58 U	18 U	56 U	60 U	11 U	11 U
2-hexanone	24 U	24 U	25 U	23 U	18 U	22 U	24 U	11 U	11 U
4-chlorotoluene	6 U	6 U	6 U	6 U	n/a	6 U	6 U	n/a	n/a
4-methyl-2-pentanone	24 U	24 U	25 U	23 U	18 U	22 U	24 U	11 U	11 U
acetone	61 U	60 U	63 U	58 U	18 U	56 U	60 U	11 U	11 U
benzene	6 U	6 U	6 U	6 U	18 U	6 U	6 U	11 U	11 U
bromobenzene	6 U	6 U	6 U	6 U	n/a	6 U	6 U	n/a	n/a
bromochloromethane	6 U	6 U	6 U	6 U	n/a	6 U	6 U	n/a	n/a
bromodichloromethane	6 U	6 U	6 U	6 U	18 U	6 U	6 U	11 U	11 U
bromoform	6 U	6 U	6 U	6 U	18 U	6 U	6 U	11 U	11 U
bromomethane	12 U	12 U	13 U	12 U	18 U	11 U	12 U	11 U	11 U
carbon disulfide	6 U	6 U	6 U	6 U	18 U	6 U	6 U	11 U	2 J
carbon tetrachloride	6 U	6 U	6 U	6 U	18 U	6 U	6 U	11 U	11 U
chlorobenzene	6 U	6 U	6 U	6 U	18 U	6 U	6 U	11 U	11 U

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- UR -- Non-detected result is considered unusable due to exceedance of technical quality control criteria.
- L -- Positive result is considered biased low due to exceedance of technical quality control criteria.
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- B -- Positive result is considered to be an artifact of blank contamination, and should not be considered present.
- R -- Positive result is considered unusable due to exceedance of technical quality control criteria.

TABLE 2

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-SB-2702	S6-SB-2705	S6-SB-2802	S6-SB-2804	S6-TP08-01	S6-SB-3303	S6-SB-3403	S6-SB-06-01	S6-SB-06-02
LOCATION:	S6-SB-2702	S6-SB-2705	S6-SB-2802	S6-SB-2804	S6-TP08-01	S6-SB-3303	S6-SB-3403	S6-SB-06-01	S6-SB-06-02
DATA SOURCE:	Depression	Depression	Depression	Depression	Depression	Mound	Mound	Not Assoc.	Not Assoc.
SAMPLE DATE:	02/26/97	02/26/97	02/26/97	02/26/97		02/26/97	02/26/97		
VOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
chloroethane	12 U	12 U	13 U	12 U	18 U	11 U	12 U	11 U	11 U
chloroform	6 U	6 U	6 U	6 U	18 U	6 U	6 U	11 U	11 U
chloromethane	12 U	12 U	13 U	12 U	18 U	11 U	12 U	11 U	11 U
cis-1,3-dichloropropene	6 U	6 U	6 U	6 U	18 U	6 U	6 U	11 U	11 U
dibromochloromethane	6 U	6 U	6 U	6 U	18 U	6 U	6 U	11 U	11 U
dichlorodifluoromethane	12 U	12 U	13 U	12 U	n/a	11 U	12 U	n/a	n/a
ethylbenzene	6 U	6 U	6 U	6 U	18 U	6 U	6 U	11 U	11 U
isopropylbenzene	6 U	6 U	6 U	6 U	n/a	6 U	6 U	n/a	n/a
methylene bromide	6 U	6 U	6 U	6 U	n/a	6 U	6 U	n/a	n/a
methylene chloride	5 B	10 B	6 B	6 B	18 U	6 U	6 U	11 U	11 U
n-butylbenzene	6 U	6 U	6 U	6 U	n/a	6 U	6 U	n/a	n/a
n-propylbenzene	6 U	6 U	6 U	6 U	n/a	6 U	6 U	n/a	n/a
o-chlorotoluene	6 U	6 U	6 U	6 U	n/a	6 U	6 U	n/a	n/a
p-isopropyltoluene	6 U	6 U	6 U	6 U	n/a	6 U	6 U	n/a	n/a
sec-butylbenzene	6 U	6 U	6 U	6 U	n/a	6 U	6 U	n/a	n/a
styrene	6 U	6 U	6 U	6 U	18 U	6 U	6 U	11 U	11 U
tert-butylbenzene	6 U	6 U	6 U	6 U	n/a	6 U	6 U	n/a	n/a
tetrachloroethene	6 U	6 U	6 U	6 U	18 U	6 U	6 U	10 U	6 U
toluene	6 U	6 U	6 U	6 U	18 U	6 U	6 U	11 U	11 U
trans-1,3-dichloropropene	6 U	6 U	6 U	6 U	18 U	6 U	6 U	11 U	11 U
trichloroethene	6 U	6 U	6 U	6 U	18 U	6 U	6 U	11 U	11 U
trichlorofluoromethane	12 U	12 U	13 U	12 U	n/a	11 U	12 U	n/a	n/a
vinyl chloride	12 U	12 U	13 U	12 U	18 U	11 U	12 U	11 U	11 U
xylene (total)	6 U	6 U	6 U	6 U	18 U	6 U	6 U	11 U	11 U

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TABLE 2

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-SB-2702	S6-SB-2705	S6-SB-2802	S6-SB-2804	S6-TP08-01	S6-SB-3303	S6-SB-3403	S6-SB-06-01	S6-SB-06-02
LOCATION:	S6-SB-2702	S6-SB-2705	S6-SB-2802	S6-SB-2804	S6-TP08-01	S6-SB-3303	S6-SB-3403	S6-SB-06-01	S6-SB-06-02
DATA SOURCE:	Depression	Depression	Depression	Depression	Depression	Mound	Mound	Not Assoc.	Not Assoc.
SAMPLE DATE:	02/26/97	02/26/97	02/26/97	02/26/97		02/26/97	02/26/97		
PESTICIDES/PCBS	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
4,4'-DDD	n/a	n/a	n/a	n/a	n/a	n/a	n/a	3.8 U	3.7 U
4,4'-DDE	n/a	n/a	n/a	n/a	n/a	n/a	n/a	3.8 U	3.7 U
4,4'-DDT	n/a	n/a	n/a	n/a	n/a	n/a	n/a	3.8 U	3.7 U
Aroclor-1016	40 U	39 U	41 U	38 U	n/a	74 U	80 U	38 U	37 U
Aroclor-1221	82 U	80 U	84 U	78 U	n/a	150 U	160 U	76 U	75 U
Aroclor-1232	40 U	39 U	41 U	38 U	n/a	74 U	80 U	38 U	37 U
Aroclor-1242	40 U	39 U	41 U	38 U	n/a	74 U	80 U	38 U	37 U
Aroclor-1248	40 U	39 U	41 U	38 U	n/a	74 U	80 U	38 U	37 U
Aroclor-1254	40 U	39 U	41 U	38 U	n/a	74 U	80 U	38 U	37 U
Aroclor-1260	40 U	39 U	41 U	38 U	n/a	74 U	80 U	38 U	37 U
aldrin	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1.9 U	1.9 U
alpha-BHC	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1.9 U	1.9 U
alpha-chlordane	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1.9 U	1.9 U
beta-BHC	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1.9 U	1.9 U
delta-BHC	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1.9 U	1.9 U
dieldrin	n/a	n/a	n/a	n/a	n/a	n/a	n/a	3.8 U	3.7 U
endosulfan I	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1.9 U	1.9 U
endosulfan II	n/a	n/a	n/a	n/a	n/a	n/a	n/a	3.8 U	3.7 U
endosulfan sulfate	n/a	n/a	n/a	n/a	n/a	n/a	n/a	3.8 U	3.7 U
endrin	n/a	n/a	n/a	n/a	n/a	n/a	n/a	3.8 U	3.7 U
endrin aldehyde	n/a	n/a	n/a	n/a	n/a	n/a	n/a	3.8 U	3.7 U
endrin ketone	n/a	n/a	n/a	n/a	n/a	n/a	n/a	3.8 U	3.7 U
gamma-BHC (Lindane)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1.9 U	1.9 U
gamma-chlordane	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1.9 U	1.9 U

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TABLE 2

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-SB-2702	S6-SB-2705	S6-SB-2802	S6-SB-2804	S6-TP08-01	S6-SB-3303	S6-SB-3403	S6-SB-06-01	S6-SB-06-02
LOCATION:	S6-SB-2702	S6-SB-2705	S6-SB-2802	S6-SB-2804	S6-TP08-01	S6-SB-3303	S6-SB-3403	S6-SB-06-01	S6-SB-06-02
DATA SOURCE:	Depression	Depression	Depression	Depression	Depression	Mound	Mound	Not Assoc.	Not Assoc.
SAMPLE DATE:	02/26/97	02/26/97	02/26/97	02/26/97		02/26/97	02/26/97		
PESTICIDES/PCBS	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
heptachlor	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1.9 U	1.9 U
heptachlor epoxide	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1.9 U	1.9 U
methoxychlor	n/a	n/a	n/a	n/a	n/a	n/a	n/a	19 U	19 U
toxaphene	n/a	n/a	n/a	n/a	n/a	n/a	n/a	190 U	190 U

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TABLE 2

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-SB-06-03		S6-SB-2903		S6-SB-3003		S6-TP07-01		S6-SB-3404		S6-SB-3406		S6-SB-3505		S6-SB-3605		S6-SB12-02	
LOCATION:	S6-SB-06-03		S6-SB-2903		S6-SB-3003		S6-TP07-01		S6-SB-3404		S6-SB-3406		S6-SB-3505		S6-SB-3605		S6-SB12-02	
DATA SOURCE:	Not Assoc.		Not Assoc.		Not Assoc.		Not Assoc.		New Trench		New Trench		New Trench		New Trench		Southern Trench	
SAMPLE DATE:			02/26/97		02/26/97				03/11/97		03/11/97		03/11/97		03/11/97			
INORGANICS	**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**	
aluminum	14100		15000		13900		23400		8180		12200		9760		8690		14100	
antimony	12.7	U	2.5	UL	2.4	UL	7.7	U	6.2		2.5	U	3		2.7	U	9.7	UJ
arsenic	4.9	U	16.5	K	12.1	K	3.3		16.5	K	11.9	K	10.2	K	9.1	K	6.4	
barium	57.4	U	81.1		39		57		148	L	51		110		73.5		107	
beryllium	1.1	U	0.97		0.72		1.3		0.5		0.8		0.62		0.66		1.1	
cadmium	2.2	U	0.62	U	0.59	U	0.33	U	23.1		0.62	U	12		4.1		2.5	B
calcium	649	U	881	J	511	J	934		63100		2640		29600		20500		1630	
chromium	26.7	K	20.9	J	9.5	J	17.9		3900		121		2300		1720		24.9	
cobalt	8.3	U	8.4	J	9.7	J	9.7		34.9		8.4		22.4		16.7		9.3	
copper	29.1	U	10.4		9		22.8		218		16.7		114		59.4		164	
cyanide	2	U	n/a		n/a		n/a		n/a		n/a		n/a		n/a		n/a	
iron	21600		21700		13800		19500		138000		22000		64700		44100		23300	
lead	14.7		15.6		9.1	K	11.8		75.1	L	12.3	L	51.1	L	19.1	L	86.2	
magnesium	2100	U	2030	J	1120	J	1830		2660		1750		1750		1910		2130	
manganese	332		385	J	350	J	239		709		407		624		515		581	L
mercury	0.1	U	0.12	U	0.12	U	0.06	U	2.6		0.12	U	1.5		0.75		0.11	K
nickel	11.4		13.1	K	9	K	13.8	K	39.8		10.8		23.2		13		24.8	
potassium	979		470		539		838		393		403		468		382		962	
selenium	0.97	U	5	U	4.7	U	0.67	U	6.9	U	5	U	5.7	U	5.5	U	0.84	U
silver	2.2	U	0.83	J	0.79	J	0.84	U	144		6		77.7		35.7		1.8	L
sodium	579	U	87		74.6		57.2	U	116		64.1		94.7		101		84.1	B
thallium	0.39	U	3.7	J	3.6	UJ	0.67	U	51.2	K	9.8	K	30	K	21.9	K	0.84	UL
vanadium	30.4		34.9		18.2		24.5		18.2	K	31.7		18.7	K	16.1	K	73	
zinc	38.3	U	38.8	J	20.7	J	21		232	K	34.1	K	142		58.8	K	190	

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TABLE 2

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-SB-06-03	S6-SB-2903	S6-SB-3003	S6-TP07-01	S6-SB-3404	S6-SB-3406	S6-SB-3505	S6-SB-3605	S6-SB12-02
LOCATION:	S6-SB-06-03	S6-SB-2903	S6-SB-3003	S6-TP07-01	S6-SB-3404	S6-SB-3406	S6-SB-3505	S6-SB-3605	S6-SB12-02
DATA SOURCE:	Not Assoc.	Not Assoc.	Not Assoc.	Not Assoc.	New Trench	New Trench	New Trench	New Trench	Southern Trench
SAMPLE DATE:		02/26/97	02/26/97		03/11/97	03/11/97	03/11/97	03/11/97	
SEMIVOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
1,2,3-trichlorobenzene	n/a	6 U	6 U	n/a	9 U	6 U	7 U	7 U	n/a
1,2,4-trichlorobenzene	370 U	6 U	6 U	n/a	9 U	6 U	7 U	7 U	420 UJ
1,2,4-trimethylbenzene	n/a	6 U	6 U	n/a	9 U	6 U	7 U	7 U	n/a
1,2-dichlorobenzene	370 U	6 U	6 U	n/a	9 U	6 U	7 U	7 U	420 UJ
1,3,5-trimethylbenzene	n/a	6 U	6 U	n/a	9 U	6 U	7 U	7 U	n/a
1,3-dichlorobenzene	370 U	6 U	6 U	n/a	9 U	6 U	7 U	7 U	420 UJ
1,4-dichlorobenzene	370 U	6 U	6 U	n/a	9 U	6 U	7 U	7 U	420 UJ
2,2'-oxybis(1-chloropropane)	370 U	410 U	390 U	n/a	570 U	410 U	470 U	450 U	420 UJ
2,4,5-trichlorophenol	890 U	410 U	390 U	n/a	570 U	410 U	470 U	450 U	1100 UJ
2,4,6-trichlorophenol	370 U	410 U	390 U	n/a	570 U	410 U	470 U	450 U	420 UJ
2,4-dichlorophenol	370 U	410 U	390 U	n/a	570 U	410 U	470 U	450 U	420 UJ
2,4-dimethylphenol	370 U	410 U	390 U	n/a	570 U	410 U	470 U	450 U	420 UJ
2,4-dinitrophenol	890 U	410 U	390 U	n/a	570 U	410 U	470 U	450 U	1100 UJ
2,4-dinitrotoluene	370 U	410 U	390 U	n/a	570 U	410 U	470 U	450 U	420 UJ
2,6-dinitrotoluene	370 U	410 U	390 U	n/a	570 U	410 U	470 U	450 U	420 UJ
2-chlorophenol	370 U	410 U	390 U	n/a	570 U	410 U	470 U	450 U	420 UJ
2-methylnaphthalene	370 U	410 U	390 U	n/a	570 U	410 U	470 U	450 U	420 UJ
2-methylphenol	370 U	410 U	390 U	n/a	570 U	410 U	470 U	450 U	420 UJ
2-nitroaniline	890 U	410 U	390 U	n/a	570 U	410 U	470 U	450 U	1100 UJ
2-nitrophenol	370 U	410 U	390 U	n/a	570 U	410 U	470 U	450 U	420 UJ
3,3'-dichlorobenzidine	370 U	410 U	390 U	n/a	570 U	410 U	470 U	450 U	420 UJ
3-nitroaniline	890 U	410 U	390 U	n/a	570 U	410 U	470 U	450 U	1100 UJ
4,6-dinitro-2-methylphenol	890 U	410 U	390 U	n/a	570 U	410 U	470 U	450 U	1100 UJ
4-bromophenyl phenyl ether	370 U	410 U	390 U	n/a	570 U	410 U	470 U	450 U	420 UJ

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TABLE 2

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-SB-06-03	S6-SB-2903	S6-SB-3003	S6-TP07-01	S6-SB-3404	S6-SB-3406	S6-SB-3505	S6-SB-3605	S6-SB12-02
LOCATION:	S6-SB-06-03	S6-SB-2903	S6-SB-3003	S6-TP07-01	S6-SB-3404	S6-SB-3406	S6-SB-3505	S6-SB-3605	S6-SB12-02
DATA SOURCE:	Not Assoc.	Not Assoc.	Not Assoc.	Not Assoc.	New Trench	New Trench	New Trench	New Trench	Southern Trench
SAMPLE DATE:		02/26/97	02/26/97		03/11/97	03/11/97	03/11/97	03/11/97	
SEMIVOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
4-chloro-3-methylphenol	370 U	410 U	390 U	n/a	570 U	410 U	470 U	450 U	420 UJ
4-chloroaniline	370 U	410 U	390 U	n/a	570 U	410 U	470 U	450 U	420 UJ
4-chlorophenyl phenyl ether	370 U	410 U	390 U	n/a	570 U	410 U	470 U	450 U	420 UJ
4-methylphenol	370 U	410 U	390 U	n/a	570 U	410 U	470 U	450 U	420 UJ
4-nitroaniline	890 U	410 U	390 U	n/a	570 U	410 U	470 U	450 U	1100 UJ
4-nitrophenol	890 U	410 U	390 U	n/a	570 U	410 U	470 U	450 U	1100 UJ
N-nitroso-di-n-propylamine	370 U	410 U	390 U	n/a	570 U	410 U	470 U	450 U	420 UJ
N-nitrosodiphenylamine	370 U	410 U	390 U	n/a	570 U	410 U	470 U	450 U	420 UJ
acenaphthene	370 U	410 U	390 U	n/a	570 U	410 U	470 U	450 U	420 UJ
acenaphthylene	370 U	410 U	390 U	n/a	570 U	410 U	470 U	450 U	420 UJ
anthracene	370 U	410 U	390 U	n/a	570 U	410 U	470 U	450 U	420 UJ
benz(a)anthracene	370 U	410 U	390 U	n/a	42 J	410 U	170 J	450 U	420 UJ
benzo(a)pyrene	370 U	410 U	390 U	n/a	570 U	410 U	160 J	450 U	420 UJ
benzo(b)fluoranthene	370 U	410 U	390 U	n/a	570 U	410 U	260 J	450 U	420 UJ
benzo(g,h,i)perylene	370 U	410 U	390 U	n/a	570 U	410 U	93 J	450 U	420 UJ
benzo(k)fluoranthene	370 U	410 U	390 U	n/a	570 U	410 U	120 J	450 U	420 UJ
benzoic acid	n/a	410 U	390 U	n/a	570 U	410 U	470 U	450 U	n/a
benzyl alcohol	n/a	410 U	390 U	n/a	570 U	410 U	470 U	450 U	n/a
beta-chloronaphthalene	370 U	410 U	390 U	n/a	570 U	410 U	470 U	450 U	420 UJ
bis(2-chloroethoxy)methane	370 U	410 U	390 U	n/a	570 U	410 U	470 U	450 U	420 UJ
bis(2-chloroethyl)ether	370 U	410 U	390 U	n/a	570 U	410 U	470 U	450 U	420 UJ
bis(2-ethylhexyl)phthalate	370 U	410 U	390 U	n/a	470 J	410 U	370 J	450 U	420 UJ
butylbenzylphthalate	370 U	410 U	390 U	n/a	570 U	410 U	470 U	450 U	420 UJ
carbazole	370 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a	420 UJ
chrysene	370 U	410 U	390 U	n/a	78 J	410 U	200 J	450 U	420 UJ

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TABLE 2

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-SB-06-03	S6-SB-2903	S6-SB-3003	S6-TP07-01	S6-SB-3404	S6-SB-3406	S6-SB-3505	S6-SB-3605	S6-SB12-02
LOCATION:	S6-SB-06-03	S6-SB-2903	S6-SB-3003	S6-TP07-01	S6-SB-3404	S6-SB-3406	S6-SB-3505	S6-SB-3605	S6-SB12-02
DATA SOURCE:	Not Assoc.	Not Assoc.	Not Assoc.	Not Assoc.	New Trench	New Trench	New Trench	New Trench	Southern Trench
SAMPLE DATE:		02/26/97	02/26/97		03/11/97	03/11/97	03/11/97	03/11/97	
SEMIVOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
di-n-butylphthalate	370 U	410 U	390 U	n/a	570 U	410 U	470 U	450 U	44 J
di-n-octylphthalate	370 U	410 U	390 U	n/a	570 U	410 U	470 U	450 U	420 UJ
dibenz(a,h)anthracene	370 U	410 U	390 U	n/a	570 U	410 U	470 U	450 U	420 UJ
dibenzofuran	370 U	410 U	390 U	n/a	570 U	410 U	470 U	450 U	420 UJ
diethylphthalate	370 U	410 U	390 U	n/a	570 U	410 U	470 U	450 U	420 UJ
dimethylphthalate	370 U	410 U	390 U	n/a	570 U	410 U	470 U	450 U	420 UJ
fluoranthene	370 U	410 U	390 U	n/a	570 U	410 U	280 J	450 U	420 UJ
fluorene	370 U	410 U	390 U	n/a	570 U	410 U	470 U	450 U	420 UJ
hexachlorobenzene	370 U	410 U	390 U	n/a	570 U	410 U	470 U	450 U	420 UJ
hexachlorobutadiene	370 U	6 U	6 U	n/a	9 U	6 U	7 U	7 U	420 UJ
hexachlorocyclopentadiene	370 U	410 U	390 U	n/a	570 U	410 U	470 U	450 U	420 UJ
hexachloroethane	370 U	410 U	390 U	n/a	570 U	410 U	470 U	450 U	420 UJ
indeno(1,2,3-cd)pyrene	370 U	410 U	390 U	n/a	570 U	410 U	94 J	450 U	420 UJ
isophorone	370 U	410 U	390 U	n/a	570 U	410 U	470 U	450 U	420 UJ
naphthalene	370 U	6 U	6 U	n/a	9 U	6 U	7 U	7 U	420 UJ
nitrobenzene	370 U	410 U	390 U	n/a	570 U	410 U	470 U	450 U	420 UJ
pentachlorophenol	890 U	410 U	390 U	n/a	570 U	410 U	470 U	450 U	1100 UJ
phenanthrene	370 U	410 U	390 U	n/a	570 U	410 U	200 J	450 U	420 UJ
phenol	370 U	410 U	390 U	n/a	570 U	410 U	470 U	450 U	420 UJ
pyrene	370 U	410 U	390 U	n/a	570 U	410 U	320 J	450 U	420 UJ
VOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
1,1,1,2-tetrachloroethane	n/a	6 U	6 U	n/a	9 U	6 U	7 U	7 U	n/a
1,1,1-trichloroethane	12 U	6 U	6 U	12 U	9 U	6 U	7 U	7 U	12 U
1,1,2,2-tetrachloroethane	12 U	6 U	6 U	12 U	9 U	6 U	7 U	7 U	12 UJ
1,1,2-trichloroethane	12 U	6 U	6 U	12 U	9 U	6 U	7 U	7 U	12 U

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UR -- Non-detected result is considered unusable due to exceedance of technical quality control criteria.
L -- Positive result is considered biased low due to exceedance of technical quality control criteria.
K -- Positive result is considered biased high due to exceedance of technical quality control criteria.
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R -- Positive result is considered unusable due to exceedance of technical quality control criteria.

TABLE 2

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-SB-06-03	S6-SB-2903	S6-SB-3003	S6-TP07-01	S6-SB-3404	S6-SB-3406	S6-SB-3505	S6-SB-3605	S6-SB12-02
LOCATION:	S6-SB-06-03	S6-SB-2903	S6-SB-3003	S6-TP07-01	S6-SB-3404	S6-SB-3406	S6-SB-3505	S6-SB-3605	S6-SB12-02
DATA SOURCE:	Not Assoc.	Not Assoc.	Not Assoc.	Not Assoc.	New Trench	New Trench	New Trench	New Trench	Southern Trench
SAMPLE DATE:		02/26/97	02/26/97		03/11/97	03/11/97	03/11/97	03/11/97	
VOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
1,1-dichloroethane	12 U	6 U	6 U	12 U	9 U	6 U	7 U	7 U	12 U
1,1-dichloroethene	12 U	6 U	6 U	12 U	9 U	6 U	7 U	7 U	12 U
1,1-dichloropropene	n/a	6 U	6 U	n/a	9 U	6 U	7 U	7 U	n/a
1,2,3-trichloropropane	n/a	6 U	6 U	n/a	9 U	6 U	7 U	7 U	n/a
1,2-dibromo-3-chloropropane	n/a	12 U	12 U	n/a	17 U	13 U	14 U	14 U	n/a
1,2-dibromoethane	n/a	6 U	6 U	n/a	9 U	6 U	7 U	7 U	n/a
1,2-dichloroethane	12 U	6 U	6 U	12 U	9 U	6 U	7 U	7 U	12 U
1,2-dichloroethene (total)	12 U	6 U	6 U	12 U	9 U	6 U	7 U	7 U	12 U
1,2-dichloropropane	12 U	6 U	6 U	12 U	9 U	6 U	7 U	7 U	12 U
1,3-dichloropropane	n/a	6 U	6 U	n/a	9 U	6 U	7 U	7 U	n/a
2,2-dichloropropane	n/a	6 U	6 U	n/a	9 U	6 U	7 U	7 U	n/a
2-butanone	12 U	62 U	59 U	12 U	87 U	62 U	72 U	69 U	12 U
2-hexanone	12 U	25 U	24 U	12 U	35 U	25 U	29 U	28 U	12 UJ
4-chlorotoluene	n/a	6 U	6 U	n/a	9 U	6 U	7 U	7 U	n/a
4-methyl-2-pentanone	12 U	25 U	24 U	12 U	35 U	25 U	29 U	28 U	12 UJ
acetone	12 U	62 U	59 U	12 U	26 J	62 U	72 UJ	69 UJ	4 B
benzene	12 U	6 U	6 U	12 U	9 U	6 U	7 U	7 U	12 U
bromobenzene	n/a	6 U	6 U	n/a	9 U	6 U	7 U	7 U	n/a
bromochloromethane	n/a	6 U	6 U	n/a	9 U	6 U	7 U	7 U	n/a
bromodichloromethane	12 U	6 U	6 U	12 U	9 U	6 U	7 U	7 U	12 U
bromoform	12 U	6 U	6 U	12 U	9 U	6 U	7 U	7 U	12 U
bromomethane	12 U	12 U	12 U	12 U	17 U	13 U	14 U	14 U	12 U
carbon disulfide	12 U	6 U	6 U	12 U	9 U	6 U	7 U	7 U	12 U
carbon tetrachloride	12 U	6 U	6 U	12 U	9 U	6 U	7 U	7 U	12 U
chlorobenzene	12 U	6 U	6 U	12 U	9 U	6 U	7 U	7 U	12 UJ

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TABLE 2

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-SB-06-03	S6-SB-2903	S6-SB-3003	S6-TP07-01	S6-SB-3404	S6-SB-3406	S6-SB-3505	S6-SB-3605	S6-SB12-02
LOCATION:	S6-SB-06-03	S6-SB-2903	S6-SB-3003	S6-TP07-01	S6-SB-3404	S6-SB-3406	S6-SB-3505	S6-SB-3605	S6-SB12-02
DATA SOURCE:	Not Assoc.	Not Assoc.	Not Assoc.	Not Assoc.	New Trench	New Trench	New Trench	New Trench	Southern Trench
SAMPLE DATE:		02/26/97	02/26/97		03/11/97	03/11/97	03/11/97	03/11/97	
VOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
chloroethane	12 U	12 U	12 U	12 U	17 U	13 U	14 U	14 U	12 U
chloroform	12 U	6 U	6 U	12 U	9 U	6 U	7 U	7 U	12 U
chloromethane	12 U	12 U	12 U	12 U	17 U	13 U	14 U	14 U	12 U
cis-1,3-dichloropropene	12 U	6 U	6 U	12 U	9 U	6 U	7 U	7 U	12 U
dibromochloromethane	12 U	6 U	6 U	12 U	9 U	6 U	7 U	7 U	12 U
dichlorodifluoromethane	n/a	12 U	12 U	n/a	17 U	13 U	14 U	14 U	n/a
ethylbenzene	12 U	6 U	6 U	12 U	9 U	6 U	7 U	7 U	12 UJ
isopropylbenzene	n/a	6 U	6 U	n/a	9 U	6 U	7 U	7 U	n/a
methylene bromide	n/a	6 U	6 U	n/a	9 U	6 U	7 U	7 U	n/a
methylene chloride	12 U	10 B	6 U	12 U	9 U	6 U	7 U	7 U	12 U
n-butylbenzene	n/a	6 U	6 U	n/a	9 U	6 U	7 U	7 U	n/a
n-propylbenzene	n/a	6 U	6 U	n/a	9 U	6 U	7 U	7 U	n/a
o-chlorotoluene	n/a	6 U	6 U	n/a	9 U	6 U	7 U	7 U	n/a
p-isopropyltoluene	n/a	6 U	6 U	n/a	9 U	6 U	7 U	7 U	n/a
sec-butylbenzene	n/a	6 U	6 U	n/a	9 U	6 U	7 U	7 U	n/a
styrene	12 U	6 U	6 U	12 U	9 U	6 U	7 U	7 U	12 UJ
tert-butylbenzene	n/a	6 U	6 U	n/a	9 U	6 U	7 U	7 U	n/a
tetrachloroethene	12 U	6 U	6 U	12 U	9 U	6 U	7 U	4 J	12 UJ
toluene	12 U	6 U	6 U	12 U	9 U	6 U	7 U	7 U	12 UJ
trans-1,3-dichloropropene	12 U	6 U	6 U	12 U	9 U	6 U	7 U	7 U	12 U
trichloroethene	12 U	6 U	6 U	12 U	9 U	6 U	7 U	7 U	12 U
trichlorofluoromethane	n/a	12 U	12 U	n/a	17 U	13 U	14 U	14 U	n/a
vinyl chloride	12 U	12 U	12 U	12 U	17 U	13 U	14 U	14 U	12 U
xylene (total)	12 U	6 U	6 U	12 U	9 U	6 U	7 U	7 U	12 UJ

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TABLE 2

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-SB-06-03		S6-SB-2903		S6-SB-3003		S6-TP07-01	S6-SB-3404		S6-SB-3406		S6-SB-3505		S6-SB-3605		S6-SB12-02	
LOCATION:	S6-SB-06-03		S6-SB-2903		S6-SB-3003		S6-TP07-01	S6-SB-3404		S6-SB-3406		S6-SB-3505		S6-SB-3605		S6-SB12-02	
DATA SOURCE:	Not Assoc.		Not Assoc.		Not Assoc.		Not Assoc.	New Trench		New Trench		New Trench		New Trench		Southern Trench	
SAMPLE DATE:			02/26/97		02/26/97			03/11/97		03/11/97		03/11/97		03/11/97			
PESTICIDES/PCBS	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
4,4'-DDD	3.7	U	n/a		n/a		n/a	n/a		n/a		n/a		n/a		4.2	UJ
4,4'-DDE	3.7	U	n/a		n/a		n/a	n/a		n/a		n/a		n/a		4.2	UJ
4,4'-DDT	3.7	U	n/a		n/a		n/a	n/a		n/a		n/a		n/a		4.2	UJ
Aroclor-1016	37	U	41	U	39	U	n/a	120	U	41	U	240	U	45	U	42	UJ
Aroclor-1221	74	U	83	U	79	U	n/a	230	U	84	U	480	U	92	U	84	UJ
Aroclor-1232	37	U	41	U	39	U	n/a	120	U	41	U	240	U	45	U	42	UJ
Aroclor-1242	37	U	41	U	39	U	n/a	120	U	41	U	240	U	45	U	42	UJ
Aroclor-1248	37	U	41	U	39	U	n/a	120	U	41	U	240	U	45	U	42	UJ
Aroclor-1254	37	U	41	U	39	U	n/a	690	J	41	U	240	U	45	U	470	J
Aroclor-1260	37	U	41	U	39	U	n/a	500	J	16	J	260	J	58		42	UJ
aldrin	1.9	U	n/a		n/a		n/a	n/a		n/a		n/a		n/a		2.2	UJ
alpha-BHC	1.9	U	n/a		n/a		n/a	n/a		n/a		n/a		n/a		2.2	UJ
alpha-chlordane	1.9	U	n/a		n/a		n/a	n/a		n/a		n/a		n/a		2.2	UJ
beta-BHC	1.9	U	n/a		n/a		n/a	n/a		n/a		n/a		n/a		2.2	UJ
delta-BHC	1.9	U	n/a		n/a		n/a	n/a		n/a		n/a		n/a		2.2	UJ
dieldrin	3.7	U	n/a		n/a		n/a	n/a		n/a		n/a		n/a		4.8	R
endosulfan I	1.9	U	n/a		n/a		n/a	n/a		n/a		n/a		n/a		2.2	UJ
endosulfan II	3.7	U	n/a		n/a		n/a	n/a		n/a		n/a		n/a		4.2	UJ
endosulfan sulfate	3.7	U	n/a		n/a		n/a	n/a		n/a		n/a		n/a		4.2	UJ
endrin	3.7	U	n/a		n/a		n/a	n/a		n/a		n/a		n/a		27	R
endrin aldehyde	3.7	U	n/a		n/a		n/a	n/a		n/a		n/a		n/a		4.2	UJ
endrin ketone	3.7	U	n/a		n/a		n/a	n/a		n/a		n/a		n/a		4.2	UJ
gamma-BHC (Lindane)	1.9	U	n/a		n/a		n/a	n/a		n/a		n/a		n/a		2.2	UJ
gamma-chlordane	1.9	U	n/a		n/a		n/a	n/a		n/a		n/a		n/a		2.2	UJ

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TABLE 2

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-SB-06-03		S6-SB-2903	S6-SB-3003	S6-TP07-01	S6-SB-3404	S6-SB-3406	S6-SB-3505	S6-SB-3605	S6-SB12-02	
LOCATION:	S6-SB-06-03		S6-SB-2903	S6-SB-3003	S6-TP07-01	S6-SB-3404	S6-SB-3406	S6-SB-3505	S6-SB-3605	S6-SB12-02	
DATA SOURCE:	Not Assoc.		Not Assoc.	Not Assoc.	Not Assoc.	New Trench	New Trench	New Trench	New Trench	Southern Trench	
SAMPLE DATE:			02/26/97	02/26/97		03/11/97	03/11/97	03/11/97	03/11/97		
PESTICIDES/PCBS	**ug/kg**		**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	
heptachlor	1.9	U	n/a	n/a	n/a	n/a	n/a	n/a	n/a	2.2	UJ
heptachlor epoxide	1.9	U	n/a	n/a	n/a	n/a	n/a	n/a	n/a	2.2	UJ
methoxychlor	19	U	n/a	n/a	n/a	n/a	n/a	n/a	n/a	22	UJ
toxaphene	190	U	n/a	n/a	n/a	n/a	n/a	n/a	n/a	220	UJ

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ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-TP-31-05		S6-TP-31-07		S6-TP-32-05		S6-TP-32-07		S6-TP-32-09		S6-TP-33-03		S6-TP-33-05		S6-TP-33-07		S6-TP-33-09	
LOCATION:	S6-TP-31-05		S6-TP-31-07		S6-TP-32-05		S6-TP-32-07		S6-TP-32-09		S6-TP-33-03		S6-TP-33-05		S6-TP-33-07		S6-TP-33-09	
DATA SOURCE:	Southern Trench		Southern Trench		Southern Trench		Southern Trench		Southern Trench		Southern Trench		Southern Trench		Southern Trench		Southern Trench	
SAMPLE DATE:	02/19/97		02/19/97		02/19/97		02/19/97		02/19/97		02/19/97		02/19/97		02/19/97		02/19/97	
INORGANICS	**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**	
aluminum	8580		9890		9200		11800		2820		13600		9570		8800		7310	
antimony	2.4	UL	2.5	UL	2.4	UL	2.4	UL	2.4	UL	2.5	UL	2.4	UL	2.4	UL	2.4	UL
arsenic	8	J	7.9	J	7.6	J	13.8	J	4.1	J	14.3	J	7.6	J	8.4	J	8	J
barium	57.9		43.9		48.6		58.9		13.3		86.2		53.9		42.8		34.2	
beryllium	0.68		0.73		0.68		0.75		0.37		1.1		0.79		0.66		0.61	
cadmium	0.59	U	0.62	U	0.61	U	0.61	U	0.6	U	1.1		0.6	U	0.6	U	0.59	U
calcium	5850		8480		7800		2050		743		1480		8920		4970		3190	
chromium	18.9		14.8		18.6		17		6.1		20		16.1		14.4		12.7	
cobalt	7.1		6.5		7		7.4		5.9		11.9		7.8		6.8		8	
copper	19.2		14.4		16.7		9.7		9.4		97.7		16.3		23.6		16.5	
iron	16500		17800		15500		17800		7870		22800		17200		14700		14500	
lead	33.5		23.4		33.9		13.5		4.2		38.5		31.9		28.9		9.3	
magnesium	2180		2330		2400		1810		662		2500		3420		2160		1870	
manganese	320		302		343		262		167		932		400		268		340	
mercury	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U	0.13		0.12	U	0.12	U	0.12	U
nickel	10		9.1		9.6		9.7		2.9		15.8		10.3		9.5		7.7	
potassium	633		560		623		550		282		1050		883		576		508	
selenium	4.7	U	5	U	4.8	U	4.9	U	4.8	U	5	U	4.8	U	4.8	U	4.7	U
silver	1.4	K	0.67	K	0.9	K	0.63	K	0.6	U	1.6	K	0.76	K	0.81	K	0.59	U
sodium	116		96.4		137		86		88		110		199		142		153	
thallium	4.1	K	4.1	K	6.9	K	4	K	3.6	U	7.4	K	3.6	U	4.5	K	4.1	K
vanadium	25.4		25.3		25.8		29.2		11.6		37.7		26.9		24.5		22.4	
zinc	72		52.9		66.4		35.6		9.3		71.4		50.9		45.9		23.4	K

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- K -- Positive result is considered biased high due to exceedance of technical quality control criteria.
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- R -- Positive result is considered unusable due to exceedance of technical quality control criteria.

TABLE 2

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-TP-31-05	S6-TP-31-07	S6-TP-32-05	S6-TP-32-07	S6-TP-32-09	S6-TP-33-03	S6-TP-33-05	S6-TP-33-07	S6-TP-33-09
LOCATION:	S6-TP-31-05	S6-TP-31-07	S6-TP-32-05	S6-TP-32-07	S6-TP-32-09	S6-TP-33-03	S6-TP-33-05	S6-TP-33-07	S6-TP-33-09
DATA SOURCE:	Southern Trench	Southern Trench	Southern Trench	Southern Trench	Southern Trench	Southern Trench	Southern Trench	Southern Trench	Southern Trench
SAMPLE DATE:	02/19/97	02/19/97	02/19/97	02/19/97	02/19/97	02/19/97	02/19/97	02/19/97	02/19/97
SEMIVOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
1,2,3-trichlorobenzene	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
1,2,4-trichlorobenzene	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
1,2,4-trimethylbenzene	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
1,2-dichlorobenzene	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
1,3,5-trimethylbenzene	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
1,3-dichlorobenzene	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
1,4-dichlorobenzene	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
2,2'-oxybis(1-chloropropane)	390 U	410 U	400 U	400 U	400 U	410 U	400 U	400 U	390 U
2,4,5-trichlorophenol	390 U	410 U	400 U	400 U	400 U	410 U	400 U	400 U	390 U
2,4,6-trichlorophenol	390 U	410 U	400 U	400 U	400 U	410 U	400 U	400 U	390 U
2,4-dichlorophenol	390 U	410 U	400 U	400 U	400 U	410 U	400 U	400 U	390 U
2,4-dimethylphenol	390 U	410 U	400 U	400 U	400 U	410 U	400 U	400 U	390 U
2,4-dinitrophenol	390 U	410 U	400 U	400 U	400 U	410 U	400 U	400 U	390 U
2,4-dinitrotoluene	390 U	410 U	400 U	400 U	400 U	410 U	400 U	400 U	390 U
2,6-dinitrotoluene	390 U	410 U	400 U	400 U	400 U	410 U	400 U	400 U	390 U
2-chlorophenol	390 U	410 U	400 U	400 U	400 U	410 U	400 U	400 U	390 U
2-methylnaphthalene	390 U	410 U	400 U	400 U	400 U	410 U	400 U	400 U	390 U
2-methylphenol	390 U	410 U	400 U	400 U	400 U	410 U	400 U	400 U	390 U
2-nitroaniline	390 U	410 U	400 U	400 U	400 U	410 U	400 U	400 U	390 U
2-nitrophenol	390 U	410 U	400 U	400 U	400 U	410 U	400 U	400 U	390 U
3,3'-dichlorobenzidine	390 U	410 U	400 U	400 U	400 U	410 U	400 U	400 U	390 U
3-nitroaniline	390 U	410 U	400 U	400 U	400 U	410 U	400 U	400 U	390 U
4,6-dinitro-2-methylphenol	390 U	410 U	400 U	400 U	400 U	410 U	400 U	400 U	390 U
4-bromophenyl phenyl ether	390 U	410 U	400 U	400 U	400 U	410 U	400 U	400 U	390 U

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TABLE 2

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-TP-31-05	S6-TP-31-07	S6-TP-32-05	S6-TP-32-07	S6-TP-32-09	S6-TP-33-03	S6-TP-33-05	S6-TP-33-07	S6-TP-33-09
LOCATION:	S6-TP-31-05	S6-TP-31-07	S6-TP-32-05	S6-TP-32-07	S6-TP-32-09	S6-TP-33-03	S6-TP-33-05	S6-TP-33-07	S6-TP-33-09
DATA SOURCE:	Southern Trench	Southern Trench	Southern Trench	Southern Trench	Southern Trench	Southern Trench	Southern Trench	Southern Trench	Southern Trench
SAMPLE DATE:	02/19/97	02/19/97	02/19/97	02/19/97	02/19/97	02/19/97	02/19/97	02/19/97	02/19/97
SEMIVOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
4-chloro-3-methylphenol	390 U	410 U	400 U	400 U	400 U	410 U	400 U	400 U	390 U
4-chloroaniline	390 U	410 U	400 U	400 U	400 U	410 U	400 U	400 U	390 U
4-chlorophenyl phenyl ether	390 U	410 U	400 U	400 U	400 U	410 U	400 U	400 U	390 U
4-methylphenol	390 U	410 U	400 U	400 U	400 U	410 U	400 U	400 U	390 U
4-nitroaniline	390 U	410 U	400 U	400 U	400 U	410 U	400 U	400 U	390 U
4-nitrophenol	390 U	410 U	400 U	400 U	400 U	410 U	400 U	400 U	390 U
N-nitroso-di-n-propylamine	390 U	410 U	400 U	400 U	400 U	410 U	400 U	400 U	390 U
N-nitrosodiphenylamine	390 U	410 U	400 U	400 U	400 U	410 U	400 U	400 U	390 U
acenaphthene	390 U	410 U	400 U	400 U	400 U	410 U	400 U	400 U	390 U
acenaphthylene	390 U	410 U	400 U	400 U	400 U	410 U	400 U	400 U	390 U
anthracene	390 U	410 U	400 U	400 U	400 U	410 U	400 U	100 J	390 U
benz(a)anthracene	51 J	410 U	60 J	400 U	400 U	410 U	160 J	650	88 J
benzo(a)pyrene	57 J	410 U	76 J	400 U	400 U	410 U	240 J	650	120 J
benzo(b)fluoranthene	390 U	410 U	87 J	400 U	400 U	410 U	250 J	700	130 J
benzo(g,h,i)perylene	51 J	410 U	59 J	400 U	400 U	410 U	140 J	190 J	43 J
benzo(k)fluoranthene	390 U	410 U	400 U	400 U	400 U	410 U	180 J	560	87 J
benzoic acid	390 U	410 U	400 U	400 U	400 U	410 U	400 U	400 U	390 U
benzyl alcohol	390 U	410 U	400 U	400 U	400 U	410 U	400 U	400 U	390 U
beta-chloronaphthalene	390 U	410 U	400 U	400 U	400 U	410 U	400 U	400 U	390 U
bis(2-chloroethoxy)methane	390 U	410 U	400 U	400 U	400 U	410 U	400 U	400 U	390 U
bis(2-chloroethyl)ether	390 U	410 U	400 U	400 U	400 U	410 U	400 U	400 U	390 U
bis(2-ethylhexyl)phthalate	96 B	89 B	75 B	93 B	88 B	80 B	85 B	85 B	110 B
butylbenzylphthalate	390 U	410 U	400 U	57 J	400 U	410 U	400 U	400 U	390 U
chrysene	57 J	410 U	83 J	400 U	400 U	410 U	190 J	580	90 J
di-n-butylphthalate	390 U	410 U	400 U	400 U	400 U	410 U	400 U	400 U	390 U

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TABLE 2

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-TP-31-05	S6-TP-31-07	S6-TP-32-05	S6-TP-32-07	S6-TP-32-09	S6-TP-33-03	S6-TP-33-05	S6-TP-33-07	S6-TP-33-09
LOCATION:	S6-TP-31-05	S6-TP-31-07	S6-TP-32-05	S6-TP-32-07	S6-TP-32-09	S6-TP-33-03	S6-TP-33-05	S6-TP-33-07	S6-TP-33-09
DATA SOURCE:	Southern Trench	Southern Trench	Southern Trench	Southern Trench	Southern Trench	Southern Trench	Southern Trench	Southern Trench	Southern Trench
SAMPLE DATE:	02/19/97	02/19/97	02/19/97	02/19/97	02/19/97	02/19/97	02/19/97	02/19/97	02/19/97
SEMIVOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
di-n-octylphthalate	390 U	410 U	400 U	400 U	400 U	410 U	400 U	400 U	390 U
dibenz(a,h)anthracene	390 U	410 U	400 U	400 U	400 U	410 U	400 U	63 J	390 U
dibenzofuran	390 U	410 U	400 U	400 U	400 U	410 U	400 U	400 U	390 U
diethylphthalate	390 U	410 U	400 U	400 U	400 U	410 U	400 U	400 U	390 U
dimethylphthalate	390 U	410 U	400 U	400 U	400 U	410 U	400 U	400 U	390 U
fluoranthene	88 J	410 U	130 J	35 J	400 U	410 U	200 J	1200	97 J
fluorene	390 U	410 U	400 U	400 U	400 U	410 U	400 U	400 U	390 U
hexachlorobenzene	390 U	410 U	400 U	400 U	400 U	410 U	400 U	400 U	390 U
hexachlorobutadiene	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
hexachlorocyclopentadiene	390 U	410 U	400 U	400 U	400 U	410 U	400 U	400 U	390 U
hexachloroethane	390 U	410 U	400 U	400 U	400 U	410 U	400 U	400 U	390 U
indeno(1,2,3-cd)pyrene	390 U	410 U	400 U	400 U	400 U	410 U	100 J	230 J	390 U
isophorone	390 U	410 U	400 U	400 U	400 U	410 U	400 U	400 U	390 U
naphthalene	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
nitrobenzene	390 U	410 U	400 U	400 U	400 U	410 U	400 U	400 U	390 U
pentachlorophenol	390 U	410 U	400 U	400 U	400 U	410 U	400 U	400 U	390 U
phenanthrene	43 J	410 U	91 J	400 U	400 U	410 U	55 J	410	390 U
phenol	390 U	410 U	400 U	400 U	400 U	410 U	400 U	400 U	390 U
pyrene	89 J	410 U	140 J	35 J	400 U	410 U	310 J	1400	140 J
VOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
1,1,1,2-tetrachloroethane	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
1,1,1-trichloroethane	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
1,1,2,2-tetrachloroethane	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
1,1,2-trichloroethane	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
1,1-dichloroethane	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U

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TABLE 2

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-TP-31-05	S6-TP-31-07	S6-TP-32-05	S6-TP-32-07	S6-TP-32-09	S6-TP-33-03	S6-TP-33-05	S6-TP-33-07	S6-TP-33-09
LOCATION:	S6-TP-31-05	S6-TP-31-07	S6-TP-32-05	S6-TP-32-07	S6-TP-32-09	S6-TP-33-03	S6-TP-33-05	S6-TP-33-07	S6-TP-33-09
DATA SOURCE:	Southern Trench	Southern Trench	Southern Trench	Southern Trench	Southern Trench	Southern Trench	Southern Trench	Southern Trench	Southern Trench
SAMPLE DATE:	02/19/97	02/19/97	02/19/97	02/19/97	02/19/97	02/19/97	02/19/97	02/19/97	02/19/97
VOLATILES	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
1,1-dichloroethene	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
1,1-dichloropropene	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
1,2,3-trichloropropane	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
1,2-dibromo-3-chloropropane	12 U	12 U	12 U	12 U	12 U	13 U	12 U	12 U	12 U
1,2-dibromoethane	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
1,2-dichloroethane	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
1,2-dichloroethene (total)	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
1,2-dichloropropane	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
1,3-dichloropropane	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
2,2-dichloropropane	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
2-butanone	59 U	62 U	61 U	61 U	60 U	63 U	60 U	60 U	59 U
2-hexanone	24 U	25 U	24 U	24 U	24 U	25 U	24 U	24 U	24 U
4-chlorotoluene	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
4-methyl-2-pentanone	24 U	25 U	24 U	24 U	24 U	25 U	24 U	24 U	24 U
acetone	59 U	62 U	61 U	61 U	60 U	63 U	60 U	60 U	59 U
benzene	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
bromobenzene	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
bromochloromethane	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
bromodichloromethane	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
bromoform	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
bromomethane	12 U	12 U	12 U	12 U	12 U	13 U	12 U	12 U	12 U
carbon disulfide	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
carbon tetrachloride	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
chlorobenzene	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
chloroethane	12 U	12 U	12 U	12 U	12 U	13 U	12 U	12 U	12 U

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TABLE 2

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-TP-31-05		S6-TP-31-07		S6-TP-32-05		S6-TP-32-07		S6-TP-32-09		S6-TP-33-03		S6-TP-33-05		S6-TP-33-07		S6-TP-33-09	
LOCATION:	S6-TP-31-05		S6-TP-31-07		S6-TP-32-05		S6-TP-32-07		S6-TP-32-09		S6-TP-33-03		S6-TP-33-05		S6-TP-33-07		S6-TP-33-09	
DATA SOURCE:	Southern Trench		Southern Trench		Southern Trench		Southern Trench		Southern Trench		Southern Trench		Southern Trench		Southern Trench		Southern Trench	
SAMPLE DATE:	02/19/97		02/19/97		02/19/97		02/19/97		02/19/97		02/19/97		02/19/97		02/19/97		02/19/97	
VOLATILES	ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg	
chloroform	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U
chloromethane	12	U	12	U	12	U	12	U	12	U	13	U	12	U	12	U	12	U
cis-1,3-dichloropropene	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U
dibromochloromethane	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U
dichlorodifluoromethane	12	U	12	U	12	U	12	U	12	U	13	U	12	U	12	U	12	U
ethylbenzene	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U
isopropylbenzene	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U
methylene bromide	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U
methylene chloride	7	B	7	B	5	B	6	U	20	B	11	B	6	U	6	U	7	B
n-butylbenzene	1	J	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U
n-propylbenzene	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U
o-chlorotoluene	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U
p-isopropyltoluene	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U
sec-butylbenzene	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U
styrene	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U
tert-butylbenzene	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U
tetrachloroethene	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U
toluene	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U
trans-1,3-dichloropropene	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U
trichloroethene	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U
trichlorofluoromethane	12	U	12	U	12	U	12	U	12	U	13	U	12	U	12	U	12	U
vinyl chloride	12	U	12	U	12	U	12	U	12	U	13	U	12	U	12	U	12	U
xylene (total)	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U	6	U

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TABLE 2

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-TP-31-05		S6-TP-31-07		S6-TP-32-05		S6-TP-32-07		S6-TP-32-09		S6-TP-33-03		S6-TP-33-05		S6-TP-33-07		S6-TP-33-09	
LOCATION:	S6-TP-31-05		S6-TP-31-07		S6-TP-32-05		S6-TP-32-07		S6-TP-32-09		S6-TP-33-03		S6-TP-33-05		S6-TP-33-07		S6-TP-33-09	
DATA SOURCE:	Southern Trench		Southern Trench		Southern Trench		Southern Trench		Southern Trench		Southern Trench		Southern Trench		Southern Trench		Southern Trench	
SAMPLE DATE:	02/19/97		02/19/97		02/19/97		02/19/97		02/19/97		02/19/97		02/19/97		02/19/97		02/19/97	
PESTICIDES/PCBS	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
Aroclor-1016	39	U	41	U	40	U	40	U	40	U	41	U	40	U	40	U	39	U
Aroclor-1221	80	U	83	U	81	U	81	U	80	U	84	U	80	U	81	U	79	U
Aroclor-1232	39	U	41	U	40	U	40	U	40	U	41	U	40	U	40	U	39	U
Aroclor-1242	39	U	41	U	40	U	40	U	40	U	41	U	40	U	40	U	39	U
Aroclor-1248	39	U	41	U	40	U	40	U	40	U	41	U	40	U	40	U	39	U
Aroclor-1254	99	J	32	J	61	J	23	J	40	U	130		93		59	J	10	J
Aroclor-1260	20	J	41	U	9	J	40	U	40	U	41	U	26	J	17	J	39	U

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- UJ -- Non-detected result is considered estimated due to exceedance of technical quality control criteria.
- UL -- Non-detected result is considered biased low due to exceedance of technical quality control criteria.
- UR -- Non-detected result is considered unusable due to exceedance of technical quality control criteria.
- L -- Positive result is considered biased low due to exceedance of technical quality control criteria.
- K -- Positive result is considered biased high due to exceedance of technical quality control criteria.
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TABLE 2

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-TP-33-W1	S6-TP22-01	S6-TP-28-07	S6-TP-29-07	S6-TP-29-09	S6-TP-29-W1	S6-TP-29-W2	S6-TP-29-W3	S6-TP-35-07
LOCATION:	S6-TP-33-W1	S6-TP22-01	S6-TP-28-07	S6-TP-29-07	S6-TP-29-09	S6-TP-29-W1	S6-TP-29-W2	S6-TP-29-W3	S6-TP-35-07
DATA SOURCE:	Southern Trench	Southern Trench	Trench 4	Trench 4	Trench 4	Trench 4	Trench 4	Trench 4	Trench 4
SAMPLE DATE:	02/19/97		02/17/97	02/18/97	02/18/97	02/18/97	02/18/97	02/18/97	02/21/97
INORGANICS	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**
aluminum	1970	16500	17200	5330	8210	12800	28400	3360	5180
antimony	2.6 L	9.9 J	2.5 UL	28.9	2.4 UL	2.4 UL	2.6 UL	48.3	9.6
arsenic	2.8 UJ	5.3	12.7	28.3 K	5.9 K	9.7 K	13.9 K	35.5 K	23.5 K
barium	12.6 L	51.6	69.1	363	41.3	49.7	116	531	176 L
beryllium	0.23	0.81	0.98	0.37	0.93	0.87	0.83	0.6	0.48
cadmium	0.56 U	0.41 L	0.63 U	152	1	6.2	14.8	48	145 J
calcium	145000	2030	1450	61000	1770	2030	8310	12300	61400 J
chromium	4.4	25.6	25.5	12400	72	238	945	46800	3410 J
cobalt	1.8	7.5	9.1	55.7	8.3	11.4	14.6	146	54.6 J
copper	6.2	15.9	12.6	269	14.1	17.7	920	121	108 J
iron	4920	12700	22100	215000	18200	24300	41500	42300	264000
lead	16.4	11	13.3 L	280 L	9.8 L	14.2	58.7 L	7700	91.2 L
magnesium	77000	2790	2070	2470	1110	2330	2010	2820	2090 J
manganese	165	220 L	154	1150	439	454	592	259	1160 J
mercury	0.11 U	0.05 U	0.13 U	3.4	0.12 U	0.52	0.52	0.98	1.8
nickel	3.5	13.6 J	12.8	66.2	8.8	14.3	19	35.7	61
potassium	169 U	1100	768	314	378	881	554	8740	396
selenium	4.5 U	0.81 U	5.1 UL	7 UL	4.8 UL	4.9 UL	5.1 UL	7 UL	6.4 U
silver	0.56 U	1 U	0.81 K	356	4.7 K	12	83.5	79	277 J
sodium	105	58 U	111	124	100	107	101	405	101
thallium	3.4 U	0.81 U	3.8 UL	46.4	3.6 UL	3.7 UL	9.1	31.9	47.2 K
vanadium	6.3 K	38	38.9	0.87 U	20.8	32.3	30.1	0.88 U	19.1 K
zinc	180	40.1	53.5 J	1150	35.2	45.7	197	78600	380 J

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TABLE 2

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-TP-33-W1		S6-TP22-01	S6-TP-28-07		S6-TP-29-07		S6-TP-29-09		S6-TP-29-W1		S6-TP-29-W2		S6-TP-29-W3		S6-TP-35-07	
LOCATION:	S6-TP-33-W1		S6-TP22-01	S6-TP-28-07		S6-TP-29-07		S6-TP-29-09		S6-TP-29-W1		S6-TP-29-W2		S6-TP-29-W3		S6-TP-35-07	
DATA SOURCE:	Southern Trench		Southern Trench	Trench 4		Trench 4		Trench 4		Trench 4		Trench 4		Trench 4		Trench 4	
SAMPLE DATE:	02/19/97			02/17/97		02/18/97		02/18/97		02/18/97		02/18/97		02/18/97		02/21/97	
SEMIVOLATILES	**ug/kg**		**ug/kg**	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1,2,3-trichlorobenzene	6	U	n/a	6	U	9	U	6	U	6	U	6	U	44	UJ	8	U
1,2,4-trichlorobenzene	6	U	n/a	6	U	9	U	6	U	6	U	6	U	44	UJ	8	U
1,2,4-trimethylbenzene	6	U	n/a	6	U	9	U	6	U	6	U	6	U	170	J	8	U
1,2-dichlorobenzene	6	U	n/a	6	U	9	U	6	U	6	U	6	U	44	UJ	8	U
1,3,5-trimethylbenzene	6	U	n/a	6	U	9	U	6	U	6	U	6	U	120		8	U
1,3-dichlorobenzene	6	U	n/a	6	U	9	U	6	U	6	U	6	U	44	UJ	8	U
1,4-dichlorobenzene	6	U	n/a	6	U	9	U	6	U	6	U	6	U	44	UJ	8	U
2,2'-oxybis(1-chloropropane)	370	U	n/a	420	U	580	U	400	U	400	U	420	U	2900	UJ	530	U
2,4,5-trichlorophenol	370	U	n/a	420	U	580	U	400	U	400	U	420	U	2900	UJ	530	U
2,4,6-trichlorophenol	370	U	n/a	420	U	580	U	400	U	400	U	420	U	2900	UJ	530	U
2,4-dichlorophenol	370	U	n/a	420	U	580	U	400	U	400	U	420	U	2900	UJ	530	U
2,4-dimethylphenol	370	U	n/a	420	U	580	U	400	U	400	U	420	U	1100	J	530	U
2,4-dinitrophenol	370	U	n/a	420	U	580	U	400	U	400	U	420	U	2900	UJ	530	U
2,4-dinitrotoluene	370	U	n/a	420	U	580	U	400	U	400	U	420	U	2900	UJ	530	U
2,6-dinitrotoluene	370	U	n/a	420	U	580	U	400	U	400	U	420	U	2900	UJ	530	U
2-chlorophenol	370	U	n/a	420	U	580	U	400	U	400	U	420	U	2900	UJ	530	U
2-methylnaphthalene	370	U	n/a	420	U	580	U	400	U	400	U	420	U	2900	UJ	530	U
2-methylphenol	370	U	n/a	420	U	580	U	400	U	400	U	420	U	2900	UJ	530	U
2-nitroaniline	370	U	n/a	420	U	580	U	400	U	400	U	420	U	2900	UJ	530	U
2-nitrophenol	370	U	n/a	420	U	580	U	400	U	400	U	420	U	2900	UJ	530	U
3,3'-dichlorobenzidine	370	U	n/a	420	U	580	UJ	400	UJ	400	UJ	420	UJ	2900	UJ	530	U
3-nitroaniline	370	U	n/a	420	U	580	U	400	U	400	U	420	U	2900	UJ	530	U
4,6-dinitro-2-methylphenol	370	U	n/a	420	U	580	U	400	U	400	U	420	U	2900	UJ	530	U
4-bromophenyl phenyl ether	370	U	n/a	420	U	580	U	400	U	400	U	420	U	2900	UJ	530	U

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TABLE 2

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-TP-33-W1	S6-TP22-01	S6-TP-28-07	S6-TP-29-07	S6-TP-29-09	S6-TP-29-W1	S6-TP-29-W2	S6-TP-29-W3	S6-TP-35-07
LOCATION:	S6-TP-33-W1	S6-TP22-01	S6-TP-28-07	S6-TP-29-07	S6-TP-29-09	S6-TP-29-W1	S6-TP-29-W2	S6-TP-29-W3	S6-TP-35-07
DATA SOURCE:	Southern Trench	Southern Trench	Trench 4	Trench 4	Trench 4	Trench 4	Trench 4	Trench 4	Trench 4
SAMPLE DATE:	02/19/97		02/17/97	02/18/97	02/18/97	02/18/97	02/18/97	02/18/97	02/21/97
SEMIVOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
4-chloro-3-methylphenol	370 U	n/a	420 U	580 U	400 U	400 U	420 U	2900 UJ	530 U
4-chloroaniline	370 U	n/a	420 U	580 U	400 U	400 U	420 U	2900 UJ	530 U
4-chlorophenyl phenyl ether	370 U	n/a	420 U	580 U	400 U	400 U	420 U	2900 UJ	530 U
4-methylphenol	370 U	n/a	420 U	580 U	400 U	400 U	420 U	6300 J	530 U
4-nitroaniline	370 U	n/a	420 U	580 U	400 U	400 U	420 U	2900 UJ	530 U
4-nitrophenol	370 U	n/a	420 U	580 U	400 U	400 U	420 U	2900 UJ	530 U
N-nitroso-di-n-propylamine	370 U	n/a	420 U	580 U	400 U	400 U	420 U	2900 UJ	530 U
N-nitrosodiphenylamine	370 U	n/a	420 U	580 U	400 U	400 U	420 U	2900 UJ	530 U
acenaphthene	45 J	n/a	420 U	580 U	400 U	400 U	420 U	2900 UJ	530 U
acenaphthylene	48 J	n/a	420 U	580 U	400 U	400 U	420 U	2900 UJ	530 U
anthracene	340 J	n/a	420 U	580 U	400 U	400 U	420 U	2900 UJ	530 U
benz(a)anthracene	890	n/a	420 U	580 U	400 U	400 U	42 J	2900 UJ	120 J
benzo(a)pyrene	1100	n/a	420 U	60 J	400 U	400 U	42 J	2900 UJ	140 J
benzo(b)fluoranthene	1200	n/a	420 U	580 U	400 U	400 U	420 U	2900 UJ	150 J
benzo(g,h,i)perylene	330 J	n/a	420 U	580 U	400 U	400 U	420 U	2900 UJ	89 J
benzo(k)fluoranthene	930	n/a	420 U	580 U	400 U	400 U	420 U	2900 UJ	470 J
benzoic acid	370 U	n/a	420 U	580 U	400 U	400 U	420 U	2900 UJ	530 U
benzyl alcohol	370 U	n/a	420 U	580 U	400 U	400 U	420 U	2900 UJ	530 U
beta-chloronaphthalene	370 U	n/a	420 U	580 U	400 U	400 U	420 U	2900 UJ	530 U
bis(2-chloroethoxy)methane	370 U	n/a	420 U	580 U	400 U	400 U	420 U	2900 UJ	530 U
bis(2-chloroethyl)ether	370 U	n/a	420 U	580 U	400 U	400 U	420 U	2900 UJ	530 U
bis(2-ethylhexyl)phthalate	97 B	n/a	92 B	440 B	87 B	94 B	105 B	2900 UJ	63 J
butylbenzylphthalate	370 U	n/a	420 U	580 U	400 U	400 U	420 U	2900 UJ	530 U
chrysene	950	n/a	420 U	63 J	400 U	400 U	51 J	320 J	140 J
di-n-butylphthalate	370 U	n/a	420 U	180 J	400 U	400 U	420 U	16000 J	66 J

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TABLE 2

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-TP-33-W1	S6-TP22-01	S6-TP-28-07	S6-TP-29-07	S6-TP-29-09	S6-TP-29-W1	S6-TP-29-W2	S6-TP-29-W3	S6-TP-35-07
LOCATION:	S6-TP-33-W1	S6-TP22-01	S6-TP-28-07	S6-TP-29-07	S6-TP-29-09	S6-TP-29-W1	S6-TP-29-W2	S6-TP-29-W3	S6-TP-35-07
DATA SOURCE:	Southern Trench	Southern Trench	Trench 4	Trench 4	Trench 4	Trench 4	Trench 4	Trench 4	Trench 4
SAMPLE DATE:	02/19/97		02/17/97	02/18/97	02/18/97	02/18/97	02/18/97	02/18/97	02/21/97
SEMIVOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
di-n-octylphthalate	370 U	n/a	420 U	580 U	400 U	400 U	420 U	2900 UJ	530 U
dibenz(a,h)anthracene	110 J	n/a	420 U	580 U	400 U	400 U	420 U	2900 UJ	530 U
dibenzofuran	370 U	n/a	420 U	580 U	400 U	400 U	420 U	2900 UJ	530 U
diethylphthalate	370 U	n/a	420 U	580 U	400 U	400 U	420 U	2900 UJ	530 U
dimethylphthalate	370 U	n/a	420 U	580 U	400 U	400 U	420 U	2900 UJ	530 U
fluoranthene	1400	n/a	420 U	92 J	400 U	400 U	94 J	360 J	260 J
fluorene	50 J	n/a	420 U	580 U	400 U	400 U	420 U	2900 UJ	530 U
hexachlorobenzene	370 U	n/a	420 U	580 U	400 U	400 U	420 U	2900 UJ	530 U
hexachlorobutadiene	6 U	n/a	6 U	9 U	6 U	6 U	6 U	44 UJ	8 U
hexachlorocyclopentadiene	370 U	n/a	420 U	580 U	400 U	400 U	420 U	2900 UJ	530 U
hexachloroethane	370 U	n/a	420 U	580 U	400 U	400 U	420 U	2900 UJ	530 U
indeno(1,2,3-cd)pyrene	420	n/a	420 U	580 U	400 U	400 U	420 U	2900 UJ	87 J
isophorone	370 U	n/a	420 U	580 U	400 U	400 U	420 U	2900 UJ	530 U
naphthalene	6 U	n/a	6 U	9 U	6 U	6 U	6 U	44 UJ	8 U
nitrobenzene	370 U	n/a	420 U	580 U	400 U	400 U	420 U	2900 UJ	530 U
pentachlorophenol	370 U	n/a	420 U	580 U	400 U	400 U	420 U	2900 UJ	530 U
phenanthrene	620	n/a	420 U	580 U	400 U	400 U	89 J	540 J	130 J
phenol	370 U	n/a	420 U	580 U	400 U	400 U	420 U	5300 J	530 U
pyrene	1800	n/a	420 U	93 J	400 U	400 U	96 J	2900 UJ	230 J
VOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
1,1,1,2-tetrachloroethane	6 U	n/a	6 U	9 U	6 U	6 U	6 U	44 U	8 U
1,1,1-trichloroethane	6 U	12 U	6 U	9 U	6 U	6 U	6 U	44 U	8 U
1,1,2,2-tetrachloroethane	6 U	12 U	6 U	9 U	6 U	6 U	6 U	44 U	8 U
1,1,2-trichloroethane	6 U	12 U	6 U	9 U	6 U	6 U	6 U	44 U	8 U
1,1-dichloroethane	6 U	12 U	6 U	9 U	6 U	6 U	6 U	44 U	8 U

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ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-TP-33-W1	S6-TP22-01	S6-TP-28-07	S6-TP-29-07	S6-TP-29-09	S6-TP-29-W1	S6-TP-29-W2	S6-TP-29-W3	S6-TP-35-07
LOCATION:	S6-TP-33-W1	S6-TP22-01	S6-TP-28-07	S6-TP-29-07	S6-TP-29-09	S6-TP-29-W1	S6-TP-29-W2	S6-TP-29-W3	S6-TP-35-07
DATA SOURCE:	Southern Trench	Southern Trench	Trench 4	Trench 4	Trench 4	Trench 4	Trench 4	Trench 4	Trench 4
SAMPLE DATE:	02/19/97		02/17/97	02/18/97	02/18/97	02/18/97	02/18/97	02/18/97	02/21/97
VOLATILES	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
1,1-dichloroethene	6 U	12 U	6 U	9 U	6 U	6 U	6 U	44 U	8 U
1,1-dichloropropene	6 U	n/a	6 U	9 U	6 U	6 U	6 U	44 U	8 U
1,2,3-trichloropropane	6 U	n/a	6 U	9 U	6 U	6 U	6 U	44 U	8 U
1,2-dibromo-3-chloropropane	11 U	n/a	13 U	17 U	12 U	12 U	13 U	88 UJ	16 U
1,2-dibromoethane	6 U	n/a	6 U	9 U	6 U	6 U	6 U	44 U	8 U
1,2-dichloroethane	6 U	12 U	6 U	9 U	6 U	6 U	6 U	44 U	8 U
1,2-dichloroethene (total)	6 U	12 U	6 U	9 U	6 U	6 U	6 U	44 U	8 U
1,2-dichloropropane	6 U	12 U	6 U	9 U	6 U	6 U	6 U	44 U	8 U
1,3-dichloropropane	6 U	n/a	6 U	9 U	6 U	6 U	6 U	44 U	8 U
2,2-dichloropropane	6 U	n/a	6 U	9 U	6 U	6 U	6 U	44 U	8 U
2-butanone	56 U	12 U	64 U	87 U	60 U	61 U	64 U	440 U	18 J
2-hexanone	23 U	12 U	25 U	35 U	24 U	24 U	26 U	180 U	32 U
4-chlorotoluene	6 U	n/a	6 U	9 U	6 U	6 U	6 U	44 U	8 U
4-methyl-2-pentanone	23 U	12 U	25 U	35 U	24 U	24 U	26 U	180 U	32 U
acetone	56 U	4 U	64 U	87 U	60 U	61 U	64 U	440 U	130
benzene	6 U	12 U	6 U	9 U	6 U	6 U	6 U	44 U	8 U
bromobenzene	6 U	n/a	6 U	9 U	6 U	6 U	6 U	44 U	8 U
bromochloromethane	6 U	n/a	6 U	9 U	6 U	6 U	6 U	44 U	8 U
bromodichloromethane	6 U	12 U	6 U	9 U	6 U	6 U	6 U	44 U	8 U
bromoform	6 U	12 U	6 U	9 U	6 U	6 U	6 U	44 U	8 U
bromomethane	11 U	12 U	13 U	17 U	12 U	12 U	13 U	88 U	16 U
carbon disulfide	6 U	12 U	6 U	9 U	6 U	6 U	6 U	44 U	8 U
carbon tetrachloride	6 U	12 U	6 U	9 U	6 U	6 U	6 U	44 U	8 U
chlorobenzene	6 U	12 U	6 U	9 U	6 U	6 U	6 U	44 U	8 U
chloroethane	11 U	12 U	13 U	17 U	12 U	12 U	13 U	88 U	16 U

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TABLE 2

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-TP-33-W1	S6-TP22-01	S6-TP-28-07	S6-TP-29-07	S6-TP-29-09	S6-TP-29-W1	S6-TP-29-W2	S6-TP-29-W3	S6-TP-35-07
LOCATION:	S6-TP-33-W1	S6-TP22-01	S6-TP-28-07	S6-TP-29-07	S6-TP-29-09	S6-TP-29-W1	S6-TP-29-W2	S6-TP-29-W3	S6-TP-35-07
DATA SOURCE:	Southern Trench	Southern Trench	Trench 4	Trench 4	Trench 4	Trench 4	Trench 4	Trench 4	Trench 4
SAMPLE DATE:	02/19/97		02/17/97	02/18/97	02/18/97	02/18/97	02/18/97	02/18/97	02/21/97
VOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
chloroform	6 U	12 U	6 U	9 U	6 U	6 U	6 U	44 U	8 U
chloromethane	11 U	12 U	13 U	17 U	12 U	12 U	13 U	88 U	16 U
cis-1,3-dichloropropene	6 U	12 U	6 U	9 U	6 U	6 U	6 U	44 U	8 U
dibromochloromethane	6 U	12 U	6 U	9 U	6 U	6 U	6 U	44 U	8 U
dichlorodifluoromethane	11 U	n/a	13 U	17 U	12 U	12 U	13 U	88 U	16 U
ethylbenzene	6 U	12 U	6 U	9 U	6 U	6 U	6 U	36 J	8 U
isopropylbenzene	6 U	n/a	6 U	9 U	6 U	6 U	6 U	44 U	8 U
methylene bromide	6 U	n/a	6 U	9 U	6 U	6 U	6 U	44 U	8 U
methylene chloride	6 B	4 U	6 U	9 U	6 U	6 U	6 U	61 B	8 U
n-butylbenzene	6 U	n/a	6 U	9 U	6 U	6 U	6 U	44 UJ	8 U
n-propylbenzene	6 U	n/a	6 U	9 U	6 U	6 U	6 U	44 U	8 U
o-chlorotoluene	6 U	n/a	6 U	9 U	6 U	6 U	6 U	44 U	8 U
p-isopropyltoluene	6 U	n/a	6 U	9 U	6 U	6 U	6 U	44 UJ	8 U
sec-butylbenzene	6 U	n/a	6 U	9 U	6 U	6 U	6 U	44 UJ	8 U
styrene	6 U	12 U	6 U	9 U	6 U	6 U	6 U	44 U	8 U
tert-butylbenzene	6 U	n/a	6 U	9 U	6 U	6 U	6 U	44 UJ	8 U
tetrachloroethene	6 U	12 U	6 U	9 U	6 U	6 U	6 U	44 U	8 U
toluene	6 U	12 U	6 U	9 U	6 U	6 U	6 U	44 U	8 U
trans-1,3-dichloropropene	6 U	12 U	6 U	9 U	6 U	6 U	6 U	44 U	8 U
trichloroethene	6 U	12 U	6 U	9 U	6 U	6 U	6 U	56	8 U
trichlorofluoromethane	11 U	n/a	13 U	17 U	12 U	12 U	13 U	88 U	16 U
vinyl chloride	11 U	12 U	13 U	17 U	12 U	12 U	13 U	88 U	16 U
xylene (total)	6 U	12 U	6 U	9 U	6 U	6 U	6 U	620	8 U

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TABLE 2

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-TP-33-W1		S6-TP22-01	S6-TP-28-07		S6-TP-29-07		S6-TP-29-09		S6-TP-29-W1		S6-TP-29-W2		S6-TP-29-W3		S6-TP-35-07	
LOCATION:	S6-TP-33-W1		S6-TP22-01	S6-TP-28-07		S6-TP-29-07		S6-TP-29-09		S6-TP-29-W1		S6-TP-29-W2		S6-TP-29-W3		S6-TP-35-07	
DATA SOURCE:	Southern Trench		Southern Trench	Trench 4		Trench 4		Trench 4		Trench 4		Trench 4		Trench 4		Trench 4	
SAMPLE DATE:	02/19/97			02/17/97		02/18/97		02/18/97		02/18/97		02/18/97		02/18/97		02/21/97	
PESTICIDES/PCBS	**ug/kg**		**ug/kg**	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
Aroclor-1016	37	U	n/a	42	U	580	U	40	U	40	U	42	U	580	U	53	U
Aroclor-1221	76	U	n/a	85	U	1200	U	81	U	82	U	86	U	1200	U	110	U
Aroclor-1232	37	U	n/a	42	U	580	U	40	U	40	U	42	U	580	U	53	U
Aroclor-1242	37	U	n/a	42	U	580	U	40	U	40	U	42	U	580	U	53	U
Aroclor-1248	37	U	n/a	42	U	580	U	40	U	40	U	42	U	580	U	53	U
Aroclor-1254	200	J	n/a	42	U	1800	J	40	U	91		200		4200	J	53	U
Aroclor-1260	67		n/a	42	U	1300	J	40	U	40	U	42	U	5100	J	180	K

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TABLE 2

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-TP-35-08		S6-TP-36-07		S6-TP-36-09		S6-TP-38-01		S6-TP-38-07		S6-TP-38-08		S6-TP-38-W1		S6-TP-39-08		S6-TP-39-09	
LOCATION:	S6-TP-35-08		S6-TP-36-07		S6-TP-36-09		S6-TP-38-01		S6-TP-38-07		S6-TP-38-08		S6-TP-38-W1		S6-TP-39-08		S6-TP-39-09	
DATA SOURCE:	Trench 4		Trench 4		Trench 4		Trench 4		Trench 4		Trench 4		Trench 4		Trench 4		Trench 4	
SAMPLE DATE:	02/21/97		02/21/97		02/21/97		02/24/97		02/24/97		02/24/97		02/24/97		02/25/97		02/25/97	
INORGANICS	**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**	
aluminum	8300		10100		3490		14400		11000		9860		39100		10400		10400	
antimony	2.5	UL	2.5	UL	14.1		2.5	UL	2.5	UL	2.3	UL	14.2	L	2.6	UL	2.5	UL
arsenic	11.7	K	8.5	K	25.3	K	7.6		6.1		4.5		9.9		6.2	K	7.2	K
barium	85.4		67.7		536	L	52.7		86.9		46.9		477		51.9		35.5	
beryllium	1.2		0.76		0.35		0.93		2		0.67		1.4		0.73		0.64	
cadmium	0.64	J	0.62	U	68.8	J	0.64	U	0.62	U	0.58	U	31.8		0.64	U	0.61	U
calcium	1490	J	9890	J	79600	J	1260	J	1400	J	743	J	6860	J	23500	J	3910	J
chromium	60.1	J	15.8	J	8490	J	15.9		19.9		15.6		66.1		14.1	J	15.2	J
cobalt	8.1	J	6.6	J	70.4	J	13.2		14.7		7		14	K	8.2	J	7.9	J
copper	8.3	J	13.7	J	425	J	10.5		7.8		11.5		4970		23.8		12.9	
iron	15000		16200		264000		20400	J	24700	J	16600	J	53200	J	16300		17700	
lead	18.6	L	15.5	L	145	L	9.7		14.5		10.2		1030		11.1		10	K
magnesium	1100	J	4970	J	1810	J	1810		4000		1650		6090		2540	J	1740	J
manganese	942	J	543	J	959	J	503		479		286		983		569	J	279	J
mercury	0.12	U	0.2		3.4		0.13	U	0.12	U	0.12	U	0.78		0.13	U	0.12	U
nickel	8.3		8.4		47.5		11.8		19.4		8.3		99.7		11.7	K	11.1	K
potassium	197		534		294	U	572		1670		363		817		556		466	
selenium	4.9	U	5	U	7.8	U	5.1	UL	5	UL	4.7	UL	6.4	UL	5.1	U	4.9	U
silver	2.8	J	1.1	J	368	J	0.9	K	1.3	K	0.71	K	77.3		0.72	J	0.7	J
sodium	96.8		107		156		89.5		109		72.2		444		112		96.8	
thallium	4.7	K	3.7	U	62.4	K	6	K	7.8	K	5	K	16.7	K	3.8	UJ	4.3	J
vanadium	24.1		25.4		18.6	K	29.2		27		28.7		48.5		20.4		27	
zinc	35.4	J	35.5	J	713	J	26.4		38.5		24.5		2320		26.6	J	33.1	J

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TABLE 2

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-TP-35-08		S6-TP-36-07		S6-TP-36-09		S6-TP-38-01		S6-TP-38-07		S6-TP-38-08		S6-TP-38-W1		S6-TP-39-08		S6-TP-39-09	
LOCATION:	S6-TP-35-08		S6-TP-36-07		S6-TP-36-09		S6-TP-38-01		S6-TP-38-07		S6-TP-38-08		S6-TP-38-W1		S6-TP-39-08		S6-TP-39-09	
DATA SOURCE:	Trench 4		Trench 4		Trench 4		Trench 4		Trench 4		Trench 4		Trench 4		Trench 4		Trench 4	
SAMPLE DATE:	02/21/97		02/21/97		02/21/97		02/24/97		02/24/97		02/24/97		02/24/97		02/25/97		02/25/97	
SEMIVOLATILES	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1,2,3-trichlorobenzene	6	U	6	U	10	U	6	U	6	U	6	U	8	UJ	6	U	6	U
1,2,4-trichlorobenzene	6	U	6	U	10	U	6	U	6	U	6	U	8	UJ	6	U	6	U
1,2,4-trimethylbenzene	6	U	6	U	10	U	6	U	6	U	6	U	8	U	6	U	6	U
1,2-dichlorobenzene	6	U	6	U	10	U	6	U	6	U	6	U	8	UJ	6	U	6	U
1,3,5-trimethylbenzene	6	U	6	U	10	U	6	U	6	U	6	U	8	UJ	6	U	6	U
1,3-dichlorobenzene	6	U	6	U	10	U	6	U	6	U	6	U	8	J	6	U	6	U
1,4-dichlorobenzene	6	U	6	U	10	U	6	U	6	U	6	U	8	UJ	6	U	6	U
2,2'-oxybis(1-chloropropane)	410	U	410	U	650	U	420	U	410	U	390	U	530	U	420	U	410	U
2,4,5-trichlorophenol	410	U	410	U	650	U	420	U	410	U	390	U	530	U	420	U	410	U
2,4,6-trichlorophenol	410	U	410	U	650	U	420	U	410	U	390	U	530	U	420	U	410	U
2,4-dichlorophenol	410	U	410	U	650	U	420	U	410	U	390	U	530	U	420	U	410	U
2,4-dimethylphenol	410	U	410	U	650	U	420	U	410	U	390	U	530	U	420	U	410	U
2,4-dinitrophenol	410	U	410	U	650	U	420	U	410	U	390	U	530	U	420	U	410	U
2,4-dinitrotoluene	410	U	410	U	650	U	420	U	410	U	390	U	530	U	420	U	410	U
2,6-dinitrotoluene	410	U	410	U	650	U	420	U	410	U	390	U	530	U	420	U	410	U
2-chlorophenol	410	U	410	U	650	U	420	U	410	U	390	U	530	U	420	U	410	U
2-methylnaphthalene	410	U	410	U	650	U	420	U	410	U	390	U	530	U	420	U	410	U
2-methylphenol	410	U	410	U	650	U	420	U	410	U	390	U	530	U	420	U	410	U
2-nitroaniline	410	U	410	U	650	U	420	U	410	U	390	U	530	U	420	U	410	U
2-nitrophenol	410	U	410	U	650	U	420	U	410	U	390	U	530	U	420	U	410	U
3,3'-dichlorobenzidine	410	U	410	U	650	U	420	U	410	U	390	U	530	U	420	U	410	U
3-nitroaniline	410	U	410	U	650	U	420	U	410	U	390	U	530	U	420	U	410	U
4,6-dinitro-2-methylphenol	410	U	410	U	650	U	420	U	410	U	390	U	530	U	420	U	410	U
4-bromophenyl phenyl ether	410	U	410	U	650	U	420	U	410	U	390	U	530	U	420	U	410	U

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TABLE 2

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-TP-35-08	S6-TP-36-07	S6-TP-36-09	S6-TP-38-01	S6-TP-38-07	S6-TP-38-08	S6-TP-38-W1	S6-TP-39-08	S6-TP-39-09
LOCATION:	S6-TP-35-08	S6-TP-36-07	S6-TP-36-09	S6-TP-38-01	S6-TP-38-07	S6-TP-38-08	S6-TP-38-W1	S6-TP-39-08	S6-TP-39-09
DATA SOURCE:	Trench 4	Trench 4	Trench 4	Trench 4	Trench 4	Trench 4	Trench 4	Trench 4	Trench 4
SAMPLE DATE:	02/21/97	02/21/97	02/21/97	02/24/97	02/24/97	02/24/97	02/24/97	02/25/97	02/25/97
SEMIVOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
4-chloro-3-methylphenol	410 U	410 U	650 U	420 U	410 U	390 U	530 U	420 U	410 U
4-chloroaniline	410 U	410 U	650 U	420 U	410 U	390 U	530 U	420 U	410 U
4-chlorophenyl phenyl ether	410 U	410 U	650 U	420 U	410 U	390 U	530 U	420 U	410 U
4-methylphenol	410 U	410 U	650 U	420 U	410 U	390 U	530 U	420 U	410 U
4-nitroaniline	410 U	410 U	650 U	420 U	410 U	390 U	530 U	420 U	410 U
4-nitrophenol	410 U	410 U	650 U	420 U	410 U	390 U	530 U	420 U	410 U
N-nitroso-di-n-propylamine	410 U	410 U	650 U	420 U	410 U	390 U	530 U	420 U	410 U
N-nitrosodiphenylamine	410 U	410 U	650 U	420 U	410 U	390 U	530 U	420 U	410 U
acenaphthene	410 U	410 U	650 U	420 U	410 U	390 U	530 U	420 U	410 U
acenaphthylene	410 U	410 U	650 U	420 U	410 U	390 U	530 U	420 U	410 U
anthracene	410 U	410 U	650 U	420 U	410 U	390 U	530 U	420 U	410 U
benz(a)anthracene	410 U	62 J	69 J	420 U	410 U	390 U	530 U	33 J	410 U
benzo(a)pyrene	410 U	59 J	62 J	420 U	410 U	390 U	530 U	46 J	410 U
benzo(b)fluoranthene	410 U	410 U	650 U	420 U	410 U	390 U	530 U	420 U	410 U
benzo(g,h,i)perylene	410 U	410 U	650 U	420 U	410 U	390 U	530 U	420 U	410 U
benzo(k)fluoranthene	410 U	410 U	650 U	420 U	410 U	390 U	530 U	420 U	410 U
benzoic acid	410 U	410 U	650 U	420 U	410 U	390 U	530 U	420 U	410 U
benzyl alcohol	410 U	410 U	650 U	420 U	410 U	390 U	530 U	420 U	410 U
beta-chloronaphthalene	410 U	410 U	650 U	420 U	410 U	390 U	530 U	420 U	410 U
bis(2-chloroethoxy)methane	410 U	410 U	650 U	420 U	410 U	390 U	530 U	420 U	410 U
bis(2-chloroethyl)ether	410 U	410 U	650 U	420 U	410 U	390 U	530 U	420 U	410 U
bis(2-ethylhexyl)phthalate	39 J	84 J	310 J	420 U	410 U	390 U	530 U	420 U	410 U
butylbenzylphthalate	410 U	410 U	650 U	420 U	410 U	390 U	530 U	420 U	410 U
chrysene	410 U	65 J	75 J	420 U	410 U	390 U	530 U	37 J	410 U
di-n-butylphthalate	410 U	410 U	48 J	420 U	410 U	43 J	530 U	420 U	410 U

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TABLE 2

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-TP-35-08		S6-TP-36-07		S6-TP-36-09		S6-TP-38-01		S6-TP-38-07		S6-TP-38-08		S6-TP-38-W1		S6-TP-39-08		S6-TP-39-09	
LOCATION:	S6-TP-35-08		S6-TP-36-07		S6-TP-36-09		S6-TP-38-01		S6-TP-38-07		S6-TP-38-08		S6-TP-38-W1		S6-TP-39-08		S6-TP-39-09	
DATA SOURCE:	Trench 4		Trench 4		Trench 4		Trench 4		Trench 4		Trench 4		Trench 4		Trench 4		Trench 4	
SAMPLE DATE:	02/21/97		02/21/97		02/21/97		02/24/97		02/24/97		02/24/97		02/24/97		02/25/97		02/25/97	
SEMIVOLATILES	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
di-n-octylphthalate	410	U	410	U	650	U	420	U	410	U	390	U	530	U	420	U	410	U
dibenz(a,h)anthracene	410	U	410	U	650	U	420	U	410	U	390	U	530	U	420	U	410	U
dibenzofuran	410	U	410	U	650	U	420	U	410	U	390	U	530	U	420	U	410	U
diethylphthalate	410	U	410	U	650	U	420	U	410	U	390	U	530	U	420	U	410	U
dimethylphthalate	410	U	410	U	650	U	420	U	410	U	390	U	530	U	420	U	410	U
fluoranthene	46	J	110	J	110	J	420	U	410	U	390	U	530	U	47	J	410	U
fluorene	410	U	410	U	650	U	420	U	410	U	390	U	530	U	420	U	410	U
hexachlorobenzene	410	U	410	U	650	U	420	U	410	U	390	U	530	U	420	U	410	U
hexachlorobutadiene	6	U	6	U	10	U	6	U	6	U	6	U	8	UJ	6	U	6	U
hexachlorocyclopentadiene	410	U	410	U	650	U	420	U	410	U	390	U	530	U	420	U	410	U
hexachloroethane	410	U	410	U	650	U	420	U	410	U	390	U	530	U	420	U	410	U
indeno(1,2,3-cd)pyrene	410	U	410	U	650	U	420	U	410	U	390	U	530	U	420	U	410	U
isophorone	410	U	410	U	650	U	420	U	410	U	390	U	530	U	420	U	410	U
naphthalene	6	U	6	U	10	U	6	U	6	U	6	U	8	UJ	6	U	6	U
nitrobenzene	410	U	410	U	650	U	420	U	410	U	390	U	530	U	420	U	410	U
pentachlorophenol	410	U	410	U	650	U	420	U	410	U	390	U	530	U	420	U	410	U
phenanthrene	410	U	62	J	650	U	420	U	410	U	390	U	530	U	420	U	410	U
phenol	410	U	410	U	650	U	420	U	410	U	390	U	530	U	420	U	410	U
pyrene	38	J	110	J	120	J	420	U	410	U	390	U	530	U	50	J	410	U
VOLATILES	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1,1,1,2-tetrachloroethane	6	U	6	U	10	U	6	U	6	U	6	U	8	UJ	6	U	6	U
1,1,1-trichloroethane	6	U	6	U	10	U	6	U	6	U	6	U	8	U	6	U	6	U
1,1,2,2-tetrachloroethane	6	U	6	U	10	U	6	U	6	U	6	U	8	UJ	6	U	6	U
1,1,2-trichloroethane	6	U	6	U	10	U	6	U	6	U	6	U	8	U	6	U	6	U
1,1-dichloroethane	6	U	6	U	10	U	6	U	6	U	6	U	8	U	6	U	6	U

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TABLE 2

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-TP-35-08		S6-TP-36-07		S6-TP-36-09		S6-TP-38-01		S6-TP-38-07		S6-TP-38-08		S6-TP-38-W1		S6-TP-39-08		S6-TP-39-09	
LOCATION:	S6-TP-35-08		S6-TP-36-07		S6-TP-36-09		S6-TP-38-01		S6-TP-38-07		S6-TP-38-08		S6-TP-38-W1		S6-TP-39-08		S6-TP-39-09	
DATA SOURCE:	Trench 4		Trench 4		Trench 4		Trench 4		Trench 4		Trench 4		Trench 4		Trench 4		Trench 4	
SAMPLE DATE:	02/21/97		02/21/97		02/21/97		02/24/97		02/24/97		02/24/97		02/24/97		02/25/97		02/25/97	
VOLATILES	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1,1-dichloroethene	6	U	6	U	10	U	6	U	6	U	6	U	8	U	6	U	6	U
1,1-dichloropropene	6	U	6	U	10	U	6	U	6	U	6	U	8	U	6	U	6	U
1,2,3-trichloropropane	6	U	6	U	10	U	6	U	6	U	6	U	8	UJ	6	U	6	U
1,2-dibromo-3-chloropropane	12	U	12	U	20	U	13	U	12	U	12	U	16	UJ	13	U	12	U
1,2-dibromoethane	6	U	6	U	10	U	6	U	6	U	6	U	8	U	6	U	6	U
1,2-dichloroethane	6	U	6	U	10	U	6	U	6	U	6	U	8	U	6	U	6	U
1,2-dichloroethene (total)	6	U	6	U	10	U	6	U	6	U	6	U	8	U	6	U	6	U
1,2-dichloropropane	6	U	6	U	10	U	6	U	6	U	6	U	8	U	6	U	6	U
1,3-dichloropropane	6	U	6	U	10	U	6	U	6	U	6	U	8	U	6	U	6	U
2,2-dichloropropane	6	U	6	U	10	U	6	U	6	U	6	U	8	U	6	U	6	U
2-butanone	62	U	20	J	52	J	64	U	62	U	58	U	80	U	64	UJ	61	UJ
2-hexanone	25	U	25	U	39	U	25	U	25	U	23	U	32	U	26	U	25	U
4-chlorotoluene	6	U	6	U	10	U	6	U	6	U	6	U	8	UJ	6	U	6	U
4-methyl-2-pentanone	25	U	25	U	39	U	25	U	25	U	23	U	32	U	26	U	25	U
acetone	36	J	110		330		64	U	72	J	42	J	80	U	32	J	26	J
benzene	6	U	6	U	10	U	6	U	6	U	6	U	8	U	6	U	6	U
bromobenzene	6	U	6	U	10	U	6	U	6	U	6	U	8	UJ	6	U	6	U
bromochloromethane	6	U	6	U	10	U	6	U	6	U	6	U	8	U	6	U	6	U
bromodichloromethane	6	U	6	U	10	U	6	U	6	U	6	U	8	U	6	U	6	U
bromoform	6	U	6	U	10	U	6	U	6	U	6	U	8	UJ	6	U	6	U
bromomethane	12	U	12	U	20	U	13	U	12	U	12	U	16	U	13	U	12	U
carbon disulfide	6	U	6	U	3	J	6	U	6	U	6	U	8	U	6	U	6	U
carbon tetrachloride	6	U	6	U	10	U	6	U	6	U	6	U	8	U	6	U	6	U
chlorobenzene	6	U	6	U	10	U	6	U	6	U	6	U	8	UJ	6	U	6	U
chloroethane	12	U	12	U	20	U	13	U	12	U	12	U	16	U	13	U	12	U

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TABLE 2

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-TP-35-08		S6-TP-36-07		S6-TP-36-09		S6-TP-38-01		S6-TP-38-07		S6-TP-38-08		S6-TP-38-W1		S6-TP-39-08		S6-TP-39-09	
LOCATION:	S6-TP-35-08		S6-TP-36-07		S6-TP-36-09		S6-TP-38-01		S6-TP-38-07		S6-TP-38-08		S6-TP-38-W1		S6-TP-39-08		S6-TP-39-09	
DATA SOURCE:	Trench 4		Trench 4		Trench 4		Trench 4		Trench 4		Trench 4		Trench 4		Trench 4		Trench 4	
SAMPLE DATE:	02/21/97		02/21/97		02/21/97		02/24/97		02/24/97		02/24/97		02/24/97		02/25/97		02/25/97	
VOLATILES	ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg	
chloroform	6	U	6	U	10	U	6	U	6	U	6	U	8	U	6	U	6	U
chloromethane	12	U	12	U	20	U	13	U	12	U	12	U	16	U	13	U	12	U
cis-1,3-dichloropropene	6	U	6	U	10	U	6	U	6	U	6	U	8	U	6	U	6	U
dibromochloromethane	6	U	6	U	10	U	6	U	6	U	6	U	8	U	6	U	6	U
dichlorodifluoromethane	12	U	12	U	20	U	13	U	12	U	12	U	16	U	13	U	12	U
ethylbenzene	6	U	6	U	10	U	6	U	6	U	6	U	8	UJ	6	U	6	U
isopropylbenzene	6	U	6	U	10	U	6	U	6	U	6	U	8	UJ	6	U	6	U
methylene bromide	6	U	6	U	10	U	6	U	6	U	6	U	8	U	6	U	6	U
methylene chloride	6	U	7	B	23	B	6	U	6	U	6	U	8	U	8	B	4	B
n-butylbenzene	6	U	6	U	10	U	6	U	6	U	6	U	8	UJ	6	U	6	U
n-propylbenzene	6	U	6	U	10	U	6	U	6	U	6	U	8	UJ	6	U	6	U
o-chlorotoluene	6	U	6	U	10	U	6	U	6	U	6	U	8	UJ	6	U	6	U
p-isopropyltoluene	6	U	6	U	10	U	6	U	6	U	6	U	8	UJ	6	U	6	U
sec-butylbenzene	6	U	6	U	10	U	6	U	6	U	6	U	8	U	6	U	6	U
styrene	6	U	6	U	10	U	6	U	6	U	6	U	8	UJ	6	U	6	U
tert-butylbenzene	6	U	6	U	10	U	6	U	6	U	6	U	8	UJ	6	U	6	U
tetrachloroethene	6	U	6	U	10	U	6	U	6	U	6	U	8	U	6	U	6	U
toluene	6	U	1	J	3	J	6	U	6	U	6	U	8	U	6	U	6	U
trans-1,3-dichloropropene	6	U	6	U	10	U	6	U	6	U	6	U	8	U	6	U	6	U
trichloroethene	6	U	6	U	10	U	6	U	6	U	6	U	8	U	6	U	6	U
trichlorofluoromethane	12	U	12	U	20	U	13	U	12	U	12	U	16	U	13	U	12	U
vinyl chloride	12	U	12	U	20	U	13	U	12	U	12	U	16	U	13	U	12	U
xylene (total)	6	U	6	U	2	J	6	U	6	U	6	U	8	UJ	6	U	6	U

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B -- *Positive result is considered to be an artifact of blank contamination, and should not be considered present.*
R -- Positive result is considered unusable due to exceedance of technical quality control criteria.

TABLE 2

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-TP-35-08		S6-TP-36-07		S6-TP-36-09		S6-TP-38-01		S6-TP-38-07		S6-TP-38-08		S6-TP-38-W1		S6-TP-39-08		S6-TP-39-09	
LOCATION:	S6-TP-35-08		S6-TP-36-07		S6-TP-36-09		S6-TP-38-01		S6-TP-38-07		S6-TP-38-08		S6-TP-38-W1		S6-TP-39-08		S6-TP-39-09	
DATA SOURCE:	Trench 4		Trench 4		Trench 4		Trench 4		Trench 4		Trench 4		Trench 4		Trench 4		Trench 4	
SAMPLE DATE:	02/21/97		02/21/97		02/21/97		02/24/97		02/24/97		02/24/97		02/24/97		02/25/97		02/25/97	
PESTICIDES/PCBS	ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/kg	
Aroclor-1016	41	U	41	U	65	UR	42	U	41	U	39	U	53	U	42	U	41	U
Aroclor-1221	83	U	83	U	130	UR	85	U	83	U	78	U	110	U	86	U	82	U
Aroclor-1232	41	U	41	U	65	UR	42	U	41	U	39	U	53	U	42	U	41	U
Aroclor-1242	41	U	41	U	65	UR	42	U	41	U	39	U	53	U	42	U	41	U
Aroclor-1248	41	U	75	J	710	L	42	U	41	U	39	U	53	U	42	U	41	U
Aroclor-1254	41	U	41	U	65	UR	42	U	41	U	39	U	69		42	U	41	U
Aroclor-1260	13	J	82	U	580	L	42	U	41	U	39	U	67	J	42	U	41	U

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TABLE 2

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-TP-40-03		S6-TP-40-06		S6-TP-40-06-DU		S6-SB-1805		S6-SB-1807		S6-SB-1904		S6-SB-1906		S6-SB-2005		S6-SB-2104	
LOCATION:	S6-TP-40-03		S6-TP-40-06		S6-TP-40-06		S6-SB-1805		S6-SB-1807		S6-SB-1904		S6-SB-1906		S6-SB-2005		S6-SB-2104	
DATA SOURCE:	Trench 4		Trench 4		Trench 4		Trench 11		Trench 11		Trench 11		Trench 11		Trench 11		Trench 11	
SAMPLE DATE:	02/25/97		02/25/97		02/25/97		02/24/97		02/24/97		02/25/97		02/25/97		02/25/97		02/25/97	
INORGANICS	**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**	
aluminum	8330		7790		9280		4140		16400		7980		10300		9540		4100	
antimony	6.7	L	2.8	L	8.4		68	L	2.5	UL	8.4	L	2.4	UL	2.5	UL	11.4	L
arsenic	19.8	K	9.2	K	20.4	K	26.4		8.1		20.3	K	5.2	K	5.9	K	25.5	K
barium	173		100		194		211	L	59.6		184		38.6		27.4		234	L
beryllium	0.55		0.75		0.53		0.38		1.1		0.57		1		0.97		0.4	
cadmium	66.9	J	14.6	J	72		55.2		0.63	U	48.5	J	0.59	U	0.62	U	135	J
calcium	27900	J	10700	J	31100	J	123000	J	976	J	63700	J	675	J	1080	J	94900	J
chromium	2680	J	1110	J	3050		22900		26.8		5540	J	14.9	J	9.2	J	5690	J
cobalt	38.1	J	17.7	J	43.2		53.3	K	8.9		33.8	J	8	J	11.9	J	63.4	J
copper	162		65.5		197		598		20.1		313		25.8		10.4		361	
iron	143000		49100		167000	J	261000	J	24700	J	128000		15100		11700		261000	
lead	57.3		28.9		73.6		120		10.7		97.1		7.1	K	3.8	K	152	
magnesium	2360	J	1430	J	2610		3330		2950		2430	J	1490	J	723	J	3600	J
manganese	699	J	608	J	757	J	1320		227		731	J	444	J	637	J	852	J
mercury	1.6		0.18		1.5		4		0.13	U	2.8		0.12	U	0.12	U	5.6	
nickel	30.5	K	15.7	K	34.3	K	126		16.1		62.3	K	10.1	K	9.1		57.1	K
potassium	529		494		583		523	U	991		543		474		351		324	
selenium	5.8	U	5.1	U	6.1	U	13.9	UL	5	UL	7.4	U	4.8	U	5	U	6.6	U
silver	246	J	103	J	290		226		1.2	K	184	J	0.69	J	0.65	J	308	J
sodium	84.1		77		83.6		223		98.4		162		99		100		173	
thallium	35.9	J	9.3	J	34.5	J	69.9	K	6.7	K	32.8	J	3.6	UJ	3.7	UJ	74.9	J
vanadium	31.8	K	21.8		33	K	1.7	U	36.8		24.7	K	19.8		16.6		22.6	K
zinc	198	J	76.4	J	238	J	700		35.2		375	J	18.7	J	20.1	J	410	J

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TABLE 2

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-TP-40-03		S6-TP-40-06		S6-TP-40-06-DU		S6-SB-1805		S6-SB-1807		S6-SB-1904		S6-SB-1906		S6-SB-2005		S6-SB-2104	
LOCATION:	S6-TP-40-03		S6-TP-40-06		S6-TP-40-06		S6-SB-1805		S6-SB-1807		S6-SB-1904		S6-SB-1906		S6-SB-2005		S6-SB-2104	
DATA SOURCE:	Trench 4		Trench 4		Trench 4		Trench 11		Trench 11		Trench 11		Trench 11		Trench 11		Trench 11	
SAMPLE DATE:	02/25/97		02/25/97		02/25/97		02/24/97		02/24/97		02/25/97		02/25/97		02/25/97		02/25/97	
SEMIVOLATILES	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1,2,3-trichlorobenzene	7	U	6	U	8	U	87	U	6	U	9	U	6	U	6	U	8	U
1,2,4-trichlorobenzene	7	U	6	U	8	U	87	U	6	U	9	U	6	U	6	U	8	U
1,2,4-trimethylbenzene	7	U	6	U	8	U	87	U	6	U	9	U	6	U	6	U	8	U
1,2-dichlorobenzene	7	U	6	U	8	U	87	U	6	U	9	U	6	U	6	U	8	U
1,3,5-trimethylbenzene	7	U	6	U	8	U	87	U	6	U	9	U	6	U	6	U	8	U
1,3-dichlorobenzene	7	U	6	U	8	U	87	U	6	U	9	U	6	U	6	U	8	U
1,4-dichlorobenzene	7	U	6	U	8	U	87	U	6	U	9	U	6	U	6	U	8	U
2,2'-oxybis(1-chloropropane)	480	U	420	U	500	U	1200	U	410	U	610	U	390	U	410	U	550	U
2,4,5-trichlorophenol	480	U	420	U	500	U	1200	U	410	U	610	U	390	U	410	U	550	U
2,4,6-trichlorophenol	480	U	420	U	500	U	1200	U	410	U	610	U	390	U	410	U	550	U
2,4-dichlorophenol	480	U	420	U	500	U	1200	U	410	U	610	U	390	U	410	U	550	U
2,4-dimethylphenol	480	U	420	U	500	U	1200	U	410	U	610	U	390	U	410	U	550	U
2,4-dinitrophenol	480	U	420	U	500	U	1200	U	410	U	610	U	390	U	410	U	550	U
2,4-dinitrotoluene	480	U	420	U	500	U	1200	U	410	U	610	U	390	U	410	U	550	U
2,6-dinitrotoluene	480	U	420	U	500	U	1200	U	410	U	610	U	390	U	410	U	550	U
2-chlorophenol	480	U	420	U	500	U	1200	U	410	U	610	U	390	U	410	U	550	U
2-methylnaphthalene	480	U	420	U	500	U	1200	U	410	U	610	U	390	U	410	U	550	U
2-methylphenol	480	U	420	U	500	U	1200	U	410	U	610	U	390	U	410	U	550	U
2-nitroaniline	480	U	420	U	500	U	1200	U	410	U	610	U	390	U	410	U	550	U
2-nitrophenol	480	U	420	U	500	U	1200	U	410	U	610	U	390	U	410	U	550	U
3,3'-dichlorobenzidine	480	U	420	U	500	U	1200	U	410	U	610	U	390	U	410	U	550	U
3-nitroaniline	480	U	420	U	500	U	1200	U	410	U	610	U	390	U	410	U	550	U
4,6-dinitro-2-methylphenol	480	U	420	U	500	U	1200	U	410	U	610	U	390	U	410	U	550	U
4-bromophenyl phenyl ether	480	U	420	U	500	U	1200	U	410	U	610	U	390	U	410	U	550	U

NOTES:

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TABLE 2

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-TP-40-03	S6-TP-40-06	S6-TP-40-06-DU	S6-SB-1805	S6-SB-1807	S6-SB-1904	S6-SB-1906	S6-SB-2005	S6-SB-2104
LOCATION:	S6-TP-40-03	S6-TP-40-06	S6-TP-40-06	S6-SB-1805	S6-SB-1807	S6-SB-1904	S6-SB-1906	S6-SB-2005	S6-SB-2104
DATA SOURCE:	Trench 4	Trench 4	Trench 4	Trench 11	Trench 11	Trench 11	Trench 11	Trench 11	Trench 11
SAMPLE DATE:	02/25/97	02/25/97	02/25/97	02/24/97	02/24/97	02/25/97	02/25/97	02/25/97	02/25/97
SEMIVOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
4-chloro-3-methylphenol	480 U	420 U	500 U	1200 U	410 U	610 U	390 U	410 U	550 U
4-chloroaniline	480 U	420 U	500 U	1200 U	410 U	610 U	390 U	410 U	550 U
4-chlorophenyl phenyl ether	480 U	420 U	500 U	1200 U	410 U	610 U	390 U	410 U	550 U
4-methylphenol	480 U	420 U	500 U	1200 U	410 U	610 U	390 U	410 U	550 U
4-nitroaniline	480 U	420 U	500 U	1200 U	410 U	610 U	390 U	410 U	550 U
4-nitrophenol	480 U	420 U	500 U	1200 U	410 U	610 U	390 U	410 U	550 U
N-nitroso-di-n-propylamine	480 U	420 U	500 U	1200 U	410 U	610 U	390 U	410 U	550 U
N-nitrosodiphenylamine	480 U	420 U	500 U	1200 U	410 U	610 U	390 U	410 U	550 U
acenaphthene	480 U	420 U	500 U	1200 U	410 U	610 U	390 U	410 U	550 U
acenaphthylene	480 U	420 U	500 U	1200 U	410 U	610 U	390 U	410 U	550 U
anthracene	480 U	420 U	500 U	1200 U	410 U	610 U	390 U	410 U	550 U
benz(a)anthracene	480 U	420 U	500 U	1200 U	410 U	610 U	390 U	410 U	120 J
benzo(a)pyrene	480 U	420 U	500 U	140 J	410 U	610 U	390 U	410 U	150 J
benzo(b)fluoranthene	480 U	420 U	500 U	1200 U	410 U	610 U	390 U	410 U	140 J
benzo(g,h,i)perylene	480 U	420 U	500 U	1200 U	410 U	610 U	390 U	410 U	90 J
benzo(k)fluoranthene	480 U	420 U	500 U	1200 U	410 U	610 U	390 U	410 U	480 J
benzoic acid	480 U	420 U	500 U	1200 U	410 U	610 U	390 U	410 U	550 U
benzyl alcohol	480 U	420 U	500 U	1200 U	410 U	610 U	390 U	410 U	550 U
beta-chloronaphthalene	480 U	420 U	500 U	1200 U	410 U	610 U	390 U	410 U	550 U
bis(2-chloroethoxy)methane	480 U	420 U	500 U	1200 U	410 U	610 U	390 U	410 U	550 U
bis(2-chloroethyl)ether	480 U	420 U	500 U	1200 U	410 U	610 U	390 U	410 U	550 U
bis(2-ethylhexyl)phthalate	480 U	420 U	63 J	870 J	410 U	100 J	390 U	410 U	60 J
butylbenzylphthalate	480 U	420 U	500 U	1200 U	410 U	610 U	390 U	410 U	550 U
chrysene	480 U	420 U	500 U	1200 U	410 U	610 U	390 U	410 U	120 J
di-n-butylphthalate	480 U	420 U	36 J	370 J	42 J	610 U	390 U	120 J	60 J

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TABLE 2

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-TP-40-03		S6-TP-40-06		S6-TP-40-06-DU		S6-SB-1805		S6-SB-1807		S6-SB-1904		S6-SB-1906		S6-SB-2005		S6-SB-2104	
LOCATION:	S6-TP-40-03		S6-TP-40-06		S6-TP-40-06		S6-SB-1805		S6-SB-1807		S6-SB-1904		S6-SB-1906		S6-SB-2005		S6-SB-2104	
DATA SOURCE:	Trench 4		Trench 4		Trench 4		Trench 11		Trench 11		Trench 11		Trench 11		Trench 11		Trench 11	
SAMPLE DATE:	02/25/97		02/25/97		02/25/97		02/24/97		02/24/97		02/25/97		02/25/97		02/25/97		02/25/97	
SEMIVOLATILES	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
di-n-octylphthalate	480	U	420	U	500	U	1200	U	410	U	610	U	390	U	410	U	550	U
dibenz(a,h)anthracene	480	U	420	U	500	U	1200	U	410	U	610	U	390	U	410	U	550	U
dibenzofuran	480	U	420	U	500	U	1200	U	410	U	610	U	390	U	410	U	550	U
diethylphthalate	480	U	420	U	500	U	1200	U	410	U	610	U	390	U	410	U	550	U
dimethylphthalate	480	U	420	U	500	U	1200	U	410	U	610	U	390	U	410	U	550	U
fluoranthene	480	U	420	U	500	U	1200	U	410	U	610	U	390	U	410	U	210	J
fluorene	480	U	420	U	500	U	1200	U	410	U	610	U	390	U	410	U	550	U
hexachlorobenzene	480	U	420	U	500	U	1200	U	410	U	610	U	390	U	410	U	550	U
hexachlorobutadiene	7	U	6	U	8	U	87	U	6	U	9	U	6	U	6	U	8	U
hexachlorocyclopentadiene	480	U	420	U	500	U	1200	U	410	U	610	U	390	U	410	U	550	U
hexachloroethane	480	U	420	U	500	U	1200	U	410	U	610	U	390	U	410	U	550	U
indeno(1,2,3-cd)pyrene	480	U	420	U	500	U	1200	U	410	U	610	U	390	U	410	U	82	J
isophorone	480	U	420	U	500	U	1200	U	410	U	610	U	390	U	410	U	550	U
naphthalene	7	U	6	U	8	U	87	U	6	U	9	U	6	U	6	U	8	U
nitrobenzene	480	U	420	U	500	U	1200	U	410	U	610	U	390	U	410	U	550	U
pentachlorophenol	480	U	420	U	500	U	1200	U	410	U	610	U	390	U	410	U	550	U
phenanthrene	480	U	420	U	500	U	1200	U	410	U	610	U	390	U	410	U	98	J
phenol	480	U	420	U	500	U	1200	U	410	U	610	U	390	U	410	U	550	U
pyrene	480	U	420	U	500	U	1200	U	410	U	610	U	390	U	410	U	210	J
VOLATILES	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1,1,1,2-tetrachloroethane	7	U	6	U	8	U	87	U	6	U	9	U	6	U	6	U	8	U
1,1,1-trichloroethane	7	U	6	U	8	U	87	U	6	U	9	U	6	U	6	U	8	U
1,1,2,2-tetrachloroethane	7	U	6	U	8	U	87	U	6	U	9	U	6	U	6	U	8	U
1,1,2-trichloroethane	7	U	6	U	8	U	87	U	6	U	9	U	6	U	6	U	8	U
1,1-dichloroethane	7	U	6	U	8	U	87	U	6	U	9	U	6	U	6	U	8	U

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TABLE 2

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-TP-40-03		S6-TP-40-06		S6-TP-40-06-DU		S6-SB-1805		S6-SB-1807		S6-SB-1904		S6-SB-1906		S6-SB-2005		S6-SB-2104	
LOCATION:	S6-TP-40-03		S6-TP-40-06		S6-TP-40-06		S6-SB-1805		S6-SB-1807		S6-SB-1904		S6-SB-1906		S6-SB-2005		S6-SB-2104	
DATA SOURCE:	Trench 4		Trench 4		Trench 4		Trench 11		Trench 11		Trench 11		Trench 11		Trench 11		Trench 11	
SAMPLE DATE:	02/25/97		02/25/97		02/25/97		02/24/97		02/24/97		02/25/97		02/25/97		02/25/97		02/25/97	
VOLATILES	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1,1-dichloroethene	7	U	6	U	8	U	87	U	6	U	9	U	6	U	6	U	8	U
1,1-dichloropropene	7	U	6	U	8	U	87	U	6	U	9	U	6	U	6	U	8	U
1,2,3-trichloropropane	7	U	6	U	8	U	87	U	6	U	9	U	6	U	6	U	8	U
1,2-dibromo-3-chloropropane	15	U	13	U	15	U	170	U	13	U	19	U	12	U	12	U	17	U
1,2-dibromoethane	7	U	6	U	8	U	87	U	6	U	9	U	6	U	6	U	8	U
1,2-dichloroethane	7	U	6	U	8	U	87	U	6	U	9	U	6	U	6	U	8	U
1,2-dichloroethene (total)	7	U	6	U	8	U	87	U	6	U	9	U	6	U	6	U	8	U
1,2-dichloropropane	7	U	6	U	8	U	87	U	6	U	9	U	6	U	6	U	8	U
1,3-dichloropropane	7	U	6	U	8	U	87	U	6	U	9	U	6	U	6	U	8	U
2,2-dichloropropane	7	U	6	U	8	U	87	U	6	U	9	U	6	U	6	U	8	U
2-butanone	73	UJ	63	U	76	U	870	U	63	U	92	UJ	60	UJ	62	UJ	83	U
2-hexanone	29	U	25	U	30	U	350	U	25	U	37	U	24	U	25	U	33	U
4-chlorotoluene	7	U	6	U	8	U	87	U	6	U	9	U	6	U	6	U	8	U
4-methyl-2-pentanone	29	U	25	U	30	U	350	U	25	U	37	U	24	U	25	U	33	U
acetone	81	J	63	U	35	J	870	U	63	U	98	J	60	UJ	62	UJ	83	U
benzene	7	U	6	U	8	U	87	U	6	U	9	U	6	U	6	U	8	U
bromobenzene	7	U	6	U	8	U	87	U	6	U	9	U	6	U	6	U	8	U
bromochloromethane	7	U	6	U	8	U	87	U	6	U	9	U	6	U	6	U	8	U
bromodichloromethane	7	U	6	U	8	U	87	U	6	U	9	U	6	U	6	U	8	U
bromoform	7	U	6	U	8	U	87	U	6	U	9	U	6	U	6	U	8	U
bromomethane	15	U	13	U	15	U	170	U	13	U	19	U	12	U	12	U	17	U
carbon disulfide	7	U	6	U	8	U	87	U	6	U	9	U	6	U	6	U	8	U
carbon tetrachloride	7	U	6	U	8	U	87	U	6	U	9	U	6	U	6	U	8	U
chlorobenzene	7	U	6	U	8	U	87	U	6	U	9	U	6	U	6	U	8	U
chloroethane	15	U	13	U	15	U	170	U	13	U	19	U	12	U	12	U	17	U

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TABLE 2

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-TP-40-03	S6-TP-40-06	S6-TP-40-06-DU	S6-SB-1805	S6-SB-1807	S6-SB-1904	S6-SB-1906	S6-SB-2005	S6-SB-2104
LOCATION:	S6-TP-40-03	S6-TP-40-06	S6-TP-40-06	S6-SB-1805	S6-SB-1807	S6-SB-1904	S6-SB-1906	S6-SB-2005	S6-SB-2104
DATA SOURCE:	Trench 4	Trench 4	Trench 4	Trench 11	Trench 11	Trench 11	Trench 11	Trench 11	Trench 11
SAMPLE DATE:	02/25/97	02/25/97	02/25/97	02/24/97	02/24/97	02/25/97	02/25/97	02/25/97	02/25/97
VOLATILES	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
chloroform	7 U	6 U	8 U	87 U	6 U	9 U	6 U	6 U	8 U
chloromethane	15 U	13 U	15 U	170 U	13 U	19 U	12 U	12 U	17 U
cis-1,3-dichloropropene	7 U	6 U	8 U	87 U	6 U	9 U	6 U	6 U	8 U
dibromochloromethane	7 U	6 U	8 U	87 U	6 U	9 U	6 U	6 U	8 U
dichlorodifluoromethane	15 U	13 U	15 U	170 U	13 U	19 U	12 U	12 U	17 U
ethylbenzene	7 U	6 U	8 U	87 U	6 U	9 U	6 U	6 U	8 U
isopropylbenzene	7 U	6 U	8 U	87 U	6 U	9 U	6 U	6 U	8 U
methylene bromide	7 U	6 U	8 U	87 U	6 U	9 U	6 U	6 U	8 U
methylene chloride	7 U	10 B	8 U	87 U	6 U	8 B	6 U	6 U	24 B
n-butylbenzene	7 U	6 U	8 U	87 U	6 U	9 U	6 U	6 U	8 U
n-propylbenzene	7 U	6 U	8 U	87 U	6 U	9 U	6 U	6 U	8 U
o-chlorotoluene	7 U	6 U	8 U	87 U	6 U	9 U	6 U	6 U	8 U
p-isopropyltoluene	7 U	6 U	8 U	87 U	3 J	9 U	6 U	6 U	8 U
sec-butylbenzene	7 U	6 U	8 U	87 U	0.9 J	9 U	6 U	6 U	8 U
styrene	7 U	6 U	8 U	87 U	6 U	9 U	6 U	6 U	8 U
tert-butylbenzene	7 U	6 U	8 U	87 U	6 U	9 U	6 U	6 U	8 U
tetrachloroethene	7 U	6 U	8 U	28 J	6 U	9 U	6 U	6 U	8 U
toluene	7 U	6 U	8 U	87 U	6 U	9 U	6 U	6 U	2 J
trans-1,3-dichloropropene	7 U	6 U	8 U	87 U	6 U	9 U	6 U	6 U	8 U
trichloroethene	7 U	6 U	8 U	87 U	6 U	9 U	6 U	6 U	8 U
trichlorofluoromethane	15 U	13 U	15 U	170 U	13 U	19 U	12 U	12 U	17 U
vinyl chloride	15 U	13 U	15 U	170 U	13 U	19 U	12 U	12 U	17 U
xylene (total)	7 U	6 U	8 U	87 U	6 U	9 U	6 U	6 U	8 U

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ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-TP-40-03		S6-TP-40-06		S6-TP-40-06-DU		S6-SB-1805		S6-SB-1807		S6-SB-1904		S6-SB-1906		S6-SB-2005		S6-SB-2104	
LOCATION:	S6-TP-40-03		S6-TP-40-06		S6-TP-40-06		S6-SB-1805		S6-SB-1807		S6-SB-1904		S6-SB-1906		S6-SB-2005		S6-SB-2104	
DATA SOURCE:	Trench 4		Trench 4		Trench 4		Trench 11		Trench 11		Trench 11		Trench 11		Trench 11		Trench 11	
SAMPLE DATE:	02/25/97		02/25/97		02/25/97		02/24/97		02/24/97		02/25/97		02/25/97		02/25/97		02/25/97	
PESTICIDES/PCBS	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
Aroclor-1016	96	U	42	U	50	U	120	U	41	U	120	U	39	U	41	U	110	U
Aroclor-1221	190	U	85	U	100	U	230	U	84	U	250	U	80	U	83	U	220	U
Aroclor-1232	96	U	42	U	50	U	120	U	41	U	120	U	39	U	41	U	110	U
Aroclor-1242	96	U	42	U	50	U	120	U	41	U	120	U	39	U	41	U	110	U
Aroclor-1248	96	U	42	U	50	U	120	U	41	U	120	U	39	U	41	U	110	U
Aroclor-1254	96	U	42	U	50	U	750	J	41	U	610		39	U	41	U	110	U
Aroclor-1260	300		80		200		440	J	41	U	120	U	39	U	41	U	760	

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TABLE 2

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-SB-2504		S6-TP02-01		S6-TP04-01		S6-SB-3804		S6-SB-3806		S6-SB-3904		S6-SB-3909		S6-SB-4002		S6-SB-4005	
LOCATION:	S6-SB-2504		S6-TP02-01		S6-TP04-01		S6-SB-3804		S6-SB-3806		S6-SB-3904		S6-SB-3909		S6-SB-4002		S6-SB-4005	
DATA SOURCE:	Trench 11		Trench 11		Trench 11		Trench 12		Trench 12		Trench 12		Trench 12		Trench 12		Trench 12	
SAMPLE DATE:	02/25/97						03/12/97		03/12/97		03/12/97		03/12/97		03/12/97		03/12/97	
INORGANICS	**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**	
aluminum	14300		41400		14200		3300	J	10400	J	4350	J	9800	J	13000	J	18200	J
antimony	2.6	UL	19.3	U	8.7	U	6.9	L	2.5	UL	6.4	L	2.4	UL	2.9	UL	2.6	UL
arsenic	13.8	K	80.7		4.4		19.4	K	10.9	K	24.5	K	3.4		10	K	37.9	K
barium	90.1		922		40.5		250	L	49.3		281		50.7		177		80.3	
beryllium	1.3		0.68		0.92		0.33		1.1		0.3		1.2		0.82		4.6	
cadmium	0.65	U	78.2		0.38	U	42.4		0.61	U	32.5		0.59	U	2.5		0.64	U
calcium	1810	J	19000		976		110000	J	758	J	121000	J	558	J	6360	J	2110	J
chromium	28.7	J	219		19.7		5840	J	284	J	6910	J	20.3	J	70.5	J	12.7	J
cobalt	9.6	J	14.8		10.6		52.4	J	10.1	J	49.4	J	9.1	J	9.5	J	31.9	J
copper	11.5		1880		14.4		373		15.3		401		2.9		44.4		32.4	
iron	18200		29000		19300		232000		25200		225000		8310		19400		44900	
lead	29.1		39300		24.2		81.5		9.6		128		4.6		33.2		34.6	
magnesium	2010	J	4060		2430		4220	J	2790	J	5770	J	1590	J	1790	J	810	J
manganese	681	J	1020		420		751	J	295	J	899	J	406	J	309	J	947	J
mercury	0.13	U	1.4		0.06	U	2.1		0.12	U	3.1		0.12	U	2.2		0.13	U
nickel	13.6	K	345		11.8	K	113		13.5		39.4		17.7		12.8		17.5	
potassium	536		1550		719		295	U	557		305	U	778		554		331	
selenium	5.2	U	5		0.75	U	7.9	U	4.9	U	8.1	U	4.7	U	5.8	U	5.2	U
silver	0.93	J	170		0.94	U	319		2.4	K	310		0.79		7.5		1.9	K
sodium	83.3		740		68.1	U	180		114		198		113		113		83.7	
thallium	3.9	UJ	0.81	U	0.75	U	89.1	J	10	J	86	J	3.7	L	9	J	16.8	J
vanadium	30.5		25.9		28.1		12.6	K	38.8		14.3	K	11.3		31		35.2	K
zinc	54.8	J	3800		28		377	J	33	J	288	J	15.8	J	183	J	39.9	J

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TABLE 2

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-SB-2504	S6-TP02-01	S6-TP04-01	S6-SB-3804	S6-SB-3806	S6-SB-3904	S6-SB-3909	S6-SB-4002	S6-SB-4005
LOCATION:	S6-SB-2504	S6-TP02-01	S6-TP04-01	S6-SB-3804	S6-SB-3806	S6-SB-3904	S6-SB-3909	S6-SB-4002	S6-SB-4005
DATA SOURCE:	Trench 11	Trench 11	Trench 11	Trench 12	Trench 12	Trench 12	Trench 12	Trench 12	Trench 12
SAMPLE DATE:	02/25/97			03/12/97	03/12/97	03/12/97	03/12/97	03/12/97	03/12/97
SEMIVOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
1,2,3-trichlorobenzene	7 U	n/a	n/a	10 U	6 U	10 UJ	6 U	7 U	6 U
1,2,4-trichlorobenzene	7 U	n/a	n/a	10 U	6 U	10 UJ	6 U	7 U	6 U
1,2,4-trimethylbenzene	7 U	n/a	n/a	10 U	6 U	10 UJ	6 U	7 UJ	6 U
1,2-dichlorobenzene	7 U	n/a	n/a	10 U	6 U	10 UJ	6 U	7 U	6 U
1,3,5-trimethylbenzene	7 U	n/a	n/a	10 U	6 U	10 UJ	6 U	7 UJ	6 U
1,3-dichlorobenzene	7 U	n/a	n/a	10 U	6 U	10 UJ	6 U	7 UJ	6 U
1,4-dichlorobenzene	7 U	n/a	n/a	10 U	6 U	10 U	6 U	7 U	6 U
2,2'-oxybis(1-chloropropane)	430 U	n/a	n/a	650 U	410 U	670 U	390 U	480 U	430 U
2,4,5-trichlorophenol	430 U	n/a	n/a	650 U	410 U	670 U	390 U	480 U	430 U
2,4,6-trichlorophenol	430 U	n/a	n/a	650 U	410 U	670 U	390 U	480 U	430 U
2,4-dichlorophenol	430 U	n/a	n/a	650 U	410 U	670 U	390 U	480 U	430 U
2,4-dimethylphenol	430 U	n/a	n/a	650 U	410 U	670 U	390 U	480 U	430 U
2,4-dinitrophenol	430 U	n/a	n/a	650 U	410 U	670 U	390 U	480 U	430 U
2,4-dinitrotoluene	430 U	n/a	n/a	650 U	410 U	670 U	390 U	480 U	430 U
2,6-dinitrotoluene	430 U	n/a	n/a	650 U	410 U	670 U	390 U	480 U	430 U
2-chlorophenol	430 U	n/a	n/a	650 U	410 U	670 U	390 U	480 U	430 U
2-methylnaphthalene	430 U	n/a	n/a	650 U	410 U	670 U	390 U	480 U	430 U
2-methylphenol	430 U	n/a	n/a	650 U	410 U	670 U	390 U	480 U	430 U
2-nitroaniline	430 U	n/a	n/a	650 U	410 U	670 U	390 U	480 U	430 U
2-nitrophenol	430 U	n/a	n/a	650 U	410 U	670 U	390 U	480 U	430 U
3,3'-dichlorobenzidine	430 U	n/a	n/a	650 U	410 U	670 U	390 U	480 U	430 U
3-nitroaniline	430 U	n/a	n/a	650 U	410 U	670 U	390 U	480 U	430 U
4,6-dinitro-2-methylphenol	430 U	n/a	n/a	650 U	410 U	670 U	390 U	480 U	430 U
4-bromophenyl phenyl ether	430 U	n/a	n/a	650 U	410 U	670 U	390 U	480 U	430 U

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TABLE 2

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-SB-2504	S6-TP02-01	S6-TP04-01	S6-SB-3804	S6-SB-3806	S6-SB-3904	S6-SB-3909	S6-SB-4002	S6-SB-4005
LOCATION:	S6-SB-2504	S6-TP02-01	S6-TP04-01	S6-SB-3804	S6-SB-3806	S6-SB-3904	S6-SB-3909	S6-SB-4002	S6-SB-4005
DATA SOURCE:	Trench 11	Trench 11	Trench 11	Trench 12	Trench 12	Trench 12	Trench 12	Trench 12	Trench 12
SAMPLE DATE:	02/25/97			03/12/97	03/12/97	03/12/97	03/12/97	03/12/97	03/12/97
SEMIVOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
4-chloro-3-methylphenol	430 U	n/a	n/a	650 U	410 U	670 U	390 U	480 U	430 U
4-chloroaniline	430 U	n/a	n/a	650 U	410 U	670 U	390 U	480 U	430 U
4-chlorophenyl phenyl ether	430 U	n/a	n/a	650 U	410 U	670 U	390 U	480 U	430 U
4-methylphenol	430 U	n/a	n/a	650 U	410 U	670 U	390 U	480 U	430 U
4-nitroaniline	430 U	n/a	n/a	650 U	410 U	670 U	390 U	480 U	430 U
4-nitrophenol	430 U	n/a	n/a	650 U	410 U	670 U	390 U	480 U	430 U
N-nitroso-di-n-propylamine	430 U	n/a	n/a	650 U	410 U	670 U	390 U	480 U	430 U
N-nitrosodiphenylamine	430 U	n/a	n/a	650 U	410 U	670 U	390 U	480 U	430 U
acenaphthene	430 U	n/a	n/a	650 U	410 U	670 U	390 U	49 J	430 U
acenaphthylene	430 U	n/a	n/a	650 U	410 U	670 U	390 U	480 U	430 U
anthracene	430 U	n/a	n/a	650 U	410 U	670 U	390 U	180 J	430 U
benz(a)anthracene	430 U	n/a	n/a	180 J	410 U	91 J	390 U	1500	64 J
benzo(a)pyrene	430 U	n/a	n/a	210 J	410 U	110 J	390 U	2800	95 J
benzo(b)fluoranthene	430 U	n/a	n/a	650 U	410 U	670 U	390 U	4100	110 J
benzo(g,h,i)perylene	430 U	n/a	n/a	300 J	410 U	670 U	390 U	200 J	430 U
benzo(k)fluoranthene	430 U	n/a	n/a	650 U	410 U	670 U	390 U	1600	91 J
benzoic acid	430 U	n/a	n/a	650 U	410 U	670 U	390 U	290 B	430 U
benzyl alcohol	430 U	n/a	n/a	650 U	410 U	670 U	390 U	480 U	430 U
beta-chloronaphthalene	430 U	n/a	n/a	650 U	410 U	670 U	390 U	480 U	430 U
bis(2-chloroethoxy)methane	430 U	n/a	n/a	650 U	410 U	670 U	390 U	480 U	430 U
bis(2-chloroethyl)ether	430 U	n/a	n/a	650 U	410 U	670 U	390 U	480 U	430 U
bis(2-ethylhexyl)phthalate	430 U	n/a	n/a	1500	410 U	5400	390 U	1800	170 J
butylbenzylphthalate	430 U	n/a	n/a	70 J	410 U	670 U	390 U	480 U	430 U
chrysene	430 U	n/a	n/a	190 J	410 U	170 J	390 U	1600	76 J
di-n-butylphthalate	430 U	n/a	n/a	650 U	410 U	670 U	390 U	480 U	430 U

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TABLE 2

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-SB-2504	S6-TP02-01	S6-TP04-01	S6-SB-3804	S6-SB-3806	S6-SB-3904	S6-SB-3909	S6-SB-4002	S6-SB-4005
LOCATION:	S6-SB-2504	S6-TP02-01	S6-TP04-01	S6-SB-3804	S6-SB-3806	S6-SB-3904	S6-SB-3909	S6-SB-4002	S6-SB-4005
DATA SOURCE:	Trench 11	Trench 11	Trench 11	Trench 12	Trench 12	Trench 12	Trench 12	Trench 12	Trench 12
SAMPLE DATE:	02/25/97			03/12/97	03/12/97	03/12/97	03/12/97	03/12/97	03/12/97
SEMIVOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
di-n-octylphthalate	430 U	n/a	n/a	650 U	410 U	670 U	390 U	480 U	430 U
dibenz(a,h)anthracene	430 U	n/a	n/a	650 U	410 U	670 U	390 U	220 J	430 U
dibenzofuran	430 U	n/a	n/a	650 U	410 U	670 U	390 U	480 U	430 U
diethylphthalate	430 U	n/a	n/a	650 U	410 U	670 U	390 U	480 U	430 U
dimethylphthalate	430 U	n/a	n/a	650 U	410 U	670 U	390 U	480 U	430 U
fluoranthene	430 U	n/a	n/a	120 J	410 U	79 J	390 U	1800	50 J
fluorene	430 U	n/a	n/a	650 U	410 U	670 U	390 U	480 U	430 U
hexachlorobenzene	430 U	n/a	n/a	650 U	410 U	670 U	390 U	480 U	430 U
hexachlorobutadiene	7 U	n/a	n/a	10 U	6 U	10 UJ	6 U	7 U	6 U
hexachlorocyclopentadiene	430 U	n/a	n/a	650 U	410 U	670 U	390 U	480 U	430 U
hexachloroethane	430 U	n/a	n/a	650 U	410 U	670 U	390 U	480 U	430 U
indeno(1,2,3-cd)pyrene	430 U	n/a	n/a	110 J	410 U	670 U	390 U	1200	47 J
isophorone	430 U	n/a	n/a	650 U	410 U	670 U	390 U	480 U	430 U
naphthalene	7 U	n/a	n/a	10 U	6 U	10 UJ	6 U	7 U	6 U
nitrobenzene	430 U	n/a	n/a	650 U	410 U	670 U	390 U	480 U	430 U
pentachlorophenol	430 U	n/a	n/a	650 U	410 U	670 U	390 U	480 U	430 U
phenanthrene	430 U	n/a	n/a	650 U	410 U	670 U	390 U	580	430 U
phenol	430 U	n/a	n/a	650 U	410 U	670 U	390 U	480 U	430 U
pyrene	430 U	n/a	n/a	290 J	410 U	130 J	390 U	2000	76 J
VOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
1,1,1,2-tetrachloroethane	7 U	n/a	n/a	10 U	6 U	10 U	6 U	7 UJ	6 U
1,1,1-trichloroethane	7 U	19 U	11 U	10 U	6 U	10 U	6 U	7 U	6 U
1,1,2,2-tetrachloroethane	7 U	19 U	11 U	10 U	6 U	10 U	6 U	7 UJ	6 U
1,1,2-trichloroethane	7 U	19 U	11 U	10 U	6 U	10 U	6 U	7 U	6 U
1,1-dichloroethane	7 U	19 U	11 U	10 U	6 U	10 U	6 U	7 U	6 U

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TABLE 2

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-SB-2504	S6-TP02-01	S6-TP04-01	S6-SB-3804	S6-SB-3806	S6-SB-3904	S6-SB-3909	S6-SB-4002	S6-SB-4005
LOCATION:	S6-SB-2504	S6-TP02-01	S6-TP04-01	S6-SB-3804	S6-SB-3806	S6-SB-3904	S6-SB-3909	S6-SB-4002	S6-SB-4005
DATA SOURCE:	Trench 11	Trench 11	Trench 11	Trench 12	Trench 12	Trench 12	Trench 12	Trench 12	Trench 12
SAMPLE DATE:	02/25/97			03/12/97	03/12/97	03/12/97	03/12/97	03/12/97	03/12/97
VOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
1,1-dichloroethene	7 U	19 U	11 U	10 U	6 U	10 U	6 U	7 U	6 U
1,1-dichloropropene	7 U	n/a	n/a	10 U	6 U	10 U	6 U	7 U	6 U
1,2,3-trichloropropane	7 U	n/a	n/a	10 U	6 U	10 UJ	6 U	7 UJ	6 U
1,2-dibromo-3-chloropropane	13 U	n/a	n/a	20 U	12 U	20 UJ	12 U	14 U	13 U
1,2-dibromoethane	7 U	n/a	n/a	10 U	6 U	10 U	6 U	7 U	6 U
1,2-dichloroethane	7 U	19 U	11 U	10 U	6 U	10 U	6 U	7 U	6 U
1,2-dichloroethene (total)	7 U	19 U	11 U	10 U	6 U	10 U	6 U	7 U	6 U
1,2-dichloropropane	7 U	19 U	11 U	10 U	6 U	10 U	6 U	7 U	6 U
1,3-dichloropropane	7 U	n/a	n/a	10 U	6 U	10 UJ	6 U	7 U	6 U
2,2-dichloropropane	7 U	n/a	n/a	10 U	6 U	10 UJ	6 U	7 U	6 U
2-butanone	65 UJ	19 U	11 U	98 U	61 U	100 U	59 U	72 U	64 U
2-hexanone	26 U	19 U	11 U	39 U	25 U	41 U	24 U	29 U	26 U
4-chlorotoluene	7 U	n/a	n/a	10 U	6 U	10 UJ	6 U	7 UJ	6 U
4-methyl-2-pentanone	26 U	19 U	11 U	39 U	25 U	41 U	24 U	29 U	26 U
acetone	61 J	19 U	3 U	98 U	61 UJ	22 J	59 UJ	24 J	64 UJ
benzene	7 U	19 U	11 U	10 U	6 U	10 U	6 U	7 U	6 U
bromobenzene	7 U	n/a	n/a	10 U	6 U	10 UJ	6 U	7 UJ	6 U
bromochloromethane	7 U	n/a	n/a	10 U	6 U	10 U	6 U	7 U	6 U
bromodichloromethane	7 U	19 U	11 U	10 U	6 U	10 U	6 U	7 U	6 U
bromoform	7 U	19 U	11 U	10 U	6 U	10 U	6 U	7 UJ	6 U
bromomethane	13 U	19 U	11 U	20 U	12 U	20 U	12 U	14 U	13 U
carbon disulfide	7 U	19 U	11 U	10 U	6 U	10 U	6 U	7 U	6 U
carbon tetrachloride	7 U	19 U	11 U	10 U	6 U	10 U	6 U	7 U	6 U
chlorobenzene	7 U	19 U	11 U	10 U	6 U	10 U	6 U	7 UJ	6 U
chloroethane	13 U	19 U	11 U	20 U	12 U	20 U	12 U	14 U	13 U

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TABLE 2

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-SB-2504	S6-TP02-01	S6-TP04-01	S6-SB-3804	S6-SB-3806	S6-SB-3904	S6-SB-3909	S6-SB-4002	S6-SB-4005
LOCATION:	S6-SB-2504	S6-TP02-01	S6-TP04-01	S6-SB-3804	S6-SB-3806	S6-SB-3904	S6-SB-3909	S6-SB-4002	S6-SB-4005
DATA SOURCE:	Trench 11	Trench 11	Trench 11	Trench 12	Trench 12	Trench 12	Trench 12	Trench 12	Trench 12
SAMPLE DATE:	02/25/97			03/12/97	03/12/97	03/12/97	03/12/97	03/12/97	03/12/97
VOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
chloroform	7 U	19 U	11 U	10 U	6 U	10 U	6 U	7 U	6 U
chloromethane	13 U	19 U	11 U	20 U	12 U	20 U	12 U	14 U	13 U
cis-1,3-dichloropropene	7 U	19 U	11 U	10 U	6 U	10 U	6 U	7 U	6 U
dibromochloromethane	7 U	19 U	11 U	10 U	6 U	10 U	6 U	7 U	6 U
dichlorodifluoromethane	13 U	n/a	n/a	20 U	12 U	20 U	12 U	14 U	13 U
ethylbenzene	7 U	19 U	11 U	10 U	6 U	10 U	6 U	7 UJ	6 U
isopropylbenzene	7 U	n/a	n/a	10 U	6 U	10 UJ	6 U	7 UJ	6 U
methylene bromide	7 U	n/a	n/a	10 U	6 U	10 U	6 U	7 U	6 U
methylene chloride	7 U	10 U	4 U	10 U	6 U	10 U	6 U	7 U	6 U
n-butylbenzene	7 U	n/a	n/a	10 U	6 U	10 UJ	6 U	7 U	6 U
n-propylbenzene	7 U	n/a	n/a	10 U	6 U	10 UJ	6 U	7 UJ	6 U
o-chlorotoluene	7 U	n/a	n/a	10 U	6 U	10 UJ	6 U	7 UJ	6 U
p-isopropyltoluene	7 U	n/a	n/a	10 U	6 U	10 UJ	6 U	7 U	6 U
sec-butylbenzene	7 U	n/a	n/a	10 U	6 U	10 UJ	6 U	7 UJ	6 U
styrene	7 U	19 U	11 U	10 U	6 U	10 U	6 U	7 UJ	6 U
tert-butylbenzene	7 U	n/a	n/a	10 U	6 U	10 UJ	6 U	7 UJ	6 U
tetrachloroethene	7 U	19 U	11 U	10 U	6 U	10 U	6 U	7 U	6 U
toluene	7 U	19 U	11 U	10 U	6 U	10 U	6 U	7 U	6 U
trans-1,3-dichloropropene	7 U	19 U	11 U	10 U	6 U	10 U	6 U	7 U	6 U
trichloroethene	7 U	19 U	11 U	10 U	6 U	10 U	6 U	7 U	6 U
trichlorofluoromethane	13 U	n/a	n/a	20 U	12 U	20 U	12 U	14 U	13 U
vinyl chloride	13 U	19 U	11 U	20 U	12 U	20 U	12 U	14 U	13 U
xylene (total)	7 U	19 U	11 U	10 U	6 U	10 U	6 U	7 UJ	6 U

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TABLE 2

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-SB-2504	S6-TP02-01	S6-TP04-01	S6-SB-3804	S6-SB-3806	S6-SB-3904	S6-SB-3909	S6-SB-4002	S6-SB-4005
LOCATION:	S6-SB-2504	S6-TP02-01	S6-TP04-01	S6-SB-3804	S6-SB-3806	S6-SB-3904	S6-SB-3909	S6-SB-4002	S6-SB-4005
DATA SOURCE:	Trench 11	Trench 11	Trench 11	Trench 12	Trench 12	Trench 12	Trench 12	Trench 12	Trench 12
SAMPLE DATE:	02/25/97			03/12/97	03/12/97	03/12/97	03/12/97	03/12/97	03/12/97
PESTICIDES/PCBS	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
4,4'-DDD	n/a	6.3 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4,4'-DDE	n/a	6.3 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4,4'-DDT	n/a	6.3 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Aroclor-1016	43 U	63 U	n/a	130 U	41 U	130 U	39 U	480 U	43 U
Aroclor-1221	87 U	130 U	n/a	260 U	82 U	270 U	79 U	970 U	86 U
Aroclor-1232	43 U	63 U	n/a	130 U	41 U	130 U	39 U	480 U	43 U
Aroclor-1242	43 U	63 U	n/a	130 U	41 U	130 U	39 U	480 U	43 U
Aroclor-1248	43 U	63 U	n/a	130 U	41 U	130 U	39 U	480 U	43 U
Aroclor-1254	43 U	61 J	n/a	130 U	41 U	130 U	39 U	1800	43 U
Aroclor-1260	17 J	63 U	n/a	1100 K	13 J	1400 K	39 U	2300 K	120
aldrin	n/a	3.2 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a
alpha-BHC	n/a	3.2 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a
alpha-chlordane	n/a	8.4 J	n/a	n/a	n/a	n/a	n/a	n/a	n/a
beta-BHC	n/a	3.2 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a
delta-BHC	n/a	3.2 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a
dieldrin	n/a	6.1 J	n/a	n/a	n/a	n/a	n/a	n/a	n/a
endosulfan I	n/a	3.2 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a
endosulfan II	n/a	6.3 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a
endosulfan sulfate	n/a	6.3 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a
endrin	n/a	6.3 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a
endrin aldehyde	n/a	6.3 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a
endrin ketone	n/a	6.3 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a
gamma-BHC (Lindane)	n/a	3.2 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a
gamma-chlordane	n/a	9.2 J	n/a	n/a	n/a	n/a	n/a	n/a	n/a

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TABLE 2

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-SB-2504	S6-TP02-01	S6-TP04-01	S6-SB-3804	S6-SB-3806	S6-SB-3904	S6-SB-3909	S6-SB-4002	S6-SB-4005
LOCATION:	S6-SB-2504	S6-TP02-01	S6-TP04-01	S6-SB-3804	S6-SB-3806	S6-SB-3904	S6-SB-3909	S6-SB-4002	S6-SB-4005
DATA SOURCE:	Trench 11	Trench 11	Trench 11	Trench 12	Trench 12	Trench 12	Trench 12	Trench 12	Trench 12
SAMPLE DATE:	02/25/97			03/12/97	03/12/97	03/12/97	03/12/97	03/12/97	03/12/97
PESTICIDES/PCBS	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
heptachlor	n/a	3.2 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a
heptachlor epoxide	n/a	3.2 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a
methoxychlor	n/a	32 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a
toxaphene	n/a	320 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a

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TABLE 2

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-SB-4104	S6-SB-4106	S6-SB03-09	S6-TP09-01	S6-TP10-02	S6-TP26-03	S6-SB-3304	S6-SB10-05	S6-SB-2603
LOCATION:	S6-SB-4104	S6-SB-4106	S6-SB03-09	S6-TP09-01	S6-TP10-02	S6-TP26-03	S6-SB-3304	S6-SB10-05	S6-SB-2603
DATA SOURCE:	Trench 12	Trench 12	Trench 12	Trench 12	Trench 12	Trench 12	Trench 13	Trench 13	Trench 6B
SAMPLE DATE:	03/12/97	03/12/97					03/11/97		02/26/97
INORGANICS	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**
aluminum	12200 J	8490 J	13500	16400	17900	24000	10500	14800	13600
antimony	2.8 UL	2.5 UL	10.2 U	7.6 U	9.7 U	14.4 J	2.5 U	11.2 U	2.4 UL
arsenic	9.6 K	3.3	4 L	5.7 L	5.8	4.4	9.3 K	4.9	9.1 K
barium	162	14	39.2	93.9	51.9	54.9	39.9	58.7	28.7
beryllium	0.92	0.45	2.3	2.3	0.96	1.5	0.5	0.92	0.72
cadmium	1.7	0.62 U	0.45 U	0.33 U	0.42 U	0.34 U	0.63 U	0.49 U	0.59 U
calcium	6760 J	820 J	828	5610	1330	1750	684	705	895 J
chromium	159 J	8 J	12.4 J	31.1	26	21.9	20.7	24.1 J	13.8 J
cobalt	10.6 J	3.5 J	33.5	13.7	11.9	10.4	4.5	10.7	8.9 J
copper	88.2	12.5	26.9	28.2	15.3	16	8	15	9.8
iron	19400	4260	29100 J	36800 J	19500 J	19100	18300	22700 J	16700
lead	38.7	3.1 U	5.9 J	44.5	10.8	12.9	9 L	9.6 J	8 K
magnesium	1430 J	456 J	800	4590	1480	2020	1390	2830	1420 J
manganese	503 J	65 J	992 J	539	466	295	92.6	587 J	230 J
mercury	3.4	0.12 U	0.14 L	0.05 U	0.06 L	0.05 U	0.13 U	0.05 U	0.12 U
nickel	10.7	4.4	13.8 L	16.4 L	11.7	15.7 J	7.2	13.5	10.5 K
potassium	391	186 U	282	1690	777	1580	214	971	521
selenium	5.6 U	5 U	0.89 U	0.66 U	0.84 U	0.68 U	5 U	0.97 U	4.7 U
silver	13.5	0.62 U	1.1 U	0.83 U	1.1 U	0.86 U	0.63 U	1.2 U	0.69 J
sodium	113	107	73 L	94.8 L	48.5	52.8 U	61.7	71.4	89.4
thallium	7.6 J	4.6 J	0.89 U	0.66 U	0.84 U	0.68 U	8.6 K	0.97 U	5.3 J
vanadium	22.9	6.8	26.8	32.2	25.4	28	33.3	34.6	24.7
zinc	285 J	9.1 J	19.6	50.4	23.2	23.8	23.1 K	34.6	38 J

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TABLE 2

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-SB-4104		S6-SB-4106		S6-SB03-09	S6-TP09-01	S6-TP10-02		S6-TP26-03	S6-SB-3304		S6-SB10-05	S6-SB-2603	
LOCATION:	S6-SB-4104		S6-SB-4106		S6-SB03-09	S6-TP09-01	S6-TP10-02		S6-TP26-03	S6-SB-3304		S6-SB10-05	S6-SB-2603	
DATA SOURCE:	Trench 12		Trench 12		Trench 12	Trench 12	Trench 12		Trench 12	Trench 13		Trench 13	Trench 6B	
SAMPLE DATE:	03/12/97		03/12/97							03/11/97			02/26/97	
SEMIVOLATILES	**ug/kg**		**ug/kg**		**ug/kg**	**ug/kg**	**ug/kg**		**ug/kg**	**ug/kg**		**ug/kg**	**ug/kg**	
1,2,3-trichlorobenzene	7	U	6	U	n/a	n/a	n/a		n/a	6	U	n/a	6	U
1,2,4-trichlorobenzene	7	U	6	U	n/a	n/a	390	U	n/a	6	U	n/a	6	U
1,2,4-trimethylbenzene	7	U	6	U	n/a	n/a	n/a		n/a	6	U	n/a	6	U
1,2-dichlorobenzene	7	U	6	U	n/a	n/a	390	U	n/a	6	U	n/a	6	U
1,3,5-trimethylbenzene	7	U	6	U	n/a	n/a	n/a		n/a	6	U	n/a	6	U
1,3-dichlorobenzene	7	U	6	U	n/a	n/a	390	U	n/a	6	U	n/a	6	U
1,4-dichlorobenzene	7	U	6	U	n/a	n/a	390	U	n/a	6	U	n/a	6	U
2,2'-oxybis(1-chloropropane)	470	U	410	U	n/a	n/a	390	U	n/a	410	U	n/a	390	U
2,4,5-trichlorophenol	470	U	410	U	n/a	n/a	980	U	n/a	410	U	n/a	390	U
2,4,6-trichlorophenol	470	U	410	U	n/a	n/a	390	U	n/a	410	U	n/a	390	U
2,4-dichlorophenol	470	U	410	U	n/a	n/a	390	U	n/a	410	U	n/a	390	U
2,4-dimethylphenol	470	U	410	U	n/a	n/a	390	U	n/a	410	U	n/a	390	U
2,4-dinitrophenol	470	U	410	U	n/a	n/a	980	U	n/a	410	U	n/a	390	U
2,4-dinitrotoluene	470	U	410	U	n/a	n/a	390	U	n/a	410	U	n/a	390	U
2,6-dinitrotoluene	470	U	410	U	n/a	n/a	390	U	n/a	410	U	n/a	390	U
2-chlorophenol	470	U	410	U	n/a	n/a	390	U	n/a	410	U	n/a	390	U
2-methylnaphthalene	470	U	410	U	n/a	n/a	390	U	n/a	410	U	n/a	390	U
2-methylphenol	470	U	410	U	n/a	n/a	390	U	n/a	410	U	n/a	390	U
2-nitroaniline	470	U	410	U	n/a	n/a	980	U	n/a	410	U	n/a	390	U
2-nitrophenol	470	U	410	U	n/a	n/a	390	U	n/a	410	U	n/a	390	U
3,3'-dichlorobenzidine	470	U	410	U	n/a	n/a	390	U	n/a	410	U	n/a	390	U
3-nitroaniline	470	U	410	U	n/a	n/a	980	U	n/a	410	U	n/a	390	U
4,6-dinitro-2-methylphenol	470	U	410	U	n/a	n/a	980	U	n/a	410	U	n/a	390	U
4-bromophenyl phenyl ether	470	U	410	U	n/a	n/a	390	U	n/a	410	U	n/a	390	U

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ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-SB-4104		S6-SB-4106		S6-SB03-09	S6-TP09-01	S6-TP10-02		S6-TP26-03	S6-SB-3304		S6-SB10-05	S6-SB-2603	
LOCATION:	S6-SB-4104		S6-SB-4106		S6-SB03-09	S6-TP09-01	S6-TP10-02		S6-TP26-03	S6-SB-3304		S6-SB10-05	S6-SB-2603	
DATA SOURCE:	Trench 12		Trench 12		Trench 12	Trench 12	Trench 12		Trench 12	Trench 13		Trench 13	Trench 6B	
SAMPLE DATE:	03/12/97		03/12/97							03/11/97			02/26/97	
SEMIVOLATILES	**ug/kg**		**ug/kg**		**ug/kg**	**ug/kg**	**ug/kg**		**ug/kg**	**ug/kg**		**ug/kg**	**ug/kg**	
4-chloro-3-methylphenol	470	U	410	U	n/a	n/a	390	U	n/a	410	U	n/a	390	U
4-chloroaniline	470	U	410	U	n/a	n/a	390	U	n/a	410	U	n/a	390	U
4-chlorophenyl phenyl ether	470	U	410	U	n/a	n/a	390	U	n/a	410	U	n/a	390	U
4-methylphenol	470	U	410	U	n/a	n/a	390	U	n/a	410	U	n/a	390	U
4-nitroaniline	470	U	410	U	n/a	n/a	980	U	n/a	410	U	n/a	390	U
4-nitrophenol	470	U	410	U	n/a	n/a	980	U	n/a	410	U	n/a	390	U
N-nitroso-di-n-propylamine	470	U	410	U	n/a	n/a	390	U	n/a	410	U	n/a	390	U
N-nitrosodiphenylamine	470	U	410	U	n/a	n/a	390	U	n/a	410	U	n/a	390	U
acenaphthene	470	U	410	U	n/a	n/a	390	U	n/a	410	U	n/a	390	U
acenaphthylene	89	J	410	U	n/a	n/a	390	U	n/a	410	U	n/a	390	U
anthracene	340	J	410	U	n/a	n/a	390	U	n/a	410	U	n/a	390	U
benz(a)anthracene	610		410	U	n/a	n/a	390	U	n/a	130	J	n/a	390	U
benzo(a)pyrene	450	J	410	U	n/a	n/a	390	U	n/a	410	U	n/a	390	U
benzo(b)fluoranthene	1600		410	U	n/a	n/a	390	U	n/a	410	U	n/a	390	U
benzo(g,h,i)perylene	110	J	410	U	n/a	n/a	390	U	n/a	410	U	n/a	390	U
benzo(k)fluoranthene	530		410	U	n/a	n/a	390	U	n/a	410	U	n/a	390	U
benzoic acid	470	U	410	U	n/a	n/a	n/a		n/a	410	U	n/a	390	U
benzyl alcohol	470	U	410	U	n/a	n/a	n/a		n/a	410	U	n/a	390	U
beta-chloronaphthalene	470	U	410	U	n/a	n/a	390	U	n/a	410	U	n/a	390	U
bis(2-chloroethoxy)methane	470	U	410	U	n/a	n/a	390	U	n/a	410	U	n/a	390	U
bis(2-chloroethyl)ether	470	U	410	U	n/a	n/a	390	U	n/a	410	U	n/a	390	U
bis(2-ethylhexyl)phthalate	210	J	110	J	n/a	n/a	45	U	n/a	410	U	n/a	390	U
butylbenzylphthalate	55	J	410	U	n/a	n/a	390	U	n/a	410	U	n/a	390	U
carbazole	n/a		n/a		n/a	n/a	390	U	n/a	n/a		n/a	n/a	
chrysene	1100		410	U	n/a	n/a	390	U	n/a	410	U	n/a	390	U

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TABLE 2

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-SB-4104	S6-SB-4106	S6-SB03-09	S6-TP09-01	S6-TP10-02	S6-TP26-03	S6-SB-3304	S6-SB10-05	S6-SB-2603
LOCATION:	S6-SB-4104	S6-SB-4106	S6-SB03-09	S6-TP09-01	S6-TP10-02	S6-TP26-03	S6-SB-3304	S6-SB10-05	S6-SB-2603
DATA SOURCE:	Trench 12	Trench 12	Trench 12	Trench 12	Trench 12	Trench 12	Trench 13	Trench 13	Trench 6B
SAMPLE DATE:	03/12/97	03/12/97					03/11/97		02/26/97
SEMIVOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
di-n-butylphthalate	470 U	410 U	n/a	n/a	390 U	n/a	410 U	n/a	390 U
di-n-octylphthalate	470 U	410 U	n/a	n/a	390 U	n/a	410 U	n/a	390 U
dibenz(a,h)anthracene	470 U	410 U	n/a	n/a	390 U	n/a	410 U	n/a	390 U
dibenzofuran	470 U	410 U	n/a	n/a	390 U	n/a	410 U	n/a	390 U
diethylphthalate	470 U	410 U	n/a	n/a	390 U	n/a	410 U	n/a	390 U
dimethylphthalate	470 U	410 U	n/a	n/a	390 U	n/a	410 U	n/a	390 U
fluoranthene	1200	410 U	n/a	n/a	390 U	n/a	410 U	n/a	390 U
fluorene	470 U	410 U	n/a	n/a	390 U	n/a	410 U	n/a	390 U
hexachlorobenzene	470 U	410 U	n/a	n/a	390 U	n/a	410 U	n/a	390 U
hexachlorobutadiene	7 U	6 U	n/a	n/a	390 U	n/a	6 U	n/a	6 U
hexachlorocyclopentadiene	470 U	410 U	n/a	n/a	390 U	n/a	410 U	n/a	390 U
hexachloroethane	470 U	410 U	n/a	n/a	390 U	n/a	410 U	n/a	390 U
indeno(1,2,3-cd)pyrene	170 J	410 U	n/a	n/a	390 U	n/a	410 U	n/a	390 U
isophorone	470 U	410 U	n/a	n/a	390 U	n/a	410 U	n/a	390 U
naphthalene	7 U	6 U	n/a	n/a	390 U	n/a	6 U	n/a	6 U
nitrobenzene	470 U	410 U	n/a	n/a	390 U	n/a	410 U	n/a	390 U
pentachlorophenol	470 U	410 U	n/a	n/a	980 U	n/a	410 U	n/a	390 U
phenanthrene	560	410 U	n/a	n/a	390 U	n/a	410 U	n/a	390 U
phenol	470 U	410 U	n/a	n/a	300 U	n/a	410 U	n/a	390 U
pyrene	1500	410 U	n/a	n/a	390 U	n/a	410 U	n/a	390 U
VOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
1,1,1,2-tetrachloroethane	7 U	6 U	n/a	n/a	n/a	n/a	6 U	n/a	6 U
1,1,1-trichloroethane	7 U	6 U	14 U	12 U	12 U	13 U	6 U	12 U	6 U
1,1,2,2-tetrachloroethane	7 U	6 U	14 U	12 U	12 U	13 U	6 U	12 U	6 U
1,1,2-trichloroethane	7 U	6 U	14 U	12 U	12 U	13 U	6 U	12 U	6 U

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TABLE 2

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-SB-4104	S6-SB-4106	S6-SB03-09	S6-TP09-01	S6-TP10-02	S6-TP26-03	S6-SB-3304	S6-SB10-05	S6-SB-2603
LOCATION:	S6-SB-4104	S6-SB-4106	S6-SB03-09	S6-TP09-01	S6-TP10-02	S6-TP26-03	S6-SB-3304	S6-SB10-05	S6-SB-2603
DATA SOURCE:	Trench 12	Trench 12	Trench 12	Trench 12	Trench 12	Trench 12	Trench 13	Trench 13	Trench 6B
SAMPLE DATE:	03/12/97	03/12/97					03/11/97		02/26/97
VOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
1,1-dichloroethane	7 U	6 U	14 U	12 U	12 U	13 U	6 U	12 U	6 U
1,1-dichloroethene	7 U	6 U	14 U	12 U	12 U	13 U	6 U	12 U	6 U
1,1-dichloropropene	7 U	6 U	n/a	n/a	n/a	n/a	6 U	n/a	6 U
1,2,3-trichloropropane	7 U	6 U	n/a	n/a	n/a	n/a	6 U	n/a	6 U
1,2-dibromo-3-chloropropane	14 U	12 U	n/a	n/a	n/a	n/a	13 U	n/a	12 U
1,2-dibromoethane	7 U	6 U	n/a	n/a	n/a	n/a	6 U	n/a	6 U
1,2-dichloroethane	7 U	6 U	14 U	12 U	12 U	13 U	6 U	12 U	6 U
1,2-dichloroethene (total)	7 U	6 U	14 U	12 U	12 U	13 U	6 U	12 U	6 U
1,2-dichloropropane	7 U	6 U	14 U	12 U	12 U	13 U	6 U	12 U	6 U
1,3-dichloropropane	7 U	6 U	n/a	n/a	n/a	n/a	6 U	n/a	6 U
2,2-dichloropropane	7 U	6 U	n/a	n/a	n/a	n/a	6 U	n/a	6 U
2-butanone	70 U	62 U	14 U	12 U	12 U	13 U	63 U	12 U	59 UJ
2-hexanone	28 U	25 U	14 U	12 U	12 U	13 U	25 U	12 U	24 U
4-chlorotoluene	7 U	6 U	n/a	n/a	n/a	n/a	6 U	n/a	6 U
4-methyl-2-pentanone	28 U	25 U	14 U	12 U	12 U	13 U	25 U	12 U	24 U
acetone	70 U	62 U	5 U	2 U	2 U	13 U	63 UJ	2 U	69 J
benzene	7 U	6 U	14 U	12 U	12 U	13 U	6 U	12 U	6 U
bromobenzene	7 U	6 U	n/a	n/a	n/a	n/a	6 U	n/a	6 U
bromochloromethane	7 U	6 U	n/a	n/a	n/a	n/a	6 U	n/a	6 U
bromodichloromethane	7 U	6 U	14 U	12 U	12 U	13 U	6 U	12 U	6 U
bromoform	7 U	6 U	14 U	12 U	12 U	13 U	6 U	12 U	6 U
bromomethane	14 U	12 U	14 U	12 U	12 U	13 U	13 U	12 U	12 U
carbon disulfide	7 U	6 U	14 U	12 U	12 U	13 U	6 U	12 U	6 U
carbon tetrachloride	7 U	6 U	14 U	12 U	12 U	13 U	6 U	12 U	6 U
chlorobenzene	7 U	6 U	14 U	12 U	12 U	13 U	6 U	12 U	6 U

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TABLE 2

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-SB-4104	S6-SB-4106	S6-SB03-09	S6-TP09-01	S6-TP10-02	S6-TP26-03	S6-SB-3304	S6-SB10-05	S6-SB-2603
LOCATION:	S6-SB-4104	S6-SB-4106	S6-SB03-09	S6-TP09-01	S6-TP10-02	S6-TP26-03	S6-SB-3304	S6-SB10-05	S6-SB-2603
DATA SOURCE:	Trench 12	Trench 12	Trench 12	Trench 12	Trench 12	Trench 12	Trench 13	Trench 13	Trench 6B
SAMPLE DATE:	03/12/97	03/12/97					03/11/97		02/26/97
VOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
chloroethane	14 U	12 U	14 U	12 U	12 U	13 U	13 U	12 U	12 U
chloroform	7 U	6 U	14 U	12 U	12 U	13 U	6 U	12 U	6 U
chloromethane	14 U	12 U	14 U	12 U	12 U	13 U	13 U	12 U	12 U
cis-1,3-dichloropropene	7 U	6 U	14 U	12 U	12 U	13 U	6 U	12 U	6 U
dibromochloromethane	7 U	6 U	14 U	12 U	12 U	13 U	6 U	12 U	6 U
dichlorodifluoromethane	14 U	12 U	n/a	n/a	n/a	n/a	13 U	n/a	12 U
ethylbenzene	7 U	6 U	14 U	12 U	12 U	13 U	6 U	12 U	6 U
isopropylbenzene	7 U	6 U	n/a	n/a	n/a	n/a	6 U	n/a	6 U
methylene bromide	7 U	6 U	n/a	n/a	n/a	n/a	6 U	n/a	6 U
methylene chloride	7 U	6 U	4 U	3 U	3 U	2 U	6 U	6 U	6 U
n-butylbenzene	7 U	6 U	n/a	n/a	n/a	n/a	6 U	n/a	6 U
n-propylbenzene	7 U	6 U	n/a	n/a	n/a	n/a	6 U	n/a	6 U
o-chlorotoluene	7 U	6 U	n/a	n/a	n/a	n/a	6 U	n/a	6 U
p-isopropyltoluene	7 U	6 U	n/a	n/a	n/a	n/a	6 U	n/a	6 U
sec-butylbenzene	7 U	6 U	n/a	n/a	n/a	n/a	6 U	n/a	6 U
styrene	7 U	6 U	14 U	12 U	12 U	13 U	6 U	12 U	6 U
tert-butylbenzene	7 U	6 U	n/a	n/a	n/a	n/a	6 U	n/a	6 U
tetrachloroethene	7 U	6 U	14 U	12 U	12 U	13 U	6 U	12 U	6 U
toluene	7 U	6 U	14 U	12 U	12 U	13 U	6 U	12 U	6 U
trans-1,3-dichloropropene	7 U	6 U	14 U	12 U	12 U	13 U	6 U	12 U	6 U
trichloroethene	7 U	6 U	14 U	12 U	12 U	13 U	6 U	12 U	6 U
trichlorofluoromethane	14 U	12 U	n/a	n/a	n/a	n/a	13 U	n/a	12 U
vinyl chloride	14 U	12 U	14 U	12 U	12 U	13 U	13 U	12 U	12 U
xylene (total)	7 U	6 U	14 U	12 U	3 J	13 U	6 U	12 U	6 U

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TABLE 2

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-SB-4104	S6-SB-4106	S6-SB03-09	S6-TP09-01	S6-TP10-02	S6-TP26-03	S6-SB-3304	S6-SB10-05	S6-SB-2603
LOCATION:	S6-SB-4104	S6-SB-4106	S6-SB03-09	S6-TP09-01	S6-TP10-02	S6-TP26-03	S6-SB-3304	S6-SB10-05	S6-SB-2603
DATA SOURCE:	Trench 12	Trench 12	Trench 12	Trench 12	Trench 12	Trench 12	Trench 13	Trench 13	Trench 6B
SAMPLE DATE:	03/12/97	03/12/97					03/11/97		02/26/97
PESTICIDES/PCBS	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
4,4'-DDD	n/a	n/a	n/a	n/a	3.9 U	n/a	n/a	n/a	n/a
4,4'-DDE	n/a	n/a	n/a	n/a	3.9 U	n/a	n/a	n/a	n/a
4,4'-DDT	n/a	n/a	n/a	n/a	3.9 U	n/a	n/a	n/a	n/a
Aroclor-1016	93 U	41 U	n/a	n/a	39 U	n/a	41 U	n/a	39 U
Aroclor-1221	190 U	83 U	n/a	n/a	80 U	n/a	84 U	n/a	79 U
Aroclor-1232	93 U	41 U	n/a	n/a	39 U	n/a	41 U	n/a	39 U
Aroclor-1242	93 U	41 U	n/a	n/a	39 U	n/a	41 U	n/a	39 U
Aroclor-1248	93 U	41 U	n/a	n/a	39 U	n/a	41 U	n/a	39 U
Aroclor-1254	180	41 U	n/a	n/a	7.2 J	n/a	41 U	n/a	39 U
Aroclor-1260	270	11 J	n/a	n/a	39 U	n/a	41 U	n/a	39 U
aldrin	n/a	n/a	n/a	n/a	2 U	n/a	n/a	n/a	n/a
alpha-BHC	n/a	n/a	n/a	n/a	2 U	n/a	n/a	n/a	n/a
alpha-chlordane	n/a	n/a	n/a	n/a	2 U	n/a	n/a	n/a	n/a
beta-BHC	n/a	n/a	n/a	n/a	2 U	n/a	n/a	n/a	n/a
delta-BHC	n/a	n/a	n/a	n/a	2 U	n/a	n/a	n/a	n/a
dieldrin	n/a	n/a	n/a	n/a	3.9 U	n/a	n/a	n/a	n/a
endosulfan I	n/a	n/a	n/a	n/a	2 U	n/a	n/a	n/a	n/a
endosulfan II	n/a	n/a	n/a	n/a	3.9 U	n/a	n/a	n/a	n/a
endosulfan sulfate	n/a	n/a	n/a	n/a	3.9 U	n/a	n/a	n/a	n/a
endrin	n/a	n/a	n/a	n/a	3.9 U	n/a	n/a	n/a	n/a
endrin aldehyde	n/a	n/a	n/a	n/a	3.9 U	n/a	n/a	n/a	n/a
endrin ketone	n/a	n/a	n/a	n/a	3.9 U	n/a	n/a	n/a	n/a
gamma-BHC (Lindane)	n/a	n/a	n/a	n/a	2 U	n/a	n/a	n/a	n/a
gamma-chlordane	n/a	n/a	n/a	n/a	2 U	n/a	n/a	n/a	n/a

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TABLE 2

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-SB-4104	S6-SB-4106	S6-SB03-09	S6-TP09-01	S6-TP10-02	S6-TP26-03	S6-SB-3304	S6-SB10-05	S6-SB-2603
LOCATION:	S6-SB-4104	S6-SB-4106	S6-SB03-09	S6-TP09-01	S6-TP10-02	S6-TP26-03	S6-SB-3304	S6-SB10-05	S6-SB-2603
DATA SOURCE:	Trench 12	Trench 12	Trench 12	Trench 12	Trench 12	Trench 12	Trench 13	Trench 13	Trench 6B
SAMPLE DATE:	03/12/97	03/12/97					03/11/97		02/26/97
PESTICIDES/PCBS	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
heptachlor	n/a	n/a	n/a	n/a	2 U	n/a	n/a	n/a	n/a
heptachlor epoxide	n/a	n/a	n/a	n/a	2 U	n/a	n/a	n/a	n/a
methoxychlor	n/a	n/a	n/a	n/a	20 U	n/a	n/a	n/a	n/a
toxaphene	n/a	n/a	n/a	n/a	200 U	n/a	n/a	n/a	n/a

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TABLE 2

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-SB-3703		S6-SB04-06		S6-TP-27-06		S6-TP-27-10		S6-SB-3211		S6-SB09-02		S6-TP13-01		S6-TP14-02		S6-TP14-02-DUP	
LOCATION:	S6-SB-3703		S6-SB04-06		S6-TP-27-06		S6-TP-27-10		S6-SB-3211		S6-SB09-02		S6-TP13-01		S6-TP14-02		S6-TP14-02	
DATA SOURCE:	Trench 6B		Trench 6B		Trench 6B		Trench 6B		Trench 6D		Trench 6D		Trench 6D		Trench 6D		Trench 6D	
SAMPLE DATE:	03/11/97				02/17/97		02/17/97		02/26/97									
INORGANICS	**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**	
aluminum	11700		7040		15300		9390		10800		18300		17400		14800		14700	
antimony	2.5	U	8.6	U	2.6	UL	2.4	UL	2.5	UL	9.5	U	10.1	U	10.4	U	9	U
arsenic	9	K	0.86		8.8		7.7		11	K	5.8		6.1		6.8		5.3	
barium	41.6		13.5		48.3		26.7		34.6		49.7		58		50.4		67.7	
beryllium	0.99		0.53		1		0.75		0.58		0.63		0.74		0.65		0.6	
cadmium	0.61	U	0.37	U	0.64	U	0.6	U	0.61	U	0.41	U	0.44	U	0.45	U	0.39	U
calcium	1000		340		1540		653		853	J	1060		633		1420		2030	
chromium	23.8		6.4	U	57.2		9		20.1		26.1		28.5		36.9		140	
cobalt	5.5		4.5		10.1		8		6.8		9.2		8.6		7.2		7.3	
copper	11.6		4.6	L	16.5		8.8		11.2		14.1		11		10.8		24.4	
iron	17200		6300	J	20900		10100		20700	J	24500	J	23000	J	23600	J	22400	J
lead	9.6	L	3.8	J	10.7	L	3.1	L	9.3		10.4	J	14.2		13.5		20.1	
magnesium	2060		649		1870		653		2140		2690		2230		2020		2140	
manganese	151		267	J	309		289		296	J	379	J	375		375		262	
mercury	0.12	U	0.06	U	0.13	U	0.12	U	0.12	U	0.05	U	0.05	U	0.14	L	0.74	L
nickel	10.9		4.6		13.4		6.3		10.8	K	13.3		10.8		9		11.4	
potassium	654		138		635		202		474		911		654		689		631	
selenium	4.9	U	0.75	U	5.1	UL	4.8	U	4.9	U	0.83	U	0.88	U	0.9	U	0.78	U
silver	0.75	K	0.94	U	2.4	K	0.6	U	0.97	K	1	U	1.1	U	1.1	U	0.98	U
sodium	83.8		66.3		59.9		95.8		74.9		76.5		44.6		44.3		47.7	
thallium	8.2	K	0.75	U	3.8	UL	3.6	UL	3.7	UJ	0.83	U	0.88	U	0.9	U	0.78	U
vanadium	29.3		8		29.6		14.2		31		40.7		36.6		34.2		31.7	
zinc	24.6	K	11.4		32.5	J	11.3	J	37.4	J	33.4		33.8		33.8		59.3	

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UR -- Non-detected result is considered unusable due to exceedance of technical quality control criteria.
L -- Positive result is considered biased low due to exceedance of technical quality control criteria.
K -- Positive result is considered biased high due to exceedance of technical quality control criteria.
B -- Positive result is considered to be an artifact of blank contamination, and should not be considered present.
R -- Positive result is considered unusable due to exceedance of technical quality control criteria.

TABLE 2

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-SB-3703	S6-SB04-06	S6-TP-27-06	S6-TP-27-10	S6-SB-3211	S6-SB09-02	S6-TP13-01	S6-TP14-02	S6-TP14-02-DUP
LOCATION:	S6-SB-3703	S6-SB04-06	S6-TP-27-06	S6-TP-27-10	S6-SB-3211	S6-SB09-02	S6-TP13-01	S6-TP14-02	S6-TP14-02
DATA SOURCE:	Trench 6B	Trench 6B	Trench 6B	Trench 6B	Trench 6D	Trench 6D	Trench 6D	Trench 6D	Trench 6D
SAMPLE DATE:	03/11/97		02/17/97	02/17/97	02/26/97				
SEMIVOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
1,2,3-trichlorobenzene	6 U	n/a	6 U	6 U	6 U	n/a	n/a	n/a	n/a
1,2,4-trichlorobenzene	6 U	n/a	6 U	6 U	6 U	400 U	400 U	400 U	400 U
1,2,4-trimethylbenzene	6 U	n/a	6 U	6 U	6 U	n/a	n/a	n/a	n/a
1,2-dichlorobenzene	6 U	n/a	6 U	6 U	6 U	400 U	400 U	400 U	400 U
1,3,5-trimethylbenzene	6 U	n/a	6 U	6 U	6 U	n/a	n/a	n/a	n/a
1,3-dichlorobenzene	6 U	n/a	6 U	6 U	6 U	400 U	400 U	400 U	400 U
1,4-dichlorobenzene	6 U	n/a	6 U	6 U	6 U	400 U	400 U	400 U	400 U
2,2'-oxybis(1-chloropropane)	410 U	n/a	420 U	390 U	400 U	400 U	400 U	400 U	400 U
2,4,5-trichlorophenol	410 U	n/a	420 U	390 U	400 U	1000 U	1000 U	990 U	1000 U
2,4,6-trichlorophenol	410 U	n/a	420 U	390 U	400 U	400 U	400 U	400 U	400 U
2,4-dichlorophenol	410 U	n/a	420 U	390 U	400 U	400 U	400 U	400 U	400 U
2,4-dimethylphenol	410 U	n/a	420 U	390 U	400 U	400 U	400 U	400 U	400 U
2,4-dinitrophenol	410 U	n/a	420 U	390 U	400 U	1000 U	1000 U	990 U	1000 U
2,4-dinitrotoluene	410 U	n/a	420 U	390 U	400 U	400 U	400 U	400 U	400 U
2,6-dinitrotoluene	410 U	n/a	420 U	390 U	400 U	400 U	400 U	400 U	400 U
2-chlorophenol	410 U	n/a	420 U	390 U	400 U	400 U	400 U	400 U	400 U
2-methylnaphthalene	410 U	n/a	420 U	390 U	400 U	400 U	400 U	400 U	400 U
2-methylphenol	410 U	n/a	420 U	390 U	400 U	400 U	400 U	400 U	400 U
2-nitroaniline	410 U	n/a	420 U	390 U	400 U	1000 U	1000 U	990 U	1000 U
2-nitrophenol	410 U	n/a	420 U	390 U	400 U	400 U	400 U	400 U	400 U
3,3'-dichlorobenzidine	410 U	n/a	420 U	390 U	400 U	400 U	400 U	400 U	400 U
3-nitroaniline	410 U	n/a	420 U	390 U	400 U	1000 U	1000 U	990 U	1000 U
4,6-dinitro-2-methylphenol	410 U	n/a	420 U	390 U	400 U	1000 U	1000 U	990 U	1000 U
4-bromophenyl phenyl ether	410 U	n/a	420 U	390 U	400 U	400 U	400 U	400 U	400 U

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UR -- Non-detected result is considered unusable due to exceedance of technical quality control criteria.
L -- Positive result is considered biased low due to exceedance of technical quality control criteria.
K -- Positive result is considered biased high due to exceedance of technical quality control criteria.
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R -- Positive result is considered unusable due to exceedance of technical quality control criteria.

TABLE 2

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-SB-3703	S6-SB04-06	S6-TP-27-06	S6-TP-27-10	S6-SB-3211	S6-SB09-02	S6-TP13-01	S6-TP14-02	S6-TP14-02-DUP
LOCATION:	S6-SB-3703	S6-SB04-06	S6-TP-27-06	S6-TP-27-10	S6-SB-3211	S6-SB09-02	S6-TP13-01	S6-TP14-02	S6-TP14-02
DATA SOURCE:	Trench 6B	Trench 6B	Trench 6B	Trench 6B	Trench 6D	Trench 6D	Trench 6D	Trench 6D	Trench 6D
SAMPLE DATE:	03/11/97		02/17/97	02/17/97	02/26/97				
SEMIVOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
4-chloro-3-methylphenol	410 U	n/a	420 U	390 U	400 U	400 U	400 U	400 U	400 U
4-chloroaniline	410 U	n/a	420 U	390 U	400 U	400 U	400 U	400 U	400 U
4-chlorophenyl phenyl ether	410 U	n/a	420 U	390 U	400 U	400 U	400 U	400 U	400 U
4-methylphenol	410 U	n/a	420 U	390 U	400 U	400 U	400 U	400 U	400 U
4-nitroaniline	410 U	n/a	420 U	390 U	400 U	1000 U	1000 U	990 U	1000 U
4-nitrophenol	410 U	n/a	420 U	390 U	400 U	1000 U	1000 U	990 U	1000 U
N-nitroso-di-n-propylamine	410 U	n/a	420 U	390 U	400 U	400 U	400 U	400 U	400 U
N-nitrosodiphenylamine	410 U	n/a	420 U	390 U	400 U	400 U	400 U	400 U	400 U
acenaphthene	410 U	n/a	420 U	390 U	400 U	400 U	400 U	400 U	400 U
acenaphthylene	410 U	n/a	420 U	390 U	400 U	400 U	400 U	400 U	400 U
anthracene	410 U	n/a	420 U	390 U	400 U	400 U	400 U	400 U	400 U
benz(a)anthracene	410 U	n/a	420 U	390 U	400 U	400 U	400 U	61 J	400 U
benzo(a)pyrene	410 U	n/a	420 U	390 U	400 U	400 U	400 U	68 J	400 U
benzo(b)fluoranthene	410 U	n/a	420 U	390 U	400 U	400 U	400 U	89 J	400 U
benzo(g,h,i)perylene	410 U	n/a	420 U	390 U	400 U	400 U	400 U	53 J	400 U
benzo(k)fluoranthene	410 U	n/a	420 U	390 U	400 U	400 U	400 U	400 U	400 U
benzoic acid	410 U	n/a	420 U	390 U	400 U	n/a	n/a	n/a	n/a
benzyl alcohol	410 U	n/a	420 U	390 U	400 U	n/a	n/a	n/a	n/a
beta-chloronaphthalene	410 U	n/a	420 U	390 U	400 U	400 U	400 U	400 U	400 U
bis(2-chloroethoxy)methane	410 U	n/a	420 U	390 U	400 U	400 U	400 U	400 U	400 U
bis(2-chloroethyl)ether	410 U	n/a	420 U	390 U	400 U	400 U	400 U	400 U	400 U
bis(2-ethylhexyl)phthalate	410 U	n/a	120 B	94 B	400 U	400 U	400 U	180 U	210 U
butylbenzylphthalate	410 U	n/a	420 U	390 U	400 U	400 U	400 U	400 U	400 U
carbazole	n/a	n/a	n/a	n/a	n/a	400 U	400 U	400 U	400 U
chrysene	410 U	n/a	420 U	390 U	400 U	400 U	400 U	65 J	400 U

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TABLE 2

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-SB-3703	S6-SB04-06	S6-TP-27-06	S6-TP-27-10	S6-SB-3211	S6-SB09-02	S6-TP13-01	S6-TP14-02	S6-TP14-02-DUP
LOCATION:	S6-SB-3703	S6-SB04-06	S6-TP-27-06	S6-TP-27-10	S6-SB-3211	S6-SB09-02	S6-TP13-01	S6-TP14-02	S6-TP14-02
DATA SOURCE:	Trench 6B	Trench 6B	Trench 6B	Trench 6B	Trench 6D	Trench 6D	Trench 6D	Trench 6D	Trench 6D
SAMPLE DATE:	03/11/97		02/17/97	02/17/97	02/26/97				
SEMIVOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
di-n-butylphthalate	410 U	n/a	420 U	390 U	400 U	400 U	400 U	400 U	400 U
di-n-octylphthalate	410 U	n/a	420 U	390 U	400 U	400 U	400 U	400 U	400 U
dibenz(a,h)anthracene	410 U	n/a	420 U	390 U	400 U	400 U	400 U	400 U	400 U
dibenzofuran	410 U	n/a	420 U	390 U	400 U	400 U	400 U	400 U	400 U
diethylphthalate	410 U	n/a	420 U	390 U	400 U	400 U	400 U	400 U	400 U
dimethylphthalate	410 U	n/a	420 U	390 U	400 U	400 U	400 U	400 U	400 U
fluoranthene	410 U	n/a	420 U	390 U	400 U	400 U	400 U	130 J	44 J
fluorene	410 U	n/a	420 U	390 U	400 U	400 U	400 U	400 U	400 U
hexachlorobenzene	410 U	n/a	420 U	390 U	400 U	400 U	400 U	400 U	400 U
hexachlorobutadiene	6 U	n/a	6 U	6 U	6 U	400 U	400 U	400 U	400 U
hexachlorocyclopentadiene	410 U	n/a	420 U	390 U	400 U	400 U	400 U	400 U	400 U
hexachloroethane	410 U	n/a	420 U	390 U	400 U	400 U	400 U	400 U	400 U
indeno(1,2,3-cd)pyrene	410 U	n/a	420 U	390 U	400 U	400 U	400 U	46 J	400 U
isophorone	410 U	n/a	420 U	390 U	400 U	400 U	400 U	400 U	400 U
naphthalene	6 U	n/a	6 U	6 U	6 U	400 U	400 U	400 U	400 U
nitrobenzene	410 U	n/a	420 U	390 U	400 U	400 U	400 U	400 U	400 U
pentachlorophenol	410 U	n/a	420 U	390 U	400 U	1000 U	1000 U	990 U	1000 U
phenanthrene	410 U	n/a	420 U	390 U	400 U	400 U	400 U	78 J	400 U
phenol	410 U	n/a	420 U	390 U	400 U	400 U	400 U	330 U	260 U
pyrene	410 U	n/a	420 U	390 U	400 U	400 U	400 U	120 J	400 U
VOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
1,1,1,2-tetrachloroethane	6 U	n/a	6 U	6 U	6 U	n/a	n/a	n/a	n/a
1,1,1-trichloroethane	6 U	11 U	6 U	6 U	6 U	12 U	12 U	12 U	11 U
1,1,2,2-tetrachloroethane	6 U	11 U	6 U	6 U	6 U	12 U	12 U	12 U	11 U
1,1,2-trichloroethane	6 U	11 U	6 U	6 U	6 U	12 U	12 U	12 U	11 U

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TABLE 2

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-SB-3703	S6-SB04-06	S6-TP-27-06	S6-TP-27-10	S6-SB-3211	S6-SB09-02	S6-TP13-01	S6-TP14-02	S6-TP14-02-DUP
LOCATION:	S6-SB-3703	S6-SB04-06	S6-TP-27-06	S6-TP-27-10	S6-SB-3211	S6-SB09-02	S6-TP13-01	S6-TP14-02	S6-TP14-02
DATA SOURCE:	Trench 6B	Trench 6B	Trench 6B	Trench 6B	Trench 6D	Trench 6D	Trench 6D	Trench 6D	Trench 6D
SAMPLE DATE:	03/11/97		02/17/97	02/17/97	02/26/97				
VOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
1,1-dichloroethane	6 U	11 U	6 U	6 U	6 U	12 U	12 U	12 U	11 U
1,1-dichloroethene	6 U	11 U	6 U	6 U	6 U	12 U	12 U	12 U	11 U
1,1-dichloropropene	6 U	n/a	6 U	6 U	6 U	n/a	n/a	n/a	n/a
1,2,3-trichloropropane	6 U	n/a	6 U	6 U	6 U	n/a	n/a	n/a	n/a
1,2-dibromo-3-chloropropane	12 U	n/a	13 U	12 U	12 U	n/a	n/a	n/a	n/a
1,2-dibromoethane	6 U	n/a	6 U	6 U	6 U	n/a	n/a	n/a	n/a
1,2-dichloroethane	6 U	11 U	6 U	6 U	6 U	12 U	12 U	12 U	11 U
1,2-dichloroethene (total)	6 U	11 U	6 U	6 U	6 U	12 U	12 U	12 U	11 U
1,2-dichloropropane	6 U	11 U	6 U	6 U	6 U	12 U	12 U	12 U	11 U
1,3-dichloropropane	6 U	n/a	6 U	6 U	6 U	n/a	n/a	n/a	n/a
2,2-dichloropropane	6 U	n/a	6 U	6 U	6 U	n/a	n/a	n/a	n/a
2-butanone	61 U	11 U	64 U	60 U	61 U	12 U	12 U	12 U	11 U
2-hexanone	25 U	11 U	26 U	24 U	25 U	12 U	12 U	12 U	11 U
4-chlorotoluene	6 U	n/a	6 U	6 U	6 U	n/a	n/a	n/a	n/a
4-methyl-2-pentanone	25 U	11 U	26 U	24 U	25 U	12 U	12 U	12 U	11 U
acetone	61 U	2 U	64 U	60 U	61 U	2 U	3 U	12 U	2 U
benzene	6 U	11 U	6 U	6 U	6 U	12 U	12 U	12 U	11 U
bromobenzene	6 U	n/a	6 U	6 U	6 U	n/a	n/a	n/a	n/a
bromochloromethane	6 U	n/a	6 U	6 U	6 U	n/a	n/a	n/a	n/a
bromodichloromethane	6 U	11 U	6 U	6 U	6 U	12 U	12 U	12 U	11 U
bromoform	6 U	11 U	6 U	6 U	6 U	12 U	12 U	12 U	11 U
bromomethane	12 U	11 U	13 U	12 U	12 U	12 U	12 U	12 U	11 U
carbon disulfide	6 U	11 U	6 U	6 U	6 U	12 U	12 U	12 U	11 U
carbon tetrachloride	6 U	11 U	6 U	6 U	6 U	12 U	12 U	12 U	11 U
chlorobenzene	6 U	11 U	6 U	6 U	6 U	12 U	12 U	12 U	11 U

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TABLE 2

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-SB-3703	S6-SB04-06	S6-TP-27-06	S6-TP-27-10	S6-SB-3211	S6-SB09-02	S6-TP13-01	S6-TP14-02	S6-TP14-02-DUP
LOCATION:	S6-SB-3703	S6-SB04-06	S6-TP-27-06	S6-TP-27-10	S6-SB-3211	S6-SB09-02	S6-TP13-01	S6-TP14-02	S6-TP14-02
DATA SOURCE:	Trench 6B	Trench 6B	Trench 6B	Trench 6B	Trench 6D	Trench 6D	Trench 6D	Trench 6D	Trench 6D
SAMPLE DATE:	03/11/97		02/17/97	02/17/97	02/26/97				
VOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
chloroethane	12 U	11 U	13 U	12 U	12 U	12 U	12 U	12 U	11 U
chloroform	6 U	11 U	6 U	6 U	6 U	12 U	12 U	12 U	11 U
chloromethane	12 U	11 U	13 U	12 U	12 U	12 U	12 U	12 U	11 U
cis-1,3-dichloropropene	6 U	11 U	6 U	6 U	6 U	12 U	12 U	12 U	11 U
dibromochloromethane	6 U	11 U	6 U	6 U	6 U	12 U	12 U	12 U	11 U
dichlorodifluoromethane	12 U	n/a	13 U	12 U	12 U	n/a	n/a	n/a	n/a
ethylbenzene	6 U	11 U	6 U	6 U	6 U	12 U	12 U	12 U	11 U
isopropylbenzene	6 U	n/a	6 U	6 U	6 U	n/a	n/a	n/a	n/a
methylene bromide	6 U	n/a	6 U	6 U	6 U	n/a	n/a	n/a	n/a
methylene chloride	6 U	3 U	6 U	5 B	6 U	5 U	6 U	1 U	3 U
n-butylbenzene	6 U	n/a	6 U	6 U	6 U	n/a	n/a	n/a	n/a
n-propylbenzene	6 U	n/a	6 U	6 U	6 U	n/a	n/a	n/a	n/a
o-chlorotoluene	6 U	n/a	6 U	6 U	6 U	n/a	n/a	n/a	n/a
p-isopropyltoluene	6 U	n/a	6 U	6 U	6 U	n/a	n/a	n/a	n/a
sec-butylbenzene	6 U	n/a	6 U	6 U	6 U	n/a	n/a	n/a	n/a
styrene	6 U	11 U	6 U	6 U	6 U	12 U	12 U	12 U	11 U
tert-butylbenzene	6 U	n/a	6 U	6 U	6 U	n/a	n/a	n/a	n/a
tetrachloroethene	6 U	11 U	6 U	6 U	6 U	12 U	12 U	12 U	11 U
toluene	6 U	11 U	6 U	6 U	6 U	12 U	12 U	12 U	11 U
trans-1,3-dichloropropene	6 U	11 U	6 U	6 U	6 U	12 U	12 U	12 U	11 U
trichloroethene	6 U	11 U	6 U	6 U	6 U	12 U	12 U	12 U	11 U
trichlorofluoromethane	12 U	n/a	13 U	12 U	12 U	n/a	n/a	n/a	n/a
vinyl chloride	12 U	11 U	13 U	12 U	12 U	12 U	12 U	12 U	11 U
xylene (total)	6 U	11 U	6 U	6 U	6 U	12 U	12 U	12 U	11 U

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TABLE 2
ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06
NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-SB-3703	S6-SB04-06	S6-TP-27-06	S6-TP-27-10	S6-SB-3211	S6-SB09-02	S6-TP13-01	S6-TP14-02	S6-TP14-02-DUP
LOCATION:	S6-SB-3703	S6-SB04-06	S6-TP-27-06	S6-TP-27-10	S6-SB-3211	S6-SB09-02	S6-TP13-01	S6-TP14-02	S6-TP14-02
DATA SOURCE:	Trench 6B	Trench 6B	Trench 6B	Trench 6B	Trench 6D	Trench 6D	Trench 6D	Trench 6D	Trench 6D
SAMPLE DATE:	03/11/97		02/17/97	02/17/97	02/26/97				
PESTICIDES/PCBS	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
4,4'-DDD	n/a	n/a	n/a	n/a	n/a	4 U	3.9 U	3.9 U	4 U
4,4'-DDE	n/a	n/a	n/a	n/a	n/a	4 U	3.9 U	3.9 U	5.5 J
4,4'-DDT	n/a	n/a	n/a	n/a	n/a	4 U	3.9 U	9.4 J	11 J
Aroclor-1016	41 U	n/a	42 U	39 U	40 U	40 U	39 U	39 U	40 U
Aroclor-1221	82 U	n/a	86 U	80 U	82 U	81 U	80 U	79 U	81 U
Aroclor-1232	41 U	n/a	42 U	39 U	40 U	40 U	39 U	39 U	40 U
Aroclor-1242	41 U	n/a	42 U	39 U	40 U	40 U	39 U	39 U	40 U
Aroclor-1248	41 U	n/a	42 U	39 U	40 U	40 U	39 U	39 U	40 U
Aroclor-1254	41 U	n/a	42 U	39 U	40 U	40 U	39 U	21 J	34 J
Aroclor-1260	41 U	n/a	42 U	39 U	40 U	40 U	39 U	39 U	40 U
aldrin	n/a	n/a	n/a	n/a	n/a	2.1 U	2 U	2 U	2 U
alpha-BHC	n/a	n/a	n/a	n/a	n/a	2.1 U	2 U	2 U	2 U
alpha-chlordane	n/a	n/a	n/a	n/a	n/a	2.1 U	2 U	2 U	2 U
beta-BHC	n/a	n/a	n/a	n/a	n/a	2.1 U	2 U	2 U	2 U
delta-BHC	n/a	n/a	n/a	n/a	n/a	2.1 U	2 U	2 U	2 U
dieldrin	n/a	n/a	n/a	n/a	n/a	4 U	3.9 U	3.9 U	4 U
endosulfan I	n/a	n/a	n/a	n/a	n/a	2.1 U	2 U	2 U	2 U
endosulfan II	n/a	n/a	n/a	n/a	n/a	4 U	3.9 U	3.9 U	4 U
endosulfan sulfate	n/a	n/a	n/a	n/a	n/a	4 U	3.9 U	3.9 U	4 U
endrin	n/a	n/a	n/a	n/a	n/a	4 U	3.9 U	3.9 U	4 U
endrin aldehyde	n/a	n/a	n/a	n/a	n/a	4 U	3.9 U	3.9 U	4 U
endrin ketone	n/a	n/a	n/a	n/a	n/a	4 U	3.9 U	3.9 U	4 U
gamma-BHC (Lindane)	n/a	n/a	n/a	n/a	n/a	2.1 U	2 U	2 U	2 U
gamma-chlordane	n/a	n/a	n/a	n/a	n/a	2.1 U	2 U	2 U	2 U

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TABLE 2

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-SB-3703	S6-SB04-06	S6-TP-27-06	S6-TP-27-10	S6-SB-3211	S6-SB09-02	S6-TP13-01	S6-TP14-02	S6-TP14-02-DUP
LOCATION:	S6-SB-3703	S6-SB04-06	S6-TP-27-06	S6-TP-27-10	S6-SB-3211	S6-SB09-02	S6-TP13-01	S6-TP14-02	S6-TP14-02
DATA SOURCE:	Trench 6B	Trench 6B	Trench 6B	Trench 6B	Trench 6D	Trench 6D	Trench 6D	Trench 6D	Trench 6D
SAMPLE DATE:	03/11/97		02/17/97	02/17/97	02/26/97				
PESTICIDES/PCBS	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
heptachlor	n/a	n/a	n/a	n/a	n/a	2.1 U	2 U	2 U	2 U
heptachlor epoxide	n/a	n/a	n/a	n/a	n/a	2.1 U	2 U	2 U	2 U
methoxychlor	n/a	n/a	n/a	n/a	n/a	21 U	20 U	18 J	20 U
toxaphene	n/a	n/a	n/a	n/a	n/a	210 U	200 U	200 U	200 U

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TABLE 2

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-TP14-03	S6-SB-3105	S6-TP-COMP	S6-TP15-01	S6-TP17-01	S6-TP17-01-DUP	S6-TP18-02	S6-TP19-02	---
LOCATION:	S6-TP14-03	S6-SB-3105	S6-TP-COMP	S6-TP15-01	S6-TP17-01	S6-TP17-01	S6-TP18-02	S6-TP19-02	---
DATA SOURCE:	Trench 6D	Trench 6G	Trench 6G	Trench 6G	Trench 6G	Trench 6G	Trench 6G	Trench 6G	
SAMPLE DATE:		02/26/97							
INORGANICS	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	
aluminum	15500	12400	251000	15500	14200	17000	16400	16900	
antimony	9.4 L	2.5 UL	20 J	9.8 U	8.6 U	14.5 J	11.1 J	11.3 U	
arsenic	5.7	8.7 K	3.2	6.5	5.4	6	7.4	7.7	
barium	82.6	100	427	161	131	135	115	85.1	
beryllium	0.86	1.3	0.94	1.3	1.1	1.1	0.92	0.83 U	
cadmium	1.1 L	0.64 U	38.3	5.2	2.9	2.7 U	3.1	1.3 L	
calcium	2380	1720 J	1320	2450	1860	1750	1640	1180 U	
chromium	124	15.3	165	32.5	25.4	37.8	28.9	25.3	
cobalt	7.3	8	4.2 L	11	12.1	8.7	8.4 L	9.2	
copper	28	9.2	14300	364	170	201	197	85.9	
iron	21500 J	16000 J	4130	27200 J	19800	19800	26600	26400	
lead	32.5	17.3	157	140	64.7	95.9	146	50.9	
magnesium	2300	1670	1630	2390	2740	2680	2220	2270	
manganese	410	696 J	774 L	930	840 L	589 L	440 L	586 L	
mercury	0.21 L	0.13 U	0.13 U	0.36 L	0.22	0.19 K	0.25	0.11 K	
nickel	21.3	12.2 K	70.7	41.1	18.9	23.9	16.6	19.2	
potassium	806	417	350	1090	1410	1570	1010	894	
selenium	0.8 U	5.1 U	1.4 K	0.88	0.75 U	0.85 U	0.83 K	0.98 U	
silver	1 U	0.84 K	39.7 J	8.8	1.7 L	4.8 L	4.8 J	1.2 U	
sodium	52.4	91	54.5 U	101	70.1 U	85.2 U	64.3 U	45.7 U	
thallium	0.8 U	3.8 UJ	1.2 U	0.85 U	0.75 U	0.85 U	0.69 U	0.98 U	
vanadium	31.9	26.4	24.5 K	48.1	44.2	42.6	38.2 K	37.7	
zinc	87.8	44.6 J	4140	488	289	283	298	122	

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ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-TP14-03	S6-SB-3105	S6-TP-COMP	S6-TP15-01	S6-TP17-01	S6-TP17-01-DUP	S6-TP18-02	S6-TP19-02	---
LOCATION:	S6-TP14-03	S6-SB-3105	S6-TP-COMP	S6-TP15-01	S6-TP17-01	S6-TP17-01	S6-TP18-02	S6-TP19-02	---
DATA SOURCE:	Trench 6D	Trench 6G	Trench 6G	Trench 6G	Trench 6G	Trench 6G	Trench 6G	Trench 6G	
SAMPLE DATE:		02/26/97							
SEMIVOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	
1,2,3-trichlorobenzene	n/a	6 U	n/a	n/a	n/a	n/a	n/a	n/a	
1,2,4-trichlorobenzene	490 U	6 U	n/a	n/a	n/a	n/a	410 U	n/a	
1,2,4-trimethylbenzene	n/a	6 U	n/a	n/a	n/a	n/a	n/a	n/a	
1,2-dichlorobenzene	490 U	6 U	n/a	n/a	n/a	n/a	410 U	n/a	
1,3,5-trimethylbenzene	n/a	6 U	n/a	n/a	n/a	n/a	n/a	n/a	
1,3-dichlorobenzene	490 U	6 U	n/a	n/a	n/a	n/a	410 U	n/a	
1,4-dichlorobenzene	490 U	6 U	n/a	n/a	n/a	n/a	410 U	n/a	
2,2'-oxybis(1-chloropropane)	490 U	420 U	n/a	n/a	n/a	n/a	410 U	n/a	
2,4,5-trichlorophenol	1200 U	420 U	n/a	n/a	n/a	n/a	1000 U	n/a	
2,4,6-trichlorophenol	490 U	420 U	n/a	n/a	n/a	n/a	410 U	n/a	
2,4-dichlorophenol	490 U	420 U	n/a	n/a	n/a	n/a	410 U	n/a	
2,4-dimethylphenol	490 U	420 U	n/a	n/a	n/a	n/a	410 U	n/a	
2,4-dinitrophenol	1200 U	420 U	n/a	n/a	n/a	n/a	1000 U	n/a	
2,4-dinitrotoluene	490 U	420 U	n/a	n/a	n/a	n/a	410 U	n/a	
2,6-dinitrotoluene	490 U	420 U	n/a	n/a	n/a	n/a	410 U	n/a	
2-chlorophenol	490 U	420 U	n/a	n/a	n/a	n/a	410 U	n/a	
2-methylnaphthalene	490 U	420 U	n/a	n/a	n/a	n/a	50 J	n/a	
2-methylphenol	490 U	420 U	n/a	n/a	n/a	n/a	410 U	n/a	
2-nitroaniline	1200 U	420 U	n/a	n/a	n/a	n/a	1000 U	n/a	
2-nitrophenol	490 U	420 U	n/a	n/a	n/a	n/a	410 U	n/a	
3,3'-dichlorobenzidine	490 U	420 U	n/a	n/a	n/a	n/a	410 U	n/a	
3-nitroaniline	1200 U	420 U	n/a	n/a	n/a	n/a	1000 U	n/a	
4,6-dinitro-2-methylphenol	1200 U	420 U	n/a	n/a	n/a	n/a	1000 U	n/a	
4-bromophenyl phenyl ether	490 U	420 U	n/a	n/a	n/a	n/a	410 U	n/a	

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TABLE 2

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-TP14-03	S6-SB-3105	S6-TP-COMP	S6-TP15-01	S6-TP17-01	S6-TP17-01-DUP	S6-TP18-02	S6-TP19-02	---
LOCATION:	S6-TP14-03	S6-SB-3105	S6-TP-COMP	S6-TP15-01	S6-TP17-01	S6-TP17-01	S6-TP18-02	S6-TP19-02	---
DATA SOURCE:	Trench 6D	Trench 6G	Trench 6G	Trench 6G	Trench 6G	Trench 6G	Trench 6G	Trench 6G	
SAMPLE DATE:		02/26/97							
SEMIVOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	
4-chloro-3-methylphenol	490 U	420 U	n/a	n/a	n/a	n/a	410 U	n/a	
4-chloroaniline	490 U	420 U	n/a	n/a	n/a	n/a	410 U	n/a	
4-chlorophenyl phenyl ether	490 U	420 U	n/a	n/a	n/a	n/a	410 U	n/a	
4-methylphenol	490 U	420 U	n/a	n/a	n/a	n/a	410 U	n/a	
4-nitroaniline	1200 U	420 U	n/a	n/a	n/a	n/a	1000 U	n/a	
4-nitrophenol	1200 U	420 U	n/a	n/a	n/a	n/a	1000 U	n/a	
N-nitroso-di-n-propylamine	490 U	420 U	n/a	n/a	n/a	n/a	410 U	n/a	
N-nitrosodiphenylamine	490 U	420 U	n/a	n/a	n/a	n/a	410 U	n/a	
acenaphthene	490 U	420 U	n/a	n/a	n/a	n/a	410 U	n/a	
acenaphthylene	61 J	420 U	n/a	n/a	n/a	n/a	410 U	n/a	
anthracene	490 U	420 U	n/a	n/a	n/a	n/a	410 U	n/a	
benz(a)anthracene	200 J	420 U	n/a	n/a	n/a	n/a	410 U	n/a	
benzo(a)pyrene	390 J	420 U	n/a	n/a	n/a	n/a	410 U	n/a	
benzo(b)fluoranthene	400 J	420 U	n/a	n/a	n/a	n/a	410 U	n/a	
benzo(g,h,i)perylene	300 J	420 U	n/a	n/a	n/a	n/a	410 U	n/a	
benzo(k)fluoranthene	180 J	420 U	n/a	n/a	n/a	n/a	410 U	n/a	
benzoic acid	n/a	420 U	n/a	n/a	n/a	n/a	n/a	n/a	
benzyl alcohol	n/a	420 U	n/a	n/a	n/a	n/a	n/a	n/a	
beta-chloronaphthalene	490 U	420 U	n/a	n/a	n/a	n/a	410 U	n/a	
bis(2-chloroethoxy)methane	490 U	420 U	n/a	n/a	n/a	n/a	410 U	n/a	
bis(2-chloroethyl)ether	490 U	420 U	n/a	n/a	n/a	n/a	410 U	n/a	
bis(2-ethylhexyl)phthalate	490 U	420 U	n/a	n/a	n/a	n/a	67 J	n/a	
butylbenzylphthalate	490 U	420 U	n/a	n/a	n/a	n/a	410 U	n/a	
carbazole	490 U	n/a	n/a	n/a	n/a	n/a	410 U	n/a	
chrysene	240 J	33 J	n/a	n/a	n/a	n/a	410 U	n/a	

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NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-TP14-03	S6-SB-3105	S6-TP-COMP	S6-TP15-01	S6-TP17-01	S6-TP17-01-DUP	S6-TP18-02	S6-TP19-02	---
LOCATION:	S6-TP14-03	S6-SB-3105	S6-TP-COMP	S6-TP15-01	S6-TP17-01	S6-TP17-01	S6-TP18-02	S6-TP19-02	---
DATA SOURCE:	Trench 6D	Trench 6G	Trench 6G	Trench 6G	Trench 6G	Trench 6G	Trench 6G	Trench 6G	
SAMPLE DATE:		02/26/97							
SEMIVOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	
di-n-butylphthalate	490 U	29 J	n/a	n/a	n/a	n/a	410 U	n/a	
di-n-octylphthalate	490 U	420 U	n/a	n/a	n/a	n/a	410 U	n/a	
dibenz(a,h)anthracene	490 U	420 U	n/a	n/a	n/a	n/a	410 U	n/a	
dibenzofuran	490 U	420 U	n/a	n/a	n/a	n/a	410 U	n/a	
diethylphthalate	490 U	420 U	n/a	n/a	n/a	n/a	410 U	n/a	
dimethylphthalate	490 U	420 U	n/a	n/a	n/a	n/a	410 U	n/a	
fluoranthene	150 J	52 J	n/a	n/a	n/a	n/a	54 J	n/a	
fluorene	490 U	420 U	n/a	n/a	n/a	n/a	410 U	n/a	
hexachlorobenzene	490 U	420 U	n/a	n/a	n/a	n/a	410 U	n/a	
hexachlorobutadiene	490 U	6 U	n/a	n/a	n/a	n/a	410 U	n/a	
hexachlorocyclopentadiene	490 U	420 U	n/a	n/a	n/a	n/a	410 U	n/a	
hexachloroethane	490 U	420 U	n/a	n/a	n/a	n/a	410 U	n/a	
indeno(1,2,3-cd)pyrene	260 J	420 U	n/a	n/a	n/a	n/a	410 U	n/a	
isophorone	490 U	420 U	n/a	n/a	n/a	n/a	410 U	n/a	
naphthalene	490 U	6 U	n/a	n/a	n/a	n/a	410 U	n/a	
nitrobenzene	490 U	420 U	n/a	n/a	n/a	n/a	410 U	n/a	
pentachlorophenol	1200 U	420 U	n/a	n/a	n/a	n/a	1000 U	n/a	
phenanthrene	50 J	420 U	n/a	n/a	n/a	n/a	410 U	n/a	
phenol	490 U	420 U	n/a	n/a	n/a	n/a	410 U	n/a	
pyrene	240 J	53 J	n/a	n/a	n/a	n/a	50 J	n/a	
VOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	
1,1,1,2-tetrachloroethane	n/a	6 U	n/a	n/a	n/a	n/a	n/a	n/a	
1,1,1-trichloroethane	13 U	6 U	n/a	12 U	13 U	13 U	12 U	12 U	
1,1,2,2-tetrachloroethane	13 U	6 U	n/a	12 U	13 U	13 U	12 U	12 U	
1,1,2-trichloroethane	13 U	6 U	n/a	12 U	13 U	13 U	12 U	12 U	

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TABLE 2

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-TP14-03	S6-SB-3105	S6-TP-COMP	S6-TP15-01	S6-TP17-01	S6-TP17-01-DUP	S6-TP18-02	S6-TP19-02	---
LOCATION:	S6-TP14-03	S6-SB-3105	S6-TP-COMP	S6-TP15-01	S6-TP17-01	S6-TP17-01	S6-TP18-02	S6-TP19-02	---
DATA SOURCE:	Trench 6D	Trench 6G	Trench 6G	Trench 6G	Trench 6G	Trench 6G	Trench 6G	Trench 6G	
SAMPLE DATE:		02/26/97							
VOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	
1,1-dichloroethane	13 U	6 U	n/a	12 U	13 U	13 U	12 U	12 U	
1,1-dichloroethene	13 U	6 U	n/a	12 U	13 U	13 U	12 U	12 U	
1,1-dichloropropene	n/a	6 U	n/a	n/a	n/a	n/a	n/a	n/a	
1,2,3-trichloropropane	n/a	6 U	n/a	n/a	n/a	n/a	n/a	n/a	
1,2-dibromo-3-chloropropane	n/a	13 U	n/a	n/a	n/a	n/a	n/a	n/a	
1,2-dibromoethane	n/a	6 U	n/a	n/a	n/a	n/a	n/a	n/a	
1,2-dichloroethane	13 U	6 U	n/a	12 U	13 U	13 U	12 U	12 U	
1,2-dichloroethene (total)	13 U	6 U	n/a	12 U	13 U	13 U	12 U	12 U	
1,2-dichloropropane	13 U	6 U	n/a	12 U	13 U	13 U	12 U	12 U	
1,3-dichloropropane	n/a	6 U	n/a	n/a	n/a	n/a	n/a	n/a	
2,2-dichloropropane	n/a	6 U	n/a	n/a	n/a	n/a	n/a	n/a	
2-butanone	13 U	64 U	n/a	12 U	13 U	13 U	12 U	12 U	
2-hexanone	13 U	25 U	n/a	12 U	13 U	13 U	12 U	12 U	
4-chlorotoluene	n/a	6 U	n/a	n/a	n/a	n/a	n/a	n/a	
4-methyl-2-pentanone	13 U	25 U	n/a	12 U	13 U	13 U	12 U	12 U	
acetone	2 U	22 J	n/a	12 U	13 U	3 U	3 U	12 U	
benzene	13 U	6 U	n/a	12 U	13 U	13 U	12 U	12 U	
bromobenzene	n/a	6 U	n/a	n/a	n/a	n/a	n/a	n/a	
bromochloromethane	n/a	6 U	n/a	n/a	n/a	n/a	n/a	n/a	
bromodichloromethane	13 U	6 U	n/a	12 U	13 U	13 U	12 U	12 U	
bromoform	13 U	6 U	n/a	12 U	13 U	13 U	12 U	12 U	
bromomethane	13 U	13 U	n/a	12 U	13 U	13 U	12 U	12 U	
carbon disulfide	13 U	6 U	n/a	12 U	13 U	13 U	12 U	12 U	
carbon tetrachloride	13 U	6 U	n/a	12 U	13 U	13 U	12 U	12 U	
chlorobenzene	13 U	6 U	n/a	12 U	13 U	13 U	12 U	12 U	

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TABLE 2

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-TP14-03	S6-SB-3105	S6-TP-COMP	S6-TP15-01	S6-TP17-01	S6-TP17-01-DUP	S6-TP18-02	S6-TP19-02	---
LOCATION:	S6-TP14-03	S6-SB-3105	S6-TP-COMP	S6-TP15-01	S6-TP17-01	S6-TP17-01	S6-TP18-02	S6-TP19-02	---
DATA SOURCE:	Trench 6D	Trench 6G	Trench 6G	Trench 6G	Trench 6G	Trench 6G	Trench 6G	Trench 6G	
SAMPLE DATE:		02/26/97							
VOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	
chloroethane	13 U	13 U	n/a	12 U	13 U	13 U	12 U	12 U	
chloroform	13 U	6 U	n/a	12 U	13 U	13 U	12 U	12 U	
chloromethane	13 U	13 U	n/a	12 U	13 U	13 U	12 U	12 U	
cis-1,3-dichloropropene	13 U	6 U	n/a	12 U	13 U	13 U	12 U	12 U	
dibromochloromethane	13 U	6 U	n/a	12 U	13 U	13 U	12 U	12 U	
dichlorodifluoromethane	n/a	13 U	n/a	n/a	n/a	n/a	n/a	n/a	
ethylbenzene	13 U	6 U	n/a	12 U	13 U	13 U	12 U	12 U	
isopropylbenzene	n/a	6 U	n/a	n/a	n/a	n/a	n/a	n/a	
methylene bromide	n/a	6 U	n/a	n/a	n/a	n/a	n/a	n/a	
methylene chloride	3 U	6 U	n/a	5 U	13 U	2 U	5 U	5 U	
n-butylbenzene	n/a	6 U	n/a	n/a	n/a	n/a	n/a	n/a	
n-propylbenzene	n/a	6 U	n/a	n/a	n/a	n/a	n/a	n/a	
o-chlorotoluene	n/a	6 U	n/a	n/a	n/a	n/a	n/a	n/a	
p-isopropyltoluene	n/a	6 U	n/a	n/a	n/a	n/a	n/a	n/a	
sec-butylbenzene	n/a	6 U	n/a	n/a	n/a	n/a	n/a	n/a	
styrene	13 U	6 U	n/a	12 U	13 U	13 U	12 U	12 U	
tert-butylbenzene	n/a	6 U	n/a	n/a	n/a	n/a	n/a	n/a	
tetrachloroethene	13 U	6 U	n/a	12 U	13 U	13 U	12 U	12 U	
toluene	13 U	6 U	n/a	12 U	13 U	13 U	12 U	12 U	
trans-1,3-dichloropropene	13 U	6 U	n/a	12 U	13 U	13 U	12 U	12 U	
trichloroethene	13 U	6 U	n/a	12 U	13 U	13 U	12 U	12 U	
trichlorofluoromethane	n/a	13 U	n/a	n/a	n/a	n/a	n/a	n/a	
vinyl chloride	13 U	13 U	n/a	12 U	13 U	13 U	12 U	12 U	
xylene (total)	13 U	6 U	n/a	12 U	13 U	13 U	12 U	12 U	

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TABLE 2

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-TP14-03	S6-SB-3105	S6-TP-COMP	S6-TP15-01	S6-TP17-01	S6-TP17-01-DUP	S6-TP18-02	S6-TP19-02	---
LOCATION:	S6-TP14-03	S6-SB-3105	S6-TP-COMP	S6-TP15-01	S6-TP17-01	S6-TP17-01	S6-TP18-02	S6-TP19-02	---
DATA SOURCE:	Trench 6D	Trench 6G	Trench 6G	Trench 6G	Trench 6G	Trench 6G	Trench 6G	Trench 6G	
SAMPLE DATE:		02/26/97							
PESTICIDES/PCBS	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	
4,4'-DDD	4.9 U	n/a	n/a	n/a	n/a	n/a	4.1 U	n/a	
4,4'-DDE	4.9 U	n/a	n/a	n/a	n/a	n/a	4.1 U	n/a	
4,4'-DDT	4.9 U	n/a	n/a	n/a	n/a	n/a	4.8 J	n/a	
Aroclor-1016	49 U	42 U	n/a	n/a	n/a	n/a	41 U	n/a	
Aroclor-1221	100 U	85 U	n/a	n/a	n/a	n/a	82 U	n/a	
Aroclor-1232	49 U	42 U	n/a	n/a	n/a	n/a	41 U	n/a	
Aroclor-1242	49 U	42 U	n/a	n/a	n/a	n/a	21 J	n/a	
Aroclor-1248	49 U	42 U	n/a	n/a	n/a	n/a	41 U	n/a	
Aroclor-1254	18 J	42 U	n/a	n/a	n/a	n/a	63 J	n/a	
Aroclor-1260	49 U	42 U	n/a	n/a	n/a	n/a	41 U	n/a	
aldrin	2.5 U	n/a	n/a	n/a	n/a	n/a	2.1 U	n/a	
alpha-BHC	2.5 U	n/a	n/a	n/a	n/a	n/a	2.1 U	n/a	
alpha-chlordane	2.5 U	n/a	n/a	n/a	n/a	n/a	2.1 U	n/a	
beta-BHC	2.5 U	n/a	n/a	n/a	n/a	n/a	2.1 U	n/a	
delta-BHC	2.5 U	n/a	n/a	n/a	n/a	n/a	2.1 U	n/a	
dieldrin	4.9 U	n/a	n/a	n/a	n/a	n/a	4.1 U	n/a	
endosulfan I	2.5 U	n/a	n/a	n/a	n/a	n/a	2.1 U	n/a	
endosulfan II	4.9 U	n/a	n/a	n/a	n/a	n/a	4.1 U	n/a	
endosulfan sulfate	4.9 U	n/a	n/a	n/a	n/a	n/a	4.1 U	n/a	
endrin	4.9 U	n/a	n/a	n/a	n/a	n/a	4.1 U	n/a	
endrin aldehyde	4.9 U	n/a	n/a	n/a	n/a	n/a	4.1 U	n/a	
endrin ketone	4.9 U	n/a	n/a	n/a	n/a	n/a	4.1 U	n/a	
gamma-BHC (Lindane)	2.5 U	n/a	n/a	n/a	n/a	n/a	2.1 U	n/a	
gamma-chlordane	2.5 U	n/a	n/a	n/a	n/a	n/a	2.1 U	n/a	

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TABLE 2

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	S6-TP14-03	S6-SB-3105	S6-TP-COMP	S6-TP15-01	S6-TP17-01	S6-TP17-01-DUP	S6-TP18-02	S6-TP19-02	---
LOCATION:	S6-TP14-03	S6-SB-3105	S6-TP-COMP	S6-TP15-01	S6-TP17-01	S6-TP17-01	S6-TP18-02	S6-TP19-02	---
DATA SOURCE:	Trench 6D	Trench 6G	Trench 6G	Trench 6G	Trench 6G	Trench 6G	Trench 6G	Trench 6G	
SAMPLE DATE:		02/26/97							
PESTICIDES/PCBS	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	
heptachlor	2.5 U	n/a	n/a	n/a	n/a	n/a	2.1 U	n/a	
heptachlor epoxide	2.5 U	n/a	n/a	n/a	n/a	n/a	2.1 U	n/a	
methoxychlor	25 U	n/a	n/a	n/a	n/a	n/a	21 U	n/a	
toxaphene	250 U	n/a	n/a	n/a	n/a	n/a	210 U	n/a	

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Suspected Site 7
Surface Soil Data

INORGANIC RESULTS FOR SURFACE SOIL SITE 07

MG/KG

SAMPLE NUMBER:	SS-07-01		SS-07-02		SS-07-03		SS-07-04		SS-07-05		SS-07-06		SS-07-07	
INORGANICS														
ALUMINUM	8290		10600		5540		8800		6890		5990		16100	
ANTIMONY	10.3	UL	9.2	UL	9.6	UL	9.9	UL	10.3	UL	10.6	UL	9.7	UL
ARSENIC	3.0		3.8		2.3		1.4		4.5		2.8		4.6	
BARIUM	74.2		62.9		56.3		44.3		36.3		22.7		39.4	
BERYLLIUM	0.74		0.74		0.44		0.31		0.58		0.30		0.76	
CADMIUM	0.62	U	0.55	U	0.58	U	0.60	U	0.62	U	0.63	U	0.58	U
CALCIUM	839		922		574		461		683		428		671	
CHROMIUM	19.2		22.1		7.4		7.9		14.4		11.8		21.5	
COBALT	12.9		4.1		3.4		3.6		3.4		1.6		7.6	
COPPER	9.1	K	9.8	K	4.4	K	4.8	K	4.5	K	2.2	K	12.6	
CYANIDE	1.2	U	1.1	U	1.2	U	1.0	U	1.2	U	1.2	U	1.2	U
IRON	12400		16900		8280		7850		19400		11400		23000	
LEAD	8.7		9.7		14.9		5.1		8.6		5.6		8.5	
MAGNESIUM	2170		1800		711		941		655		821	B	2800	
MANGANESE	286		84.4		180		74.0		229		19.7		278	
MERCURY	0.050	UL	0.050	UL	0.050	UL	0.050	UL	0.050	UL	0.050	UL	0.050	UL
NICKEL	10.4	K	8.3	K	4.6	K	4.0	K	2.9	K	3.3	K	10.8	K
POTASSIUM	539		511		178		212		205		165		918	
SELENIUM	0.83	UL	0.73	UL	0.77	UL	0.80	UL	0.83	UL	0.85	UL	0.78	UL
SILVER	0.83	UR	0.73	UR	0.77	UR	0.80	UR	0.83	UR	0.85	UR	0.78	UR
SODIUM	73.4	B	60.2	B	66.9	B	105	B	69.8	B	70.4	B	70.2	B
THALLIUM	1.0	U	0.92	U	1.0	U	1.0	U	1.0	U	1.1	U	1.0	U
VANADIUM	25.2		30.6		14.0		13.7		30.9		25.5		39.3	
ZINC	28.2		24.3		28.8		13.9		15.5		9.0	B	29.3	

TABLE 1

07/29/96

NAWC WARMINSTER, WARMINSTER, PENNSYLVANIA

INORGANIC RESULTS FOR SURFACE SOIL SITE 07

MG/KG

DRAFT

Page 2

SAMPLE NUMBER:	SS-07-08		SS-07-09		SS-07-10		SS-07-11				
INORGANICS											
ALUMINUM	15100		17400		16400		7510				
ANTIMONY	11.1	UL	9.4	UL	11.0	UL	9.7	UL			
ARSENIC	6.8		4.6		4.7	L	5.5				
BARIUM	39.8		38.5		44.0		35.8				
BERYLLIUM	0.61		0.78		0.89		0.78				
CADMIUM	0.67	U	0.57	U	0.66	U	0.58	U			
CALCIUM	640		861		980		737				
CHROMIUM	26.6		22.7		21.2		16.8				
COBALT	5.5		12.5		10.6		3.5				
COPPER	11.5	K	12.3	K	12.6		5.9	K			
CYANIDE	5.9		1.2	U	1.2	U	1.2	U			
IRON	24500		23600		25700		23800				
LEAD	10.7		9.3		10.9		8.2				
MAGNESIUM	2530		2690		2660		778				
MANGANESE	119		503		448		223				
MERCURY	0.050	UL	0.050	UL	0.060	UL	0.050	UL			
NICKEL	12.0	K	14.0	K	12.6	K	3.9	K			
POTASSIUM	651		923		1080		229				
SELENIUM	0.89	UL	0.76	UL	0.88	UL	0.77	UL			
SILVER	0.89	UR	0.76	UR	0.88	UR	0.77	UR			
SODIUM	62.3	B	74.2	B	68.7	B	75.1	B			
THALLIUM	1.1	U	0.94	U	1.2	K	1.0	U			
VANADIUM	37.1		34.8		35.1		31.8				
ZINC	36.4		31.8		33.3		13.7				

009170

UG/KG

SAMPLE NUMBER:	SS-07-01		SS-07-02		SS-07-03		SS-07-04		SS-07-05		SS-07-06		SS-07-07	
VOLATILES														
1,1,1-TRICHLOROETHANE	11.0	U	12.0	U	11.0	U	12.0	U	12.0	U	13.0	U	12.0	U
1,1,2,2-TETRACHLOROETHANE	11.0	U	12.0	U	11.0	U	12.0	U	12.0	U	13.0	U	12.0	U
1,1,2-TRICHLOROETHANE	11.0	U	12.0	U	11.0	U	12.0	U	12.0	U	13.0	U	12.0	U
1,1-DICHLOROETHANE	11.0	U	12.0	U	11.0	U	12.0	U	12.0	U	13.0	U	12.0	U
1,1-DICHLOROETHENE	11.0	U	12.0	U	11.0	U	12.0	U	12.0	U	13.0	U	12.0	U
1,2-DICHLOROETHANE	11.0	U	12.0	U	11.0	U	12.0	U	12.0	U	13.0	U	12.0	U
1,2-DICHLOROETHENE (TOTAL)	11.0	U	12.0	U	11.0	U	12.0	U	12.0	U	13.0	U	12.0	U
1,2-DICHLOROPROPANE	11.0	U	12.0	U	11.0	U	12.0	U	12.0	U	13.0	U	12.0	U
2-BUTANONE	11.0	U	12.0	U	11.0	U	12.0	U	12.0	U	13.0	U	12.0	U
2-HEXANONE	11.0	U	12.0	U	11.0	U	12.0	U	12.0	U	13.0	U	12.0	U
4-METHYL-2-PENTANONE	11.0	U	12.0	U	11.0	U	12.0	U	12.0	U	13.0	U	12.0	U
ACETONE	11.0	U	12.0	U	11.0	U	12.0	U	12.0	U	13.0	U	8.0	B
BENZENE	11.0	U	12.0	U	11.0	U	12.0	U	12.0	U	13.0	U	12.0	U
BROMODICHLOROMETHANE	11.0	U	12.0	U	11.0	U	12.0	U	12.0	U	13.0	U	12.0	U
BROMOFORM	11.0	U	12.0	U	11.0	U	12.0	U	12.0	U	13.0	U	12.0	U
BROMOMETHANE	11.0	U	12.0	U	11.0	U	12.0	U	12.0	U	13.0	U	12.0	U
CARBON DISULFIDE	11.0	U	12.0	U	11.0	U	12.0	U	12.0	U	13.0	U	12.0	U
CARBON TETRACHLORIDE	11.0	U	12.0	U	11.0	U	12.0	U	12.0	U	13.0	U	12.0	U
CHLOROBENZENE	11.0	U	12.0	U	11.0	U	12.0	U	12.0	U	13.0	U	12.0	U
CHLOROETHANE	11.0	U	12.0	U	11.0	U	12.0	U	12.0	U	13.0	U	12.0	U
CHLOROFORM	11.0	U	12.0	U	11.0	U	12.0	U	12.0	U	13.0	U	12.0	U
CHLOROMETHANE	11.0	U	12.0	U	11.0	U	12.0	U	12.0	U	13.0	U	12.0	U
CIS-1,3-DICHLOROPROPENE	11.0	U	12.0	U	11.0	U	12.0	U	12.0	U	13.0	U	12.0	U
DIBROMOCHLOROMETHANE	11.0	U	12.0	U	11.0	U	12.0	U	12.0	U	13.0	U	12.0	U
ETHYLBENZENE	11.0	U	12.0	U	11.0	U	12.0	U	12.0	U	13.0	U	12.0	U
METHYLENE CHLORIDE	11.0	U	12.0	U	2.0	B	12.0	U	12.0	U	2.0	B	12.0	U
STYRENE	11.0	U	12.0	U	11.0	U	12.0	U	12.0	U	13.0	U	12.0	U
TETRACHLOROETHENE	11.0	U	12.0	U	2.0	J	12.0	U	12.0	U	13.0	U	12.0	U
TOLUENE	11.0	U	12.0	U	1.0	J	12.0	U	12.0	U	13.0	U	12.0	U
TRANS-1,3-DICHLOROPROPENE	11.0	U	12.0	U	11.0	U	12.0	U	12.0	U	13.0	U	12.0	U
TRICHLOROETHENE	4.0	J	16.0		34.0		10.0	J	9.0	J	13.0	U	[illegible]	J
VINYL CHLORIDE	11.0	U	12.0	U	11.0	U	12.0	U	12.0	U	13.0	U	12.0	U
XYLENE (TOTAL)	11.0	U	12.0	U	11.0	U	12.0	U	12.0	U	13.0	U	12.0	U

TABLE 1

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NAWC WARMINSTER, WARMINSTER, PENNSYLVANIA

VOLATILE ORGANIC RESULTS FOR SURFACE SOIL SITE 07

UG/KG

DRAFT

SAMPLE NUMBER:	SS-07-08		SS-07-09		SS-07-10		SS-07-11				
VOLATILES											
1,1,1-TRICHLOROETHANE	12.0	U	12.0	U	12.0	U	12.0	U			
1,1,2,2-TETRACHLOROETHANE	12.0	U	12.0	U	12.0	U	12.0	U			
1,1,2-TRICHLOROETHANE	12.0	U	12.0	U	12.0	U	12.0	U			
1,1-DICHLOROETHANE	12.0	U	12.0	U	12.0	U	12.0	U			
1,1-DICHLOROETHENE	12.0	U	12.0	U	12.0	U	12.0	U			
1,2-DICHLOROETHANE	12.0	U	12.0	U	12.0	U	12.0	U			
1,2-DICHLOROETHENE (TOTAL)	12.0	U	12.0	U	12.0	U	12.0	U			
1,2-DICHLOROPROPANE	12.0	U	12.0	U	12.0	U	12.0	U			
2-BUTANONE	12.0	U	12.0	U	12.0	U	12.0	U			
2-HEXANONE	12.0	U	12.0	U	12.0	U	12.0	U			
4-METHYL-2-PENTANONE	12.0	U	12.0	U	12.0	U	12.0	U			
ACETONE	12.0	U	12.0	U	12.0	U	12.0	U			
BENZENE	12.0	U	12.0	U	12.0	U	12.0	U			
BROMODICHLOROMETHANE	12.0	U	12.0	U	12.0	U	12.0	U			
BROMOFORM	12.0	U	12.0	U	12.0	U	12.0	U			
BROMOMETHANE	12.0	U	12.0	U	12.0	U	12.0	U			
CARBON DISULFIDE	12.0	U	12.0	U	12.0	U	12.0	U			
CARBON TETRACHLORIDE	12.0	U	12.0	U	12.0	U	12.0	U			
CHLOROBENZENE	12.0	U	12.0	U	12.0	U	12.0	U			
CHLOROETHANE	12.0	U	12.0	U	12.0	U	12.0	U			
CHLOROFORM	12.0	U	12.0	U	12.0	U	12.0	U			
CHLOROMETHANE	12.0	U	12.0	U	12.0	U	12.0	U			
CIS-1,3-DICHLOROPROPENE	12.0	U	12.0	U	12.0	U	12.0	U			
DIBROMOCHLOROMETHANE	12.0	U	12.0	U	12.0	U	12.0	U			
ETHYLBENZENE	12.0	U	12.0	U	12.0	U	12.0	U			
METHYLENE CHLORIDE	12.0	U	12.0	U	12.0	U	12.0	U			
STYRENE	12.0	U	12.0	U	12.0	U	12.0	U			
TETRACHLOROETHENE	12.0	U	12.0	U	12.0	U	12.0	U			
TOLUENE	12.0	U	12.0	U	12.0	U	12.0	U			
TRANS-1,3-DICHLOROPROPENE	12.0	U	12.0	U	12.0	U	12.0	U			
TRICHLOROETHENE	3.0	J	3.0	J	4.0	J	9.0	J			
VINYL CHLORIDE	12.0	U	12.0	U	12.0	U	12.0	U			
XYLENE (TOTAL)	12.0	U	12.0	U	12.0	U	12.0	U			

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SEMIVOLATILE ORGANIC RESULTS FOR SURFACE SOIL SITE 07

UG/KG

SAMPLE NUMBER:	SS-07-01		SS-07-02		SS-07-03		SS-07-04		SS-07-05		SS-07-06		SS-07-07	
SEMIVOLATILES														
1,2,4-TRICHLOROBENZENE	380	U	400	U	430	U	380	U	410	U	410	U	390	U
1,2-DICHLOROBENZENE	380	U	400	U	430	U	380	U	410	U	410	U	390	U
1,3-DICHLOROBENZENE	380	U	400	U	430	U	380	U	410	U	410	U	390	U
1,4-DICHLOROBENZENE	380	U	400	U	430	U	380	U	410	U	410	U	390	U
2,2'-OXYBIS(1-CHLOROPROPANE)	380	U	400	U	430	U	380	U	410	U	410	U	390	U
2,4,5-TRICHLOROPHENOL	920	U	960	U	1000	U	930	U	980	U	990	U	940	U
2,4,6-TRICHLOROPHENOL	380	U	400	U	430	U	380	U	410	U	410	U	390	U
2,4-DICHLOROPHENOL	380	U	400	U	430	U	380	U	410	U	410	U	390	U
2,4-DIMETHYLPHENOL	380	U	400	U	430	U	380	U	410	U	410	U	390	U
2,4-DINITROPHENOL	920	U	960	U	1000	U	930	U	980	U	990	U	940	U
2,4-DINITROTOLUENE	380	U	400	U	430	U	380	U	410	U	410	U	390	U
2,6-DINITROTOLUENE	380	U	400	U	430	U	380	U	410	U	410	U	390	U
2-CHLORONAPHTHALENE	380	U	400	U	430	U	380	U	410	U	410	U	390	U
2-CHLOROPHENOL	380	U	400	U	430	U	380	U	410	U	410	U	390	U
2-METHYLNAPHTHALENE	380	U	400	U	430	U	380	U	410	U	410	U	390	U
2-METHYLPHENOL	380	U	400	U	430	U	380	U	410	U	410	U	390	U
2-NITROANILINE	920	U	960	U	1000	U	930	U	980	U	990	U	940	U
2-NITROPHENOL	380	U	400	U	430	U	380	U	410	U	410	U	390	U
3,3'-DICHLOROBENZIDINE	380	U	400	U	430	U	380	U	410	U	410	U	390	U
3-NITROANILINE	920	U	960	U	1000	U	930	U	980	U	990	U	940	U
4,6-DINITRO-2-METHYLPHENOL	920	U	960	U	1000	U	930	U	980	U	990	U	940	U
4-BROMOPHENYL PHENYL ETHER	380	U	400	U	430	U	380	U	410	U	410	U	390	U
4-CHLORO-3-METHYLPHENOL	380	U	400	U	430	U	380	U	410	U	410	U	390	U
4-CHLOROANILINE	380	U	400	U	430	U	380	U	410	U	410	U	390	U
4-CHLOROPHENYL PHENYL ETHER	380	U	400	U	430	U	380	U	410	U	410	U	390	U
4-METHYLPHENOL	380	U	400	U	430	U	380	U	410	U	410	U	390	U
4-NITROANILINE	920	U	960	U	1000	U	930	U	980	U	990	U	940	U
4-NITROPHENOL	920	U	960	U	1000	U	930	U	980	U	990	U	940	U
ACENAPHTHENE	380	U	400	U	430	U	380	U	410	U	410	U	390	U
ACENAPHTHYLENE	380	U	400	U	430	U	380	U	410	U	410	U	390	U
ANTHRACENE	380	U	400	U	430	U	380	U	410	U	410	U	390	U
BENZ(A)ANTHRACENE	380	U	400	U	430	U	380	U	410	U	410	U	390	U
BENZO(A)PYRENE	380	U	400	U	430	U	380	U	410	U	410	U	390	U
BENZO(B)FLUORANTHENE	380	U	400	U	430	U	380	U	410	U	410	U	390	U
BENZO(G,H,I)PERYLENE	380	U	400	U	430	U	380	U	410	U	410	U	390	U

TABLE 1

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NAWC WARMINSTER, WARMINSTER, PENNSYLVANIA

SEMIVOLATILE ORGANIC RESULTS FOR SURFACE SOIL SITE 07

UG/KG

DRAFT

SAMPLE NUMBER:	SS-07-01		SS-07-02		SS-07-03		SS-07-04		SS-07-05		SS-07-06		SS-07-07	
SEMIVOLATILES														
BENZO(K)FLUORANTHENE	380	U	400	U	430	U	380	U	410	U	410	U	390	U
BIS(2-CHLOROETHOXY)METHANE	380	U	400	U	430	U	380	U	410	U	410	U	390	U
BIS(2-CHLOROETHYL)ETHER	380	U	400	U	430	U	380	U	410	U	410	U	390	U
BIS(2-ETHYLHEXYL)PHTHALATE	380	U	400	U	430	U	380	U	410	U	410	U	390	U
BUTYLBENZYLPHTHALATE	380	U	400	U	430	U	380	U	410	U	410	U	390	U
CARBAZOLE	380	U	400	U	430	U	380	U	410	U	410	U	390	U
CHRYSENE	380	U	400	U	430	U	380	U	410	U	410	U	390	U
DI-N-BUTYLPHTHALATE	380	U	400	U	430	U	380	U	410	U	410	U	390	U
DI-N-OCTYLPHTHALATE	380	U	400	U	430	U	380	U	410	U	410	U	390	U
DIBENZ(A,H)ANTHRACENE	380	U	400	U	430	U	380	U	410	U	410	U	390	U
DIBENZOFURAN	380	U	400	U	430	U	380	U	410	U	410	U	390	U
DIETHYLPHTHALATE	380	U	400	U	430	U	380	U	410	U	410	U	390	U
DIMETHYLPHTHALATE	380	U	400	U	430	U	380	U	410	U	410	U	390	U
FLUORANTHENE	380	U	400	U	430	U	380	U	410	U	410	U	390	U
FLUORENE	380	U	400	U	430	U	380	U	410	U	410	U	390	U
HEXACHLOROBENZENE	380	U	400	U	430	U	380	U	410	U	410	U	390	U
HEXACHLOROBUTADIENE	380	U	400	U	430	U	380	U	410	U	410	U	390	U
HEXACHLOROCYCLOPENTADIENE	380	U	400	U	430	U	380	U	410	U	410	U	390	U
HEXACHLOROETHANE	380	U	400	U	430	U	380	U	410	U	410	U	390	U
INDENO(1,2,3-CD)PYRENE	380	U	400	U	430	U	380	U	410	U	410	U	390	U
ISOPHORONE	380	U	400	U	430	U	380	U	410	U	410	U	390	U
N-NITROSO-DI-N-PROPYLAMINE	380	U	400	U	430	U	380	U	410	U	410	U	390	U
N-NITROSODIPHENYLAMINE	380	U	400	U	430	U	380	U	410	U	410	U	390	U
NAPHTHALENE	380	U	400	U	430	U	380	U	410	U	410	U	390	U
NITROBENZENE	380	U	400	U	430	U	380	U	410	U	410	U	390	U
PENTACHLOROPHENOL	920	U	960	U	1000	U	930	U	980	U	990	U	940	U
PHENANTHRENE	380	U	400	U	430	U	380	U	410	U	410	U	390	U
PYRENE	380	U	400	U	430	U	380	U	410	U	410	U	390	U

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UG/KG

SAMPLE NUMBER:	SS-07-08		SS-07-09		SS-07-10		SS-07-11				
SEMIVOLATILES											
1,2,4-TRICHLOROBENZENE	420	U	390	U	400	U	410	U			
1,2-DICHLOROBENZENE	420	U	390	U	400	U	410	U			
1,3-DICHLOROBENZENE	420	U	390	U	400	U	410	U			
1,4-DICHLOROBENZENE	420	U	390	U	400	U	410	U			
2,2'-OXYBIS(1-CHLOROPROPANE)	420	U	390	U	400	U	410	U			
2,4,5-TRICHLOROPHENOL	1000	U	940	U	970	U	990	U			
2,4,6-TRICHLOROPHENOL	420	U	390	U	400	U	410	U			
2,4-DICHLOROPHENOL	420	U	390	U	400	U	410	U			
2,4-DIMETHYLPHENOL	420	U	390	U	400	U	410	U			
2,4-DINITROPHENOL	1000	U	940	U	970	U	990	U			
2,4-DINITROTOLUENE	420	U	390	U	400	U	410	U			
2,6-DINITROTOLUENE	420	U	390	U	400	U	410	U			
2-CHLORONAPHTHALENE	420	U	390	U	400	U	410	U			
2-CHLOROPHENOL	420	U	390	U	400	U	410	U			
2-METHYLNAPHTHALENE	420	U	390	U	400	U	410	U			
2-METHYLPHENOL	420	U	390	U	400	U	410	U			
2-NITROANILINE	1000	U	940	U	970	U	990	U			
2-NITROPHENOL	420	U	390	U	400	U	410	U			
3,3'-DICHLOROBENZIDINE	420	U	390	U	400	U	410	U			
3-NITROANILINE	1000	U	940	U	970	U	990	U			
4,6-DINITRO-2-METHYLPHENOL	1000	U	940	U	970	U	990	U			
4-BROMOPHENYL PHENYL ETHER	420	U	390	U	400	U	410	U			
4-CHLORO-3-METHYLPHENOL	420	U	390	U	400	U	410	U			
4-CHLOROANILINE	420	U	390	U	400	U	410	U			
4-CHLOROPHENYL PHENYL ETHER	420	U	390	U	400	U	410	U			
4-METHYLPHENOL	420	U	390	U	400	U	410	U			
4-NITROANILINE	1000	U	940	U	970	U	990	U			
4-NITROPHENOL	1000	U	940	U	970	U	990	U			
ACENAPHTHENE	420	U	390	U	400	U	410	U			
ACENAPHTHYLENE	420	U	390	U	400	U	410	U			
ANTHRACENE	420	U	390	U	400	U	410	U			
BENZ(A)ANTHRACENE	420	U	390	U	400	U	410	U			
BENZO(A)PYRENE	420	U	390	U	400	U	410	U			
BENZO(B)FLUORANTHENE	420	U	390	U	400	U	410	U			
BENZO(G,H,I)PERYLENE	420	U	390	U	400	U	410	U			

TABLE 1

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NAWC WARMINSTER, WARMINSTER, PENNSYLVANIA

SEMIVOLATILE ORGANIC RESULTS FOR SURFACE SOIL SITE 07

UG/KG

DRAFT

SAMPLE NUMBER:	SS-07-08		SS-07-09		SS-07-10		SS-07-11				
SEMIVOLATILES											
BENZO(K)FLUORANTHENE	420	U	390	U	400	U	410	U			
BIS(2-CHLOROETHOXY)METHANE	420	U	390	U	400	U	410	U			
BIS(2-CHLOROETHYL)ETHER	420	U	390	U	400	U	410	U			
BIS(2-ETHYLHEXYL)PHTHALATE	420	U	390	U	400	U	410	U			
BUTYLBENZYLPHTHALATE	420	U	390	U	400	U	410	U			
CARBAZOLE	420	U	390	U	400	U	410	U			
CHRYSENE	420	U	390	U	400	U	410	U			
DI-N-BUTYLPHTHALATE	420	U	390	U	400	U	410	U			
DI-N-OCTYLPHTHALATE	420	U	390	U	400	U	410	U			
DIBENZ(A,H)ANTHRACENE	420	U	390	U	400	U	410	U			
DIBENZOFURAN	420	U	390	U	400	U	410	U			
DIETHYLPHTHALATE	420	U	390	U	400	U	410	U			
DIMETHYLPHTHALATE	420	U	390	U	400	U	410	U			
FLUORANTHENE	420	U	390	U	400	U	410	U			
FLUORENE	420	U	390	U	400	U	410	U			
HEXACHLOROBENZENE	420	U	390	U	400	U	410	U			
HEXACHLOROBUTADIENE	420	U	390	U	400	U	410	U			
HEXACHLOROCYCLOPENTADIENE	420	U	390	U	400	U	410	U			
HEXACHLOROETHANE	420	U	390	U	400	U	410	U			
INDENO(1,2,3-CD)PYRENE	420	U	390	U	400	U	410	U			
ISOPHORONE	420	U	390	U	400	U	410	U			
N-NITROSO-DI-N-PROPYLAMINE	420	U	390	U	400	U	410	U			
N-NITROSODIPHENYLAMINE	420	U	390	U	400	U	410	U			
NAPHTHALENE	420	U	390	U	400	U	410	U			
NITROBENZENE	420	U	390	U	400	U	410	U			
PENTACHLOROPHENOL	1000	U	940	U	970	U	990	U			
PHENANTHRENE	420	U	390	U	400	U	410	U			
PYRENE	420	U	390	U	400	U	410	U			

UG/KG

SAMPLE NUMBER:	SS-07-01		SS-07-02		SS-07-03		SS-07-04		SS-07-05		SS-07-06		SS-07-07	
PESTICIDES														
4,4'-DDD	3.8	U	4.0	U	4.3	U	3.8	U	4.1	U	4.1	U	3.9	U
4,4'-DDE	3.8	U	4.0	U	4.3	U	3.8	U	4.1	U	4.1	U	3.9	U
4,4'-DDT	3.8	U	4.0	U	4.3	U	3.8	U	4.1	U	4.1	U	3.9	U
ALDRIN	2.0	U	2.0	U	2.2	U	2.0	U	2.1	U	2.1	U	2.0	U
ALPHA-BHC	2.0	U	2.0	U	2.2	U	2.0	U	2.1	U	2.1	U	2.0	U
ALPHA-CHLORDANE	2.0	U	2.0	U	2.2	U	2.0	U	2.1	U	2.1	U	2.0	U
AROCLOR-1016	38.0	U	40.0	U	43.0	U	38.0	U	41.0	U	41.0	U	39.0	U
AROCLOR-1221	77.0	U	80.0	U	87.0	U	78.0	U	82.0	U	83.0	U	79.0	U
AROCLOR-1232	38.0	U	40.0	U	43.0	U	38.0	U	41.0	U	41.0	U	39.0	U
AROCLOR-1242	38.0	U	40.0	U	43.0	U	38.0	U	41.0	U	41.0	U	39.0	U
AROCLOR-1248	38.0	U	40.0	U	43.0	U	38.0	U	41.0	U	41.0	U	39.0	U
AROCLOR-1254	38.0	U	40.0	U	43.0	U	38.0	U	41.0	U	41.0	U	39.0	U
AROCLOR-1260	38.0	U	40.0	U	43.0	U	38.0	U	41.0	U	41.0	U	39.0	U
BETA-BHC	2.0	U	2.0	U	2.2	U	2.0	U	2.1	U	2.1	U	2.0	U
DELTA-BHC	2.0	U	2.0	U	2.2	U	2.0	U	2.1	U	2.1	U	2.0	U
DIELDRIN	3.8	U	4.0	U	4.3	U	3.8	U	4.1	U	4.1	U	3.9	U
ENDOSULFAN I	2.0	U	2.0	U	2.2	U	2.0	U	2.1	U	2.1	U	2.0	U
ENDOSULFAN II	3.8	U	4.0	U	4.3	U	3.8	U	4.1	U	4.1	U	3.9	U
ENDOSULFAN SULFATE	3.8	U	4.0	U	4.3	U	3.8	U	4.1	U	4.1	U	3.9	U
ENDRIN	3.8	U	4.0	U	4.3	U	3.8	U	4.1	U	4.1	U	3.9	U
ENDRIN ALDEHYDE	3.8	U	4.0	U	4.3	U	3.8	U	4.1	U	4.1	U	3.9	U
ENDRIN KETONE	3.8	U	4.0	U	4.3	U	3.8	U	4.1	U	4.1	U	3.9	U
GAMMA-BHC (LINDANE)	2.0	U	2.0	U	2.2	U	2.0	U	2.1	U	2.1	U	2.0	U
GAMMA-CHLORDANE	2.0	U	2.0	U	2.2	U	2.0	U	2.1	U	2.1	U	2.0	U
HEPTACHLOR	2.0	U	2.0	U	2.2	U	2.0	U	2.1	U	2.1	U	2.0	U
HEPTACHLOR EPOXIDE	2.0	U	2.0	U	2.2	U	2.0	U	2.1	U	2.1	U	2.0	U
METHOXYCHLOR	20.0	U	20.0	U	22.0	U	20.0	U	21.0	U	21.0	U	20.0	U
TOXAPHENE	200	U	200	U	220	U	200	U	210	U	210	U	200	U

TABLE 1

07/29/96

NAWC WARMINSTER, WARMINSTER, PENNSYLVANIA

PESTICIDE/PCB RESULTS FOR SURFACE SOIL SITE 07

UG/KG

DRAFT

SAMPLE NUMBER:	SS-07-08		SS-07-09		SS-07-10		SS-07-11				
PESTICIDES											
4,4'-DDD	4.2	U	3.9	U	4.0	U	4.1	U			
4,4'-DDE	4.2	U	3.9	U	4.0	U	4.1	U			
4,4'-DDT	4.2	U	3.9	U	4.0	U	4.1	U			
ALDRIN	2.2	U	2.0	U	2.1	U	2.1	U			
ALPHA-BHC	2.2	U	2.0	U	2.1	U	2.1	U			
ALPHA-CHLORDANE	2.2	U	2.0	U	2.1	U	2.1	U			
AROCLOR-1016	42.0	U	39.0	U	40.0	U	41.0	U			
AROCLOR-1221	85.0	U	79.0	U	81.0	U	83.0	U			
AROCLOR-1232	42.0	U	39.0	U	40.0	U	41.0	U			
AROCLOR-1242	42.0	U	39.0	U	40.0	U	41.0	U			
AROCLOR-1248	42.0	U	39.0	U	40.0	U	41.0	U			
AROCLOR-1254	42.0	U	39.0	U	40.0	U	41.0	U			
AROCLOR-1260	42.0	U	39.0	U	40.0	U	41.0	U			
BETA-BHC	2.2	U	2.0	U	2.1	U	2.1	U			
DELTA-BHC	2.2	U	2.0	U	2.1	U	2.1	U			
DIELDRIN	4.2	U	3.9	U	4.0	U	4.1	U			
ENDOSULFAN I	2.2	U	2.0	U	2.1	U	2.1	U			
ENDOSULFAN II	4.2	U	3.9	U	4.0	U	4.1	U			
ENDOSULFAN SULFATE	4.2	U	3.9	U	4.0	U	4.1	U			
ENDRIN	4.2	U	3.9	U	4.0	U	4.1	U			
ENDRIN ALDEHYDE	4.2	U	3.9	U	4.0	U	4.1	U			
ENDRIN KETONE	4.2	U	3.9	U	4.0	U	4.1	U			
GAMMA-BHC (LINDANE)	2.2	U	2.0	U	2.1	U	2.1	U			
GAMMA-CHLORDANE	2.2	U	2.0	U	2.1	U	2.1	U			
HEPTACHLOR	2.2	U	2.0	U	2.1	U	2.1	U			
HEPTACHLOR EPOXIDE	2.2	U	2.0	U	2.1	U	2.1	U			
METHOXYCHLOR	22.0	U	20.0	U	21.0	U	21.0	U			
TOXAPHENE	220	U	200	U	210	U	210	U			

Suspected Site 7
Subsurface Soil Data

VOLATILE ORGANIC RESULTS FOR SUBSURFACE SOIL SITE 07

UG/KG

SAMPLE NUMBER:	TP01-07-01		TP01-07-02		TP02-07-03		TP02-07-04		TP03-07-05		TP03-07-06		TP04-07-07	
VOLATILES														
1,1,1-TRICHLOROETHANE	12.0	U	12.0	U	12.0	U	12.0	U	12.0	U	11.0	U	12.0	U
1,1,2,2-TETRACHLOROETHANE	12.0	U	12.0	U	12.0	U	12.0	U	12.0	U	11.0	U	12.0	U
1,1,2-TRICHLOROETHANE	12.0	U	12.0	U	12.0	U	12.0	U	12.0	U	11.0	U	12.0	U
1,1-DICHLOROETHANE	12.0	U	12.0	U	12.0	U	12.0	U	12.0	U	11.0	U	12.0	U
1,1-DICHLOROETHENE	12.0	U	12.0	U	12.0	U	12.0	U	12.0	U	11.0	U	12.0	U
1,2-DICHLOROETHANE	12.0	U	12.0	U	12.0	U	12.0	U	12.0	U	11.0	U	12.0	U
1,2-DICHLOROETHENE (TOTAL)	12.0	U	12.0	U	12.0	U	12.0	U	12.0	U	11.0	U	12.0	U
1,2-DICHLOROPROPANE	12.0	U	12.0	U	12.0	U	12.0	U	12.0	U	11.0	U	12.0	U
2-BUTANONE	12.0	U	12.0	U	12.0	U	12.0	U	12.0	U	11.0	U	12.0	U
2-HEXANONE	12.0	U	12.0	U	12.0	U	12.0	U	12.0	U	11.0	U	12.0	U
4-METHYL-2-PENTANONE	12.0	U	12.0	U	12.0	U	12.0	U	12.0	U	11.0	U	12.0	U
ACETONE	12.0	U	12.0	U	12.0	U	12.0	U	12.0	U	11.0	U	4.0	B
BENZENE	12.0	U	12.0	U	12.0	U	12.0	U	12.0	U	11.0	U	12.0	U
BROMODICHLOROMETHANE	12.0	U	12.0	U	12.0	U	12.0	U	12.0	U	11.0	U	12.0	U
BROMOFORM	12.0	U	12.0	U	12.0	U	12.0	U	12.0	U	11.0	U	12.0	U
BROMOMETHANE	12.0	U	12.0	U	12.0	U	12.0	U	12.0	U	11.0	U	12.0	U
CARBON DISULFIDE	12.0	U	12.0	U	12.0	U	12.0	U	12.0	U	11.0	U	12.0	U
CARBON TETRACHLORIDE	12.0	U	12.0	U	12.0	U	12.0	U	12.0	U	11.0	U	12.0	U
CHLOROBENZENE	12.0	U	12.0	U	12.0	U	12.0	U	12.0	U	11.0	U	12.0	U
CHLOROETHANE	12.0	UJ	12.0	UJ	12.0	UJ	12.0	UJ	12.0	UJ	11.0	UJ	12.0	U
CHLOROFORM	12.0	U	12.0	U	12.0	U	12.0	U	12.0	U	11.0	U	12.0	U
CHLOROMETHANE	12.0	U	12.0	U	12.0	U	12.0	U	12.0	U	11.0	U	12.0	U
CIS-1,3-DICHLOROPROPENE	12.0	U	12.0	U	12.0	U	12.0	U	12.0	U	11.0	U	12.0	U
DIBROMOCHLOROMETHANE	12.0	U	12.0	U	12.0	U	12.0	U	12.0	U	11.0	U	12.0	U
ETHYLBENZENE	12.0	U	12.0	U	12.0	U	12.0	U	12.0	U	11.0	U	12.0	U
METHYLENE CHLORIDE	11.0	B	10.0	B	9.0	B	13.0	B	10.0	B	9.0	B	11.0	B
STYRENE	12.0	U	12.0	U	12.0	U	12.0	U	12.0	U	11.0	U	12.0	U
TETRACHLOROETHENE	12.0	U	12.0	U	12.0	U	12.0	U	12.0	U	11.0	U	12.0	U
TOLUENE	12.0	U	12.0	U	12.0	U	12.0	U	12.0	U	11.0	U	12.0	U
TRANS-1,3-DICHLOROPROPENE	12.0	U	12.0	U	12.0	U	12.0	U	12.0	U	11.0	U	12.0	U
TRICHLOROETHENE	12.0	U	12.0	U	12.0	U	12.0	U	12.0	U	11.0	U	12.0	U
VINYL CHLORIDE	12.0	U	12.0	U	12.0	U	12.0	U	12.0	U	11.0	U	12.0	U
XYLENE (TOTAL)	12.0	U	12.0	U	12.0	U	12.0	U	12.0	U	11.0	U	12.0	U

TABLE 1

07/29/96

NAWC WARMINSTER, WARMINSTER, PENNSYLVANIA

VOLATILE ORGANIC RESULTS FOR SUBSURFACE SOIL SITE 07

UG/KG

DRAFT

SAMPLE NUMBER:	TP04-07-08							
VOLATILES								
1,1,1-TRICHLOROETHANE	12.0	U						
1,1,2,2-TETRACHLOROETHANE	12.0	U						
1,1,2-TRICHLOROETHANE	12.0	U						
1,1-DICHLOROETHANE	12.0	U						
1,1-DICHLOROETHENE	12.0	U						
1,2-DICHLOROETHANE	12.0	U						
1,2-DICHLOROETHENE (TOTAL)	12.0	U						
1,2-DICHLOROPROPANE	12.0	U						
2-BUTANONE	12.0	U						
2-HEXANONE	12.0	U						
4-METHYL-2-PENTANONE	12.0	U						
ACETONE	8.0	B						
BENZENE	12.0	U						
BROMODICHLOROMETHANE	12.0	U						
BROMOFORM	12.0	U						
BROMOMETHANE	12.0	U						
CARBON DISULFIDE	12.0	U						
CARBON TETRACHLORIDE	12.0	U						
CHLOROBENZENE	12.0	U						
CHLOROETHANE	12.0	U						
CHLOROFORM	12.0	U						
CHLOROMETHANE	12.0	U						
CIS-1,3-DICHLOROPROPENE	12.0	U						
DIBROMOCHLOROMETHANE	12.0	U						
ETHYLBENZENE	12.0	U						
METHYLENE CHLORIDE	9.0	B						
STYRENE	12.0	U						
TETRACHLOROETHENE	12.0	U						
TOLUENE	12.0	U						
TRANS-1,3-DICHLOROPROPENE	12.0	U						
TRICHLOROETHENE	12.0	U						
VINYL CHLORIDE	12.0	U						
XYLENE (TOTAL)	12.0	U						

APPENDIX C
REMOVAL VERIFICATION SAMPLE RESULTS

11/26/97

DRAFT

TABLE 1

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	W-P6A-01		W-P6A-02		W-P6A-03		W-P6A-04		W-P6A-04-DUP		W-P6A-05		W-P6A-06		W-P6A-07		W-P6A-08	
LOCATION:	Side wall		Side wall		Side wall		Excavated		Excavated		Side wall		Side wall		Floor		Excavated	
DATA SOURCE:	Pit P6A		Pit P6A		Pit P6A		Pit P6A		Pit P6A		Pit P6A		Pit P6A		Pit P6A		Pit P6A	
SAMPLE DATE:	05/19/97		05/19/97		05/19/97		05/19/97		05/19/97		05/19/97		05/19/97		05/19/97		05/19/97	
INORGANICS	**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**	
aluminum	15600		20000		17100		6270		7160		16900		19200		21100		20100	
antimony	2.6	UR	2.4	UR	2.5	UR	8.4	K	7.4	J	2.5	U	3.7	K	3	K	2.7	K
arsenic	3.6	K	4	K	4.7	K	2.5	K	3.1	K	8.4		8.4		3.5	K	5.5	K
barium	92.6		51.6		56.5		181		123		96.1		46.9		68.7		66.2	
beryllium	0.74		2		1.2		0.37		0.4		1.1		0.65		1.9		1.2	
cadmium	7.8	L	0.41	UL	0.42	UL	155	L	57.3	L	0.42	UL	0.44	UL	0.42	UL	2.2	L
calcium	5300	J	1400	J	1380	J	90200	J	52400	J	1380	J	791	J	1110	J	3720	J
chromium	1460	J	71.1	J	56.4	J	9090	J	4880	J	28.2	J	26.2	J	24.8	J	319	J
cobalt	17.4	J	10.7	J	11.3	J	48.3	J	33.3	J	9	J	8.5	J	22.2	J	17	J
copper	85.4	L	16.9	L	13.8	L	382	L	235	L	11	L	15.5	L	9.2	L	26.7	L
iron	50800	J	38400	J	23800	J	188000	J	123000	J	17300	J	26300	J	35100	J	36200	J
lead	41.8	J	14.1	J	14.8	J	90.4	J	74.3	J	15.8	J	10.3	J	19.3	J	37.8	J
magnesium	1610	J	2460	J	2450	J	3260	J	2340	J	1830	J	2480	J	2880	J	2420	J
manganese	542	J	387	J	320	J	835	J	668	J	656	J	217	J	1050	J	480	J
mercury	0.91		0.05		0.04	U	1.5		1.3		0.1		0.04	U	0.04	U	0.15	
nickel	17.1		18.4		14.7		1190		701		13.1		14.9		16.5		32.5	
potassium	749		1590		1350		473		423		709		1090		2100		1430	
selenium	0.33	UL	0.3	UL	0.31	UL	2.1	UL	1.7	UL	0.31	UL	0.32	UL	0.31	UL	0.34	UL
silver	45.5	J	1.2	J	2	J	306	J	191	J	0.59	J	0.72	J	0.61	J	11.1	J
sodium	75.8	J	67.5	J	69.2	J	98	J	78.7	B	64.7	J	64.7	B	86.6	J	86.5	J
thallium	1	J	0.43	UL	0.46	J	4.9	L	2.4	UL	0.44	UL	0.64	J	0.44	UL	0.63	J
vanadium	27.1		28.4		27.3		34.8	K	24.2	K	29.7		42.5		25.1		31.4	
zinc	78	J	35.7	J	30.6	J	360	J	246	J	41.8	J	34.7	J	28.3	J	49.9	J

NOTES:

- J -- Value is considered estimated due to exceedance of technical quality control criteria or because result is less than the Contract Required Quantitation Limit (CRQL).
- U -- Value is a non-detected result as reported by the laboratory.
- UJ -- Non-detected result is considered estimated due to exceedance of technical quality control criteria.
- UL -- Non-detected result is considered biased low due to exceedance of technical quality control criteria.
- UR -- Non-detected result is considered unusable due to exceedance of technical quality control criteria.
- L -- Positive result is considered biased low due to exceedance of technical quality control criteria.
- K -- Positive result is considered biased high due to exceedance of technical quality control criteria.
- B -- Positive result is considered to be an artifact of blank contamination, and should not be considered present.
- R -- Positive result is considered unusable due to exceedance of technical quality control criteria.

TABLE 1

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	W-P6A-01	W-P6A-02	W-P6A-03	W-P6A-04	W-P6A-04-DUP	W-P6A-05	W-P6A-06	W-P6A-07	W-P6A-08
LOCATION:	Side wall	Side wall	Side wall	Excavated	Excavated	Side wall	Side wall	Floor	Excavated
DATA SOURCE:	Pit P6A	Pit P6A	Pit P6A	Pit P6A	Pit P6A	Pit P6A	Pit P6A	Pit P6A	Pit P6A
SAMPLE DATE:	05/19/97	05/19/97	05/19/97	05/19/97	05/19/97	05/19/97	05/19/97	05/19/97	05/19/97
SEMIVOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
1,2,4-trichlorobenzene	420 U	390 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1,2-dichlorobenzene	420 U	390 U	6 U	8.1 U	8.6 U	6 U	6.2 U	6 U	6.5 U
1,3-dichlorobenzene	420 U	390 U	6 U	8.1 U	8.6 U	6 U	6.2 U	6 U	6.5 U
1,4-dichlorobenzene	420 U	390 U	6 U	8.1 U	8.6 U	6 U	6.2 U	6 U	6.5 U
2,2'-oxybis(1-chloropropane)	420 U	390 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2,4,5-trichlorophenol	420 U	390 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2,4,6-trichlorophenol	420 U	390 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2,4-dichlorophenol	420 U	390 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2,4-dimethylphenol	420 U	390 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2,4-dinitrophenol	2000 U	1900 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2,4-dinitrotoluene	420 U	390 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2,6-dinitrotoluene	420 U	390 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2-chlorophenol	420 U	390 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2-methylnaphthalene	420 U	390 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2-methylphenol	420 U	390 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2-nitroaniline	2000 U	1900 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2-nitrophenol	420 U	390 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3,3'-dichlorobenzidine	2000 U	1900 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3-nitroaniline	2000 U	1900 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4,6-dinitro-2-methylphenol	2000 U	1900 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4-bromophenyl phenyl ether	420 U	390 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4-chloro-3-methylphenol	420 U	390 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4-chloroaniline	420 U	390 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4-chlorophenyl phenyl ether	420 U	390 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a

NOTES:

- J -- Value is considered estimated due to exceedance of technical quality control criteria or because result is less than the Contract Required Quantitation Limit (CRQL).
- U -- Value is a non-detected result as reported by the laboratory.
- UJ -- Non-detected result is considered estimated due to exceedance of technical quality control criteria.
- UL -- Non-detected result is considered biased low due to exceedance of technical quality control criteria.
- UR -- Non-detected result is considered unusable due to exceedance of technical quality control criteria.
- L -- Positive result is considered biased low due to exceedance of technical quality control criteria.
- K -- Positive result is considered biased high due to exceedance of technical quality control criteria.
- B -- Positive result is considered to be an artifact of blank contamination, and should not be considered present.
- R -- Positive result is considered unusable due to exceedance of technical quality control criteria.

TABLE 1

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	W-P6A-01		W-P6A-02		W-P6A-03		W-P6A-04		W-P6A-04-DUP		W-P6A-05		W-P6A-06		W-P6A-07		W-P6A-08	
LOCATION:	Side wall		Side wall		Side wall		Excavated		Excavated		Side wall		Side wall		Floor		Excavated	
DATA SOURCE:	Pit P6A		Pit P6A		Pit P6A		Pit P6A		Pit P6A		Pit P6A		Pit P6A		Pit P6A		Pit P6A	
SAMPLE DATE:	05/19/97		05/19/97		05/19/97		05/19/97		05/19/97		05/19/97		05/19/97		05/19/97		05/19/97	
SEMIVOLATILES	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
4-methylphenol	420	U	390	U	n/a		n/a		n/a		n/a		n/a		n/a		n/a	
4-nitroaniline	2000	U	1900	U	n/a		n/a		n/a		n/a		n/a		n/a		n/a	
4-nitrophenol	2000	U	1900	U	n/a		n/a		n/a		n/a		n/a		n/a		n/a	
N-nitroso-di-n-propylamine	420	U	390	U	n/a		n/a		n/a		n/a		n/a		n/a		n/a	
N-nitrosodiphenylamine	420	U	390	U	n/a		n/a		n/a		n/a		n/a		n/a		n/a	
acenaphthene	420	U	390	U	81	U	1100	U	1100	U	81	U	84	U	80	U	87000	U
acenaphthylene	420	U	390	U	81	U	1100	U	1100	U	81	U	84	U	80	U	87000	U
anthracene	420	U	390	U	21	U	280	U	290	U	20	U	21	U	20	U	22000	U
benz(a)anthracene	51	J	390	U	4.9	J	22	J	21	J	7.2	J	0.84	UJ	0.8	UJ	19000	J
benzo(a)pyrene	420	U	390	U	6.1	J	35	J	23	J	6.8	J	0.84	UJ	0.8	UJ	20000	J
benzo(b)fluoranthene	77	J	390	U	7.9		47		40		11		0.84	U	0.8	U	17000	
benzo(g,h,i)perylene	420	U	390	U	7.7		160		110		9.5		2.1	U	2	U	16000	
benzo(k)fluoranthene	420	U	390	U	3.4	J	42	J	42	J	4.2	J	0.84	UJ	0.8	UJ	7900	J
beta-chloronaphthalene	420	U	390	U	n/a		n/a		n/a		n/a		n/a		n/a		n/a	
bis(2-chloroethoxy)methane	420	U	390	U	n/a		n/a		n/a		n/a		n/a		n/a		n/a	
bis(2-chloroethyl)ether	420	U	390	U	n/a		n/a		n/a		n/a		n/a		n/a		n/a	
bis(2-ethylhexyl)phthalate	250	J	390	U	n/a		n/a		n/a		n/a		n/a		n/a		n/a	
butylbenzylphthalate	420	U	390	U	n/a		n/a		n/a		n/a		n/a		n/a		n/a	
carbazole	420	U	390	U	n/a		n/a		n/a		n/a		n/a		n/a		n/a	
chrysene	73	J	390	U	6	U	81	U	86	U	9.9		6.2	U	6	U	18000	
di-n-butylphthalate	420	U	390	U	n/a		n/a		n/a		n/a		n/a		n/a		n/a	
di-n-octylphthalate	420	U	390	U	n/a		n/a		n/a		n/a		n/a		n/a		n/a	
dibenz(a,h)anthracene	420	U	390	U	1.2	UJ	75	J	26	J	4.6	J	1.2	UJ	1.2	UJ	1300	UJ
dibenzofuran	420	U	390	U	n/a		n/a		n/a		n/a		n/a		n/a		n/a	
diethylphthalate	420	U	390	U	n/a		n/a		n/a		n/a		n/a		n/a		n/a	

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TABLE 1

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	W-P6A-01	W-P6A-02	W-P6A-03	W-P6A-04	W-P6A-04-DUP	W-P6A-05	W-P6A-06	W-P6A-07	W-P6A-08
LOCATION:	Side wall	Side wall	Side wall	Excavated	Excavated	Side wall	Side wall	Floor	Excavated
DATA SOURCE:	Pit P6A	Pit P6A	Pit P6A	Pit P6A	Pit P6A	Pit P6A	Pit P6A	Pit P6A	Pit P6A
SAMPLE DATE:	05/19/97	05/19/97	05/19/97	05/19/97	05/19/97	05/19/97	05/19/97	05/19/97	05/19/97
SEMIVOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
dimethylphthalate	420 U	390 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a
fluoranthene	70 J	390 U	9.5	110 U	110 U	18	8.4 U	8 U	22000
fluorene	420 U	390 U	8.1 U	110 U	110 U	8.1 U	8.4 U	8 U	8700 U
hexachlorobenzene	420 U	390 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a
hexachlorobutadiene	420 U	390 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a
hexachlorocyclopentadiene	2000 U	1900 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a
hexachloroethane	420 U	390 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a
indeno(1,2,3-cd)pyrene	420 U	390 U	6.2	63	63	10	2.1 U	2 U	9800
isophorone	420 U	390 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a
naphthalene	420 U	390 U	40 U	540 U	560 U	40 U	41 U	40 U	43000 U
nitrobenzene	420 U	390 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a
pentachlorophenol	2000 U	1900 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a
phenanthrene	420 U	390 U	21 U	280 U	290 U	20 U	21 U	20 U	22000 U
phenol	420 U	390 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a
pyrene	420 U	390 U	14	450	110 U	23	8.4 U	8 U	8700 U
VOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
1,1,1-trichloroethane	6.4 U	5.9 U	6 U	8.1 U	8.6 U	6 U	6.2 U	6 U	6.5 U
1,1,2,2-tetrachloroethane	6.4 U	5.9 U	6 U	8.1 U	8.6 U	6 U	6.2 U	6 U	6.5 U
1,1,2-trichloroethane	6.4 U	5.9 U	6 U	8.1 U	8.6 U	6 U	6.2 U	6 U	6.5 U
1,1-dichloroethane	6.4 U	5.9 U	6 U	8.1 U	8.6 U	6 U	6.2 U	6 U	6.5 U
1,1-dichloroethene	6.4 U	5.9 U	6 U	8.1 U	8.6 U	6 U	6.2 U	6 U	6.5 U
1,2-dichloroethane	6.4 U	5.9 U	6 U	8.1 U	8.6 U	6 U	6.2 U	6 U	6.5 U
1,2-dichloroethene (total)	6.4 U	5.9 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1,2-dichloroethene (trans)	n/a	n/a	6 U	8.1 U	8.6 U	6 U	6.2 U	6 U	6.5 U
1,2-dichloropropane	6.4 U	5.9 U	6 U	8.1 U	8.6 U	6 U	6.2 U	6 U	6.5 U

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NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	W-P6A-01	W-P6A-02	W-P6A-03	W-P6A-04	W-P6A-04-DUP	W-P6A-05	W-P6A-06	W-P6A-07	W-P6A-08
LOCATION:	Side wall	Side wall	Side wall	Excavated	Excavated	Side wall	Side wall	Floor	Excavated
DATA SOURCE:	Pit P6A	Pit P6A	Pit P6A	Pit P6A	Pit P6A	Pit P6A	Pit P6A	Pit P6A	Pit P6A
SAMPLE DATE:	05/19/97	05/19/97	05/19/97	05/19/97	05/19/97	05/19/97	05/19/97	05/19/97	05/19/97
VOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
2-butanone	130 U	120 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2-hexanone	64 U	59 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4-methyl-2-pentanone	64 U	59 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a
acetone	130 U	120 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a
benzene	6.4 U	5.9 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a
bromodichloromethane	6.4 U	5.9 U	6 U	8.1 U	8.6 U	6 U	6.2 U	6 U	6.5 U
bromoform	6.4 U	5.9 U	6 U	8.1 U	8.6 U	6 U	6.2 U	6 U	6.5 U
bromomethane	13 U	12 U	12 U	16 U	17 U	12 U	12 U	12 U	13 U
carbon disulfide	6.4 U	5.9 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a
carbon tetrachloride	6.4 U	5.9 U	6 U	8.1 U	8.6 U	6 U	6.2 U	6 U	6.5 U
chlorobenzene	6.4 U	5.9 U	6 U	8.1 U	8.6 U	6 U	6.2 U	6 U	6.5 U
chloroethane	13 U	12 U	12 U	16 U	17 U	12 U	12 U	12 U	13 U
chloroform	6.4 U	5.9 U	6 U	8.1 U	8.6 U	6 U	6.2 U	6 U	6.5 U
chloromethane	13 U	12 U	12 U	16 U	17 U	12 U	12 U	12 U	13 U
cis-1,3-dichloropropene	6.4 U	5.9 U	6 U	8.1 U	8.6 U	6 U	6.2 U	6 U	6.5 U
dibromochloromethane	6.4 U	5.9 U	6 U	8.1 U	8.6 U	6 U	6.2 U	6 U	6.5 U
ethylbenzene	6.4 U	5.9 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a
methylene chloride	6.4 U	5.9 U	6 U	8.1 U	8.6 U	6 U	6.2 U	6 U	6.5 U
styrene	6.4 U	5.9 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a
tetrachloroethene	6.4 U	5.9 U	6 U	8.1 U	8.6 U	6 U	6.2 U	6 U	6.5 U
toluene	6.4 U	5.9 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a
trans-1,3-dichloropropene	6.4 U	5.9 U	6 U	8.1 U	8.6 U	6 U	6.2 U	6 U	6.5 U
trichloroethene	6.4 U	5.9 U	6 U	8.1 U	8.6 U	6 U	6.2 U	6 U	6.5 U
vinyl chloride	13 U	12 U	12 U	16 U	17 U	12 U	12 U	12 U	13 U
xylene (total)	6.4 U	5.9 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a

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NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	W-P6A-01	W-P6A-02	W-P6A-03	W-P6A-04	W-P6A-04-DUP	W-P6A-05	W-P6A-06	W-P6A-07	W-P6A-08
LOCATION:	Side wall	Side wall	Side wall	Excavated	Excavated	Side wall	Side wall	Floor	Excavated
DATA SOURCE:	Pit P6A	Pit P6A	Pit P6A	Pit P6A	Pit P6A	Pit P6A	Pit P6A	Pit P6A	Pit P6A
SAMPLE DATE:	05/19/97	05/19/97	05/19/97	05/19/97	05/19/97	05/19/97	05/19/97	05/19/97	05/19/97
PESTICIDES/PCBS	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
4,4'-DDD	2.9 J	2 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4,4'-DDE	2.2 U	2 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4,4'-DDT	2.2 U	2 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Aroclor-1016	42 U	39 U	40 U	54 U	56 U	40 U	41 U	40 U	43 U
Aroclor-1221	42 U	39 U	40 U	54 U	56 U	40 U	41 U	40 U	43 U
Aroclor-1232	42 U	39 U	40 U	54 U	56 U	40 U	41 U	40 U	43 U
Aroclor-1242	42 U	39 U	40 U	54 U	56 U	40 U	41 U	40 U	43 U
Aroclor-1248	42 U	39 U	40 U	54 U	56 U	40 U	41 U	40 U	43 U
Aroclor-1254	42 U	39 U	40 U	900	660	40 U	41 U	40 U	310
Aroclor-1260	42 U	39 U	40 U	450	380	40 U	70	40 U	340
aldrin	2.2 U	2 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a
alpha-BHC	2.2 U	2 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a
alpha-chlordane	2.2 U	2 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a
beta-BHC	2.2 U	2 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a
delta-BHC	2.2 U	2 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a
dieldrin	2.5	2 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a
endosulfan I	2.2 U	2 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a
endosulfan II	2.2 U	2 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a
endosulfan sulfate	2.2 U	2 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a
endrin	2.2 U	2 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a
endrin aldehyde	2.2 U	2 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a
endrin ketone	2.8	2 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a
gamma-BHC (Lindane)	2.2 U	2 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a
gamma-chlordane	2.2 U	2 U	n/a	n/a	n/a	n/a	n/a	n/a	n/a

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ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	W-P6A-01		W-P6A-02		W-P6A-03	W-P6A-04	W-P6A-04-DUP	W-P6A-05	W-P6A-06	W-P6A-07	W-P6A-08
LOCATION:	Side wall		Side wall		Side wall	Excavated	Excavated	Side wall	Side wall	Floor	Excavated
DATA SOURCE:	Pit P6A		Pit P6A		Pit P6A	Pit P6A	Pit P6A	Pit P6A	Pit P6A	Pit P6A	Pit P6A
SAMPLE DATE:	05/19/97		05/19/97		05/19/97	05/19/97	05/19/97	05/19/97	05/19/97	05/19/97	05/19/97
PESTICIDES/PCBS	**ug/kg**		**ug/kg**		**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
heptachlor	2.2	U	2	U	n/a	n/a	n/a	n/a	n/a	n/a	n/a
heptachlor epoxide	2.2	U	2	U	n/a	n/a	n/a	n/a	n/a	n/a	n/a
methoxychlor	22	U	20	U	n/a	n/a	n/a	n/a	n/a	n/a	n/a
toxaphene	86	U	78	U	n/a	n/a	n/a	n/a	n/a	n/a	n/a

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NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	W-P6A-09	W-P6A-10	W-P6A-11	W-P6A-12	W-TR6E-01	W-TR6E-02	W-TR6E-03	W-TR6E-04	W-TR6E-04-DUP
LOCATION:	Floor	Excavated	Floor	Side wall	Side wall	Side wall	Side wall	Floor	Floor
DATA SOURCE:	Pit P6A	Pit P6A	Pit P6A	Pit P6A	Trench TR6E	Trench TR6E	Trench TR6E	Trench TR6E	Trench TR6E
SAMPLE DATE:	05/19/97	06/10/97	06/10/97	06/24/97	05/20/97	05/20/97	05/20/97	05/20/97	05/20/97
INORGANICS	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**
aluminum	28500	11500 J	n/a	n/a	13700	9030	15200	16500	14900
antimony	2.6 U	12.4 L	n/a	n/a	2.6 UL	2.4 UL	2.4 UL	2.4 UL	2.4 UL
arsenic	2.5 K	4.6 K	n/a	n/a	6.8	3.7	5.7	5.5	5.7
barium	81.5	200 J	n/a	n/a	86.9	38	66.1	69.6	71
beryllium	1.5	0.65 L	n/a	n/a	0.67	0.53	0.77	0.34	0.42
cadmium	0.62 L	34.9 J	n/a	n/a	0.45 UL	0.42 UL	0.51 L	0.41 UL	0.41 UL
calcium	335 J	55000 J	n/a	n/a	2760 J	1140 J	1720 J	1110 J	956 J
chromium	26.1 J	5210 J	n/a	n/a	21 J	17.3 J	22.1 J	26.5 J	23.9 J
cobalt	26.3 J	28.5 J	n/a	n/a	7.7 K	6.4 K	9.3 K	3.1 K	3.2 K
copper	39.1 L	175	n/a	n/a	32.6 L	14.9 L	18.7 L	12.7 L	11.1 L
iron	15500 J	117000	n/a	n/a	22200 J	15600 J	18600 J	14800 J	16100 J
lead	6.6 J	2130 L	n/a	119 K	88.4 J	11.3 J	53.9 J	9.3 J	9.2 J
magnesium	1970 J	4140 J	n/a	n/a	2100 J	1560 J	2230 J	1900 J	1790 J
manganese	351 J	896	n/a	n/a	419 J	181 J	502 J	191 J	187 J
mercury	0.04 U	6.9	n/a	n/a	0.09	0.13	0.04	0.04 U	0.04 U
nickel	11.7	30.1 L	n/a	n/a	12	7.8	11.4	7.8	7.9
potassium	637	1310	n/a	n/a	936	627	1020	816	777
selenium	0.34 UL	1.6 K	n/a	n/a	0.47 K	0.37 K	0.33 K	0.42 K	0.52 K
silver	0.4 J	167 K	n/a	n/a	0.75	0.51	0.46	0.8	0.7
sodium	85.6 J	125 J	n/a	n/a	95.7 J	98.3 J	104 J	84 J	96.9 J
thallium	0.48 UL	1.4 UL	n/a	n/a	0.47 UL	0.44 UL	0.43 UL	0.46 L	0.44 UL
vanadium	27.5	28.5 J	n/a	n/a	30	23.9	31.3	30.4	34.6
zinc	10.7 J	1840 L	n/a	n/a	187 J	26.9 J	49.3 J	26 J	25.2 J

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ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	W-P6A-09	W-P6A-10	W-P6A-11	W-P6A-12	W-TR6E-01	W-TR6E-02	W-TR6E-03	W-TR6E-04	W-TR6E-04-DUP
LOCATION:	Floor	Excavated	Floor	Side wall	Side wall	Side wall	Side wall	Floor	Floor
DATA SOURCE:	Pit P6A	Pit P6A	Pit P6A	Pit P6A	Trench TR6E	Trench TR6E	Trench TR6E	Trench TR6E	Trench TR6E
SAMPLE DATE:	05/19/97	06/10/97	06/10/97	06/24/97	05/20/97	05/20/97	05/20/97	05/20/97	05/20/97
SEMIVOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
1,2,4-trichlorobenzene	n/a	n/a	n/a	n/a	420 U	n/a	n/a	390 U	390 U
1,2-dichlorobenzene	6.5 U	9.7 U	n/a	n/a	420 U	5.9 U	5.8 U	390 U	390 U
1,3-dichlorobenzene	6.5 U	9.7 U	n/a	n/a	420 U	5.9 U	5.8 U	390 U	390 U
1,4-dichlorobenzene	6.5 U	9.7 U	n/a	n/a	420 U	5.9 U	5.8 U	390 U	390 U
2,2'-oxybis(1-chloropropane)	n/a	n/a	n/a	n/a	420 U	n/a	n/a	390 U	390 U
2,4,5-trichlorophenol	n/a	n/a	n/a	n/a	420 U	n/a	n/a	390 U	390 U
2,4,6-trichlorophenol	n/a	n/a	n/a	n/a	420 U	n/a	n/a	390 U	390 U
2,4-dichlorophenol	n/a	n/a	n/a	n/a	420 U	n/a	n/a	390 U	390 U
2,4-dimethylphenol	n/a	n/a	n/a	n/a	420 U	n/a	n/a	390 U	390 U
2,4-dinitrophenol	n/a	n/a	n/a	n/a	2000 U	n/a	n/a	1900 U	1900 U
2,4-dinitrotoluene	n/a	n/a	n/a	n/a	420 U	n/a	n/a	390 U	390 U
2,6-dinitrotoluene	n/a	n/a	n/a	n/a	420 U	n/a	n/a	390 U	390 U
2-chlorophenol	n/a	n/a	n/a	n/a	420 U	n/a	n/a	390 U	390 U
2-methylnaphthalene	n/a	n/a	n/a	n/a	420 U	n/a	n/a	390 U	390 U
2-methylphenol	n/a	n/a	n/a	n/a	420 U	n/a	n/a	390 U	390 U
2-nitroaniline	n/a	n/a	n/a	n/a	2000 U	n/a	n/a	1900 U	1900 U
2-nitrophenol	n/a	n/a	n/a	n/a	420 U	n/a	n/a	390 U	390 U
3,3'-dichlorobenzidine	n/a	n/a	n/a	n/a	2000 U	n/a	n/a	1900 U	1900 U
3-nitroaniline	n/a	n/a	n/a	n/a	2000 U	n/a	n/a	1900 U	1900 U
4,6-dinitro-2-methylphenol	n/a	n/a	n/a	n/a	2000 U	n/a	n/a	1900 U	1900 U
4-bromophenyl phenyl ether	n/a	n/a	n/a	n/a	420 U	n/a	n/a	390 U	390 U
4-chloro-3-methylphenol	n/a	n/a	n/a	n/a	420 U	n/a	n/a	390 U	390 U
4-chloroaniline	n/a	n/a	n/a	n/a	420 U	n/a	n/a	390 U	390 U
4-chlorophenyl phenyl ether	n/a	n/a	n/a	n/a	420 U	n/a	n/a	390 U	390 U

NOTES:

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- UJ -- Non-detected result is considered estimated due to exceedance of technical quality control criteria.
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TABLE 1

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	W-P6A-09	W-P6A-10	W-P6A-11	W-P6A-12	W-TR6E-01	W-TR6E-02	W-TR6E-03	W-TR6E-04	W-TR6E-04-DUP
LOCATION:	Floor	Excavated	Floor	Side wall	Side wall	Side wall	Side wall	Floor	Floor
DATA SOURCE:	Pit P6A	Pit P6A	Pit P6A	Pit P6A	Trench TR6E	Trench TR6E	Trench TR6E	Trench TR6E	Trench TR6E
SAMPLE DATE:	05/19/97	06/10/97	06/10/97	06/24/97	05/20/97	05/20/97	05/20/97	05/20/97	05/20/97
SEMIVOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
4-methylphenol	n/a	n/a	n/a	n/a	420 U	n/a	n/a	390 U	390 U
4-nitroaniline	n/a	n/a	n/a	n/a	2000 U	n/a	n/a	1900 U	1900 U
4-nitrophenol	n/a	n/a	n/a	n/a	2000 U	n/a	n/a	1900 U	1900 U
N-nitroso-di-n-propylamine	n/a	n/a	n/a	n/a	420 U	n/a	n/a	390 U	390 U
N-nitrosodiphenylamine	n/a	n/a	n/a	n/a	420 U	n/a	n/a	390 U	390 U
acenaphthene	87 U	650 UJ	110 U	n/a	420 U	1600 U	78 U	390 U	390 U
acenaphthylene	87 U	650 UJ	110 U	n/a	420 U	1600 U	78 U	390 U	390 U
anthracene	22 U	160 UJ	27 U	n/a	420 U	400 U	20 U	390 U	390 U
benz(a)anthracene	0.87 UJ	34 J	4.5	n/a	92 J	330	11	390 U	390 U
benzo(a)pyrene	0.87 UJ	190 J	5.5	n/a	100 J	390 J	12 J	390 U	390 U
benzo(b)fluoranthene	0.87 U	77 J	5.2	n/a	110 J	370	12	390 U	390 U
benzo(g,h,i)perylene	2.2 U	260 J	5	n/a	420 U	320	11	390 U	390 U
benzo(k)fluoranthene	0.87 UJ	37 J	2.4	n/a	83 J	200 J	6.8 J	390 U	390 U
beta-chloronaphthalene	n/a	n/a	n/a	n/a	420 U	n/a	n/a	390 U	390 U
bis(2-chloroethoxy)methane	n/a	n/a	n/a	n/a	420 U	n/a	n/a	390 U	390 U
bis(2-chloroethyl)ether	n/a	n/a	n/a	n/a	420 U	n/a	n/a	390 U	390 U
bis(2-ethylhexyl)phthalate	n/a	n/a	n/a	n/a	420 U	n/a	n/a	390 U	390 U
butylbenzylphthalate	n/a	n/a	n/a	n/a	420 U	n/a	n/a	390 U	390 U
carbazole	n/a	n/a	n/a	n/a	420 U	n/a	n/a	390 U	390 U
chrysene	6.5 U	48 UJ	7.9 U	n/a	120 J	120 U	15	390 U	390 U
di-n-butylphthalate	n/a	n/a	n/a	n/a	420 U	n/a	n/a	390 U	390 U
di-n-octylphthalate	n/a	n/a	n/a	n/a	420 U	n/a	n/a	390 U	390 U
dibenz(a,h)anthracene	1.3 UJ	46 J	1.6 U	n/a	420 U	260	2.1	390 U	390 U
dibenzofuran	n/a	n/a	n/a	n/a	420 U	n/a	n/a	390 U	390 U
diethylphthalate	n/a	n/a	n/a	n/a	420 U	n/a	n/a	390 U	390 U

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NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	W-P6A-09	W-P6A-10	W-P6A-11	W-P6A-12	W-TR6E-01	W-TR6E-02	W-TR6E-03	W-TR6E-04	W-TR6E-04-DUP
LOCATION:	Floor	Excavated	Floor	Side wall	Side wall	Side wall	Side wall	Floor	Floor
DATA SOURCE:	Pit P6A	Pit P6A	Pit P6A	Pit P6A	Trench TR6E	Trench TR6E	Trench TR6E	Trench TR6E	Trench TR6E
SAMPLE DATE:	05/19/97	06/10/97	06/10/97	06/24/97	05/20/97	05/20/97	05/20/97	05/20/97	05/20/97
SEMIVOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
dimethylphthalate	n/a	n/a	n/a	n/a	420 U	n/a	n/a	390 U	390 U
fluoranthene	8.7 U	77 J	11 U	n/a	220 J	690	28	390 U	390 U
fluorene	8.7 U	87 J	13	n/a	420 U	160 U	7.8 U	390 U	390 U
hexachlorobenzene	n/a	n/a	n/a	n/a	420 U	n/a	n/a	390 U	390 U
hexachlorobutadiene	n/a	n/a	n/a	n/a	420 U	n/a	n/a	390 U	390 U
hexachlorocyclopentadiene	n/a	n/a	n/a	n/a	2000 U	n/a	n/a	1900 U	1900 U
hexachloroethane	n/a	n/a	n/a	n/a	420 U	n/a	n/a	390 U	390 U
indeno(1,2,3-cd)pyrene	2.2 U	16 UJ	4.1	n/a	420 U	300	13	390 U	390 U
isophorone	n/a	n/a	n/a	n/a	420 U	n/a	n/a	390 U	390 U
naphthalene	43 U	320 UJ	52 U	n/a	420 U	780 U	39 U	390 U	390 U
nitrobenzene	n/a	n/a	n/a	n/a	420 U	n/a	n/a	390 U	390 U
pentachlorophenol	n/a	n/a	n/a	n/a	2000 U	n/a	n/a	1900 U	1900 U
phenanthrene	22 U	160 UJ	27 U	n/a	99 J	400 U	20 U	390 U	390 U
phenol	n/a	n/a	n/a	n/a	420 U	n/a	n/a	390 U	390 U
pyrene	8.7 U	220 J	11 U	n/a	140 J	710	35	390 U	390 U
VOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
1,1,1-trichloroethane	6.5 U	9.7 U	n/a	n/a	6.4 U	5.9 U	5.8 U	5.9 U	5.9 U
1,1,2,2-tetrachloroethane	6.5 U	9.7 U	n/a	n/a	6.4 U	5.9 U	5.8 U	5.9 U	5.9 U
1,1,2-trichloroethane	6.5 U	9.7 U	n/a	n/a	6.4 U	5.9 U	5.8 U	5.9 U	5.9 U
1,1-dichloroethane	6.5 U	9.7 U	n/a	n/a	6.4 U	5.9 U	5.8 U	5.9 U	5.9 U
1,1-dichloroethene	6.5 U	9.7 U	n/a	n/a	6.4 U	5.9 U	5.8 U	5.9 U	5.9 U
1,2-dichloroethane	6.5 U	9.7 U	n/a	n/a	6.4 U	5.9 U	5.8 U	5.9 U	5.9 U
1,2-dichloroethene (total)	n/a	n/a	n/a	n/a	6.4 U	n/a	n/a	5.9 U	5.9 U
1,2-dichloroethene (trans)	6.5 U	9.7 U	n/a	n/a	n/a	5.9 U	5.8 U	n/a	n/a
1,2-dichloropropane	6.5 U	9.7 U	n/a	n/a	6.4 U	5.9 U	5.8 U	5.9 U	5.9 U

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NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	W-P6A-09	W-P6A-10	W-P6A-11	W-P6A-12	W-TR6E-01	W-TR6E-02	W-TR6E-03	W-TR6E-04	W-TR6E-04-DUP
LOCATION:	Floor	Excavated	Floor	Side wall	Side wall	Side wall	Side wall	Floor	Floor
DATA SOURCE:	Pit P6A	Pit P6A	Pit P6A	Pit P6A	Trench TR6E	Trench TR6E	Trench TR6E	Trench TR6E	Trench TR6E
SAMPLE DATE:	05/19/97	06/10/97	06/10/97	06/24/97	05/20/97	05/20/97	05/20/97	05/20/97	05/20/97
VOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
2-butanone	n/a	n/a	n/a	n/a	130 UJ	n/a	n/a	120 U	120 U
2-hexanone	n/a	n/a	n/a	n/a	64 U	n/a	n/a	59 U	59 U
4-methyl-2-pentanone	n/a	n/a	n/a	n/a	64 U	n/a	n/a	59 U	59 U
acetone	n/a	n/a	n/a	n/a	130 UJ	n/a	n/a	100 J	120
benzene	n/a	n/a	n/a	n/a	6.4 U	n/a	n/a	5.9 U	5.9 U
bromodichloromethane	6.5 U	9.7 U	n/a	n/a	6.4 U	5.9 U	5.8 U	5.9 U	5.9 U
bromoform	6.5 U	9.7 U	n/a	n/a	6.4 U	5.9 U	5.8 U	5.9 U	5.9 U
bromomethane	13 U	19 U	n/a	n/a	13 U	12 U	12 U	12 U	12 U
carbon disulfide	n/a	n/a	n/a	n/a	6.4 U	n/a	n/a	5.9 U	5.9 U
carbon tetrachloride	6.5 U	9.7 U	n/a	n/a	6.4 U	5.9 U	5.8 U	5.9 U	5.9 U
chlorobenzene	6.5 U	9.7 U	n/a	n/a	6.4 U	5.9 U	5.8 U	5.9 U	5.9 U
chloroethane	13 U	19 U	n/a	n/a	13 U	12 U	12 U	12 U	12 U
chloroform	6.5 U	9.7 U	n/a	n/a	6.4 U	5.9 U	5.8 U	5.9 U	5.9 U
chloromethane	13 U	19 U	n/a	n/a	13 U	12 U	12 U	12 U	12 U
cis-1,3-dichloropropene	6.5 U	9.7 U	n/a	n/a	6.4 U	5.9 U	5.8 U	5.9 U	5.9 U
dibromochloromethane	6.5 U	9.7 U	n/a	n/a	6.4 U	5.9 U	5.8 U	5.9 U	5.9 U
ethylbenzene	n/a	n/a	n/a	n/a	6.4 U	n/a	n/a	5.9 U	5.9 U
methylene chloride	6.5 U	9.7 U	n/a	n/a	6.4 U	5.9 U	5.8 U	5.9 U	5.9 U
styrene	n/a	n/a	n/a	n/a	6.4 U	n/a	n/a	5.9 U	5.9 U
tetrachloroethene	6.5 U	9.7 U	n/a	n/a	6.4 U	5.9 U	5.8 U	5.9 U	5.9 U
toluene	n/a	n/a	n/a	n/a	6.4 U	n/a	n/a	5.9 U	5.9 U
trans-1,3-dichloropropene	6.5 U	9.7 U	n/a	n/a	6.4 U	5.9 U	5.8 U	5.9 U	5.9 U
trichloroethene	6.5 U	9.7 U	n/a	n/a	6.4 U	5.9 U	5.8 U	5.9 U	5.9 U
vinyl chloride	13 U	19 U	n/a	n/a	13 U	12 U	12 U	12 U	12 U
xylene (total)	n/a	n/a	n/a	n/a	6.4 U	n/a	n/a	5.9 U	5.9 U

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SAMPLE NUMBER:	W-P6A-09	W-P6A-10	W-P6A-11	W-P6A-12	W-TR6E-01	W-TR6E-02	W-TR6E-03	W-TR6E-04	W-TR6E-04-DUP
LOCATION:	Floor	Excavated	Floor	Side wall	Side wall	Side wall	Side wall	Floor	Floor
DATA SOURCE:	Pit P6A	Pit P6A	Pit P6A	Pit P6A	Trench TR6E	Trench TR6E	Trench TR6E	Trench TR6E	Trench TR6E
SAMPLE DATE:	05/19/97	06/10/97	06/10/97	06/24/97	05/20/97	05/20/97	05/20/97	05/20/97	05/20/97
PESTICIDES/PCBS	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
4,4'-DDD	n/a	n/a	n/a	n/a	2.2 U	n/a	n/a	2 U	2 U
4,4'-DDE	n/a	n/a	n/a	n/a	5.8	n/a	n/a	2 U	2 U
4,4'-DDT	n/a	n/a	n/a	n/a	7.4	n/a	n/a	2 U	2 U
Aroclor-1016	43 U	320 U	n/a	n/a	42 U	78 U	39 U	39 U	39 U
Aroclor-1221	43 U	320 U	n/a	n/a	42 U	78 U	39 U	39 U	39 U
Aroclor-1232	43 U	320 U	n/a	n/a	42 U	78 U	39 U	39 U	39 U
Aroclor-1242	43 U	320 U	n/a	n/a	42 U	78 U	39 U	39 U	39 U
Aroclor-1248	43 U	320 U	n/a	n/a	42 U	78 U	39 U	39 U	39 U
Aroclor-1254	43 U	320 U	n/a	n/a	42 U	860	39 U	39 U	39 U
Aroclor-1260	43 U	320 U	n/a	n/a	42 U	78 U	39 U	74	39 U
aldrin	n/a	n/a	n/a	n/a	2.2 U	n/a	n/a	2 U	2 U
alpha-BHC	n/a	n/a	n/a	n/a	2.2 U	n/a	n/a	2 U	2 U
alpha-chlordane	n/a	n/a	n/a	n/a	2.2 U	n/a	n/a	2 U	2 U
beta-BHC	n/a	n/a	n/a	n/a	2.2 U	n/a	n/a	2 U	2 U
delta-BHC	n/a	n/a	n/a	n/a	2.2 U	n/a	n/a	2 U	2 U
dieldrin	n/a	n/a	n/a	n/a	2.2 U	n/a	n/a	2 U	2 U
endosulfan I	n/a	n/a	n/a	n/a	2.2 U	n/a	n/a	2 U	2 U
endosulfan II	n/a	n/a	n/a	n/a	2.2 U	n/a	n/a	2 U	2 U
endosulfan sulfate	n/a	n/a	n/a	n/a	2.2 U	n/a	n/a	2 U	2 U
endrin	n/a	n/a	n/a	n/a	2.2 U	n/a	n/a	2 U	2 U
endrin aldehyde	n/a	n/a	n/a	n/a	2.2 U	n/a	n/a	2 U	2 U
endrin ketone	n/a	n/a	n/a	n/a	2.2 U	n/a	n/a	2 U	2 U
gamma-BHC (Lindane)	n/a	n/a	n/a	n/a	2.2 U	n/a	n/a	2 U	2 U
gamma-chlordane	n/a	n/a	n/a	n/a	2.2 U	n/a	n/a	2 U	2 U

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NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	W-P6A-09	W-P6A-10	W-P6A-11	W-P6A-12	W-TR6E-01	W-TR6E-02	W-TR6E-03	W-TR6E-04	W-TR6E-04-DUP
LOCATION:	Floor	Excavated	Floor	Side wall	Side wall	Side wall	Side wall	Floor	Floor
DATA SOURCE:	Pit P6A	Pit P6A	Pit P6A	Pit P6A	Trench TR6E	Trench TR6E	Trench TR6E	Trench TR6E	Trench TR6E
SAMPLE DATE:	05/19/97	06/10/97	06/10/97	06/24/97	05/20/97	05/20/97	05/20/97	05/20/97	05/20/97
PESTICIDES/PCBS	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
heptachlor	n/a	n/a	n/a	n/a	2.2 U	n/a	n/a	2 U	2 U
heptachlor epoxide	n/a	n/a	n/a	n/a	2.2 U	n/a	n/a	2 U	2 U
methoxychlor	n/a	n/a	n/a	n/a	22 U	n/a	n/a	20 U	20 U
toxaphene	n/a	n/a	n/a	n/a	85 U	n/a	n/a	79 U	79 U

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TABLE 1

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	W-TR6E-05		W-TR6E-06		W-TR6E-07		W-TR6E-08		W-TR6E-09		W-TR6E-10		W-TR6E-11		W-TR6E-12		W-TR6E-13	
LOCATION:	Side wall		Floor		Floor		Excavated		Excavated		Side wall		Excavated		Excavated		Side wall	
DATA SOURCE:	Trench TR6E		Trench TR6E		Trench TR6E		Trench TR6E		Trench TR6E		Trench TR6E		Trench TR6E		Trench TR6E		Trench TR6E	
SAMPLE DATE:	05/20/97		05/20/97		05/20/97		05/20/97		05/20/97		05/20/97		06/10/97		06/10/97		06/10/97	
INORGANICS	**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**		**mg/kg**	
aluminum	10400		14200		11100		5230		13800		10400		11600	J	2930	J	14600	J
antimony	2.4	UL	2.7	UL	2.4	UL	8.6	L	2.5	UL	2.6	UL	0.21	L	5.1	L	1.1	L
arsenic	3.4		5.8		5.8		5		5.1		2.2	K	5.2		2.2	K	6.4	
barium	36.1		102		73.2		1560		70.2		29.7		64.3	J	608	J	82.3	J
beryllium	0.51		0.97		0.41		0.37		0.75		0.5		0.64	L	0.17	L	0.98	L
cadmium	0.41	UL	0.47	UL	0.49	L	21.2		0.43	UL	0.44	UL	0.87	J	10.8	J	0.33	J
calcium	1460	J	652	J	1350	J	51900	J	1370	J	894	J	22400	J	27700	J	1410	J
chromium	16.3	J	16.8	J	67.9	J	3110	J	24.3	J	17.5	J	35.3	J	1220	J	19.7	J
cobalt	7.2	K	6		3.5	K	6.1	K	6.3	K	7.2	K	7.2	J	3.4	J	8.3	J
copper	17.8	L	8.3	L	23.9	L	1050	L	13.9	L	18.1	L	25.8		349		15.3	
iron	14700	J	12500	J	15900	J	18700	J	14700	J	17500	J	16400		8900		15600	
lead	11.8	J	17.9	J	42.8	J	411	J	26.1	J	7.7	J	63	L	187	L	21.9	L
magnesium	1590	J	1630	J	1700	J	2810	J	1980	J	1670	J	6680	J	2560	J	2100	J
manganese	306	J	684	J	121	J	772	J	166	J	191	J	316		325		428	
mercury	0.04	U	0.04	U	2		72.9		0.04		0.04	U	0.74		36.6		0.07	
nickel	8.6		12		8.7		33.8		11.1		8		11.2	L	14.8	L	12.7	L
potassium	838		585		522		498		953		576		1230		306		1180	
selenium	0.3	U	0.55	K	0.81	K	2.5	K	0.55	K	0.33	U	0.3	J	1.2	K	0.54	J
silver	0.43		0.4	U	2.9		154		1.1		0.45		1.1	B	65.5		0.43	B
sodium	104	J	128	J	85.3	J	229	J	96.5	J	142	J	150	J	110	J	149	J
thallium	0.43	UL	0.49	UL	0.44	UL	0.71	UL	0.45	UL	0.46	UL	0.43	UL	0.51	UL	0.45	UL
vanadium	23.7		25.4		26.9		25.5		27.9		25.2		27.4	J	12	J	29.8	J
zinc	27.3	J	54.5	J	67.9	J	2150	J	54.6	J	41.6	J	81.1	L	885	L	48.1	L

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TABLE 1

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	W-TR6E-05		W-TR6E-06		W-TR6E-07		W-TR6E-08		W-TR6E-09		W-TR6E-10		W-TR6E-11		W-TR6E-12		W-TR6E-13	
LOCATION:	Side wall		Floor		Floor		Excavated		Excavated		Side wall		Excavated		Excavated		Side wall	
DATA SOURCE:	Trench TR6E		Trench TR6E		Trench TR6E		Trench TR6E		Trench TR6E		Trench TR6E		Trench TR6E		Trench TR6E		Trench TR6E	
SAMPLE DATE:	05/20/97		05/20/97		05/20/97		05/20/97		05/20/97		05/20/97		06/10/97		06/10/97		06/10/97	
SEMIVOLATILES	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1,2-dichlorobenzene	5.9	U	6.7	U	5.9	U	9.7	UJ	6.1	U	6.3	U	5.8	U	6.9	U	6	U
1,3-dichlorobenzene	5.9	U	6.7	U	5.9	U	9.7	UJ	6.1	U	6.3	U	5.8	U	6.9	U	6	U
1,4-dichlorobenzene	5.9	U	6.7	U	5.9	U	9.7	UJ	6.1	U	6.3	U	5.8	U	6.9	U	6	U
acenaphthene	390	U	890	U	160	U	130000	U	1600	U	84	U	390	UJ	4600	U	400	UJ
acenaphthylene	390	U	890	U	160	U	130000	U	1600	U	84	U	390	UJ	4600	U	400	UJ
anthracene	100	U	230	U	40	U	33000	U	420	U	21	U	98	UJ	1200	U	100	UJ
benz(a)anthracene	69		8.9	U	63	J	4100		53		1		230	J	1800		92	J
benzo(a)pyrene	3.9	U	11	J	1.6	U	5600	J	92	J	1.3	J	280	J	2500		120	J
benzo(b)fluoranthene	95		14		87	J	5400		85		1.8		220	J	2500		94	J
benzo(g,h,i)perylene	74		23	U	68	J	3800		59		2.1	U	190	J	1900		77	J
benzo(k)fluoranthene	3.9	U	8.9	U	4.8	J	3300	J	38	J	0.84	U	130	J	1400		51	J
chrysene	80		1200		330	J	9700	U	1600		7		290	J	3700		130	J
dibenz(a,h)anthracene	25		13	U	45	J	1900	U	25	U	1.3	U	44	J	390		16	J
fluoranthene	120		89	U	130	J	13000	U	160	U	8.4	U	450	J	5000		140	J
fluorene	39	U	89	U	310	J	20000		160	U	8.4	U	39	UJ	460	U	40	UJ
indeno(1,2,3-cd)pyrene	10	U	23	U	74	J	4100		71		2.1	U	190	J	2400		78	J
naphthalene	190	U	440	U	78	U	64000	U	810	U	41	U	190	UJ	2300	U	200	UJ
phenanthrene	100	U	230	U	44	J	33000	U	420	U	21	U	250	J	2100		100	UJ
pyrene	120		89	U	120	J	13000	U	160	U	8.4	U	450	J	1900		180	J
VOLATILES	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1,1,1-trichloroethane	5.9	U	6.7	U	5.9	U	9.7	UJ	6.1	U	6.3	U	5.8	U	6.9	U	6	U
1,1,2,2-tetrachloroethane	5.9	U	6.7	U	5.9	U	9.7	UJ	6.1	U	6.3	U	5.8	U	6.9	U	6	U
1,1,2-trichloroethane	5.9	U	6.7	U	5.9	U	9.7	UJ	6.1	U	6.3	U	5.8	U	6.9	U	6	U
1,1-dichloroethane	5.9	U	6.7	U	5.9	U	9.7	UJ	6.1	U	6.3	U	5.8	U	6.9	U	6	U

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TABLE 1

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	W-TR6E-05		W-TR6E-06		W-TR6E-07		W-TR6E-08		W-TR6E-09		W-TR6E-10		W-TR6E-11		W-TR6E-12		W-TR6E-13	
LOCATION:	Side wall		Floor		Floor		Excavated		Excavated		Side wall		Excavated		Excavated		Side wall	
DATA SOURCE:	Trench TR6E		Trench TR6E		Trench TR6E		Trench TR6E		Trench TR6E		Trench TR6E		Trench TR6E		Trench TR6E		Trench TR6E	
SAMPLE DATE:	05/20/97		05/20/97		05/20/97		05/20/97		05/20/97		05/20/97		06/10/97		06/10/97		06/10/97	
VOLATILES	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
1,1-dichloroethene	5.9	U	6.7	U	5.9	U	9.7	UJ	6.1	U	6.3	U	5.8	U	6.9	U	6	U
1,2-dichloroethane	5.9	U	6.7	U	5.9	U	9.7	UJ	6.1	U	6.3	U	5.8	U	6.9	U	6	U
1,2-dichloroethene (trans)	5.9	U	6.7	U	5.9	U	9.7	UJ	6.1	U	6.3	U	5.8	U	6.9	U	6	U
1,2-dichloropropane	5.9	U	6.7	U	5.9	U	9.7	UJ	6.1	U	6.3	U	5.8	U	6.9	U	6	U
bromodichloromethane	5.9	U	6.7	U	5.9	U	9.7	UJ	6.1	U	6.3	U	5.8	U	6.9	U	6	U
bromoform	5.9	U	6.7	U	5.9	U	9.7	UJ	6.1	U	6.3	U	5.8	U	6.9	U	6	U
bromomethane	12	U	13	U	12	U	19	UJ	12	U	13	U	12	U	14	U	12	U
carbon tetrachloride	5.9	U	6.7	U	5.9	U	9.7	UJ	6.1	U	6.3	U	5.8	U	6.9	U	6	U
chlorobenzene	5.9	U	6.7	U	5.9	U	9.7	UJ	6.1	U	6.3	U	5.8	U	6.9	U	6	U
chloroethane	12	U	13	U	12	U	19	UJ	12	U	13	U	12	U	14	U	12	U
chloroform	5.9	U	6.7	U	5.9	U	9.7	UJ	6.1	U	6.3	U	5.8	U	6.9	U	6	U
chloromethane	12	U	13	U	12	U	19	UJ	12	U	13	U	12	U	14	U	12	U
cis-1,3-dichloropropene	5.9	U	6.7	U	5.9	U	9.7	UJ	6.1	U	6.3	U	5.8	U	6.9	U	6	U
dibromochloromethane	5.9	U	6.7	U	5.9	U	9.7	UJ	6.1	U	6.3	U	5.8	U	6.9	U	6	U
methylene chloride	5.9	U	6.7	U	5.9	U	9.7	UJ	6.1	U	6.3	U	5.8	U	6.9	U	6	U
tetrachloroethene	5.9	U	6.7	U	5.9	U	9.7	UJ	6.1	U	6.3	U	5.8	U	6.9	U	6	U
trans-1,3-dichloropropene	5.9	U	6.7	U	5.9	U	9.7	UJ	6.1	U	6.3	U	5.8	U	6.9	U	6	U
trichloroethene	5.9	U	6.7	U	5.9	U	9.7	UJ	6.1	U	6.3	U	5.8	U	6.9	U	6	U
vinyl chloride	12	U	13	U	12	U	19	UJ	12	U	13	U	12	U	14	U	12	U
PESTICIDES/PCBS	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
Aroclor-1016	39	U	44	U	39	U	1300	U	41	U	41	U	380	U	2300	U	40	U
Aroclor-1221	39	U	44	U	39	U	1300	U	41	U	41	U	380	U	2300	U	40	U
Aroclor-1232	39	U	44	U	39	U	1300	U	41	U	41	U	380	U	2300	U	40	U
Aroclor-1242	39	U	44	U	39	U	1300	U	41	U	41	U	380	U	2300	U	40	U
Aroclor-1248	39	U	44	U	39	U	1300	U	41	U	41	U	2000		2600		40	U

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TABLE 1

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	W-TR6E-05	W-TR6E-06	W-TR6E-07	W-TR6E-08	W-TR6E-09	W-TR6E-10	W-TR6E-11	W-TR6E-12	W-TR6E-13
LOCATION:	Side wall	Floor	Floor	Excavated	Excavated	Side wall	Excavated	Excavated	Side wall
DATA SOURCE:	Trench TR6E	Trench TR6E	Trench TR6E	Trench TR6E	Trench TR6E	Trench TR6E	Trench TR6E	Trench TR6E	Trench TR6E
SAMPLE DATE:	05/20/97	05/20/97	05/20/97	05/20/97	05/20/97	05/20/97	06/10/97	06/10/97	06/10/97
PESTICIDES/PCBS	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**
Aroclor-1254	39 U	44 U	110	12000	41 U	41 U	380 U	2300 U	40 U
Aroclor-1260	39 U	44 U	39 U	1300 U	41 U	41 U	380 U	2300 U	40 U

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TABLE 1

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	W-TR6E-14		W-TR6E-15		W-TR6E-16		W-TR6E-16-DUP		W-TR6E-17		W-TR6E-18		W-TR6E-19		W-TR6E-20		W-TR6E-20-DUP	
LOCATION:	Excavated		Excavated		Side wall		Side wall		Floor		Excavated		Side wall		Excavated		Excavated	
DATA SOURCE:	Trench TR6E		Trench TR6E		Trench TR6E		Trench TR6E		Trench TR6E		Trench TR6E		Trench TR6E		Trench TR6E		Trench TR6E	
SAMPLE DATE:	06/24/97		06/24/97		07/10/97		07/10/97		07/10/97		07/10/97		07/23/97		07/23/97		07/23/97	
SEMIVOLATILES	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
acenaphthene	8000	U	1500	U	500		650		38	U	990		n/a		790	U	790	U
acenaphthylene	8000	U	1500	U	190	U	190	U	19	U	190	U	n/a		790	U	790	U
anthracene	2000	U	390	U	61		91		1.5		100		n/a		200	U	280	
benz(a)anthracene	4800		1000		290		460		9.6		420		n/a		650		640	
benzo(a)pyrene	4300		1200		350		600		14		480		n/a		850		760	
benzo(b)fluoranthene	3800		930		350		600		16		420		n/a		610		570	
benzo(g,h,i)perylene	2900		700		230		400		18		340		n/a		460		430	
benzo(k)fluoranthene	2300		530		160		300		7.4		230		n/a		380		340	
chrysene	4300		930		210		370		8.5		310		n/a		1300		1000	
dibenz(a,h)anthracene	770		190		310		580		14		410		n/a		120		130	
fluoranthene	9400		1500		470		810		18		800		n/a		1300		1400	
fluorene	7800		150	U	52		89		2.3	J	110		n/a		79	U	79	U
indeno(1,2,3-cd)pyrene	2800		950		240		370		13		310		n/a		540		460	
naphthalene	4000	U	750	U	190	U	190	U	13		190	U	n/a		390	U	390	U
phenanthrene	5500		390	U	160		260		7		380		n/a		690		770	
pyrene	12000		1800		410		700		16		680		n/a		1300		1300	
PESTICIDES/PCBS	**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**		**ug/kg**	
Aroclor-1016	200	U	37	U	460	U	460	U	47	U	9400	U	38	U	78	U	390	U
Aroclor-1221	200	U	37	U	460	U	460	U	47	U	9400	U	38	U	78	U	390	U
Aroclor-1232	200	U	37	U	460	U	460	U	47	U	9400	U	38	U	78	U	390	U
Aroclor-1242	200	U	37	U	460	U	460	U	47	U	9400	U	38	U	78	U	390	U
Aroclor-1248	200	U	37	U	460	U	460	U	47	U	30000		38	U	690		1700	
Aroclor-1254	930		100		480		1000		43		19000	U	38	U	670		1300	
Aroclor-1260	200	U	37	U	920	U	920	U	93	U	2600		38	U	230		390	U

NOTES:

- J -- Value is considered estimated due to exceedance of technical quality control criteria or because result is less than the Contract Required Quantitation Limit (CRQL).
- U -- Value is a non-detected result as reported by the laboratory.
- UJ -- Non-detected result is considered estimated due to exceedance of technical quality control criteria.
- UL -- Non-detected result is considered biased low due to exceedance of technical quality control criteria.
- UR -- Non-detected result is considered unusable due to exceedance of technical quality control criteria.
- L -- Positive result is considered biased low due to exceedance of technical quality control criteria.
- K -- Positive result is considered biased high due to exceedance of technical quality control criteria.
- B -- Positive result is considered to be an artifact of blank contamination, and should not be considered present.
- R -- Positive result is considered unusable due to exceedance of technical quality control criteria.

TABLE 1

ANALYTICAL RESULTS FOR SUBSURFACE SOIL - SITE 06

NAWC, WARMINSTER, PENNSYLVANIA

SAMPLE NUMBER:	W-TR6E-21	W-TR6E-22	W-TR6E-23	W-TR6E-24	W-TR6E-25	---	---	---	---
LOCATION:	Excavated	Excavated	Side wall	Side wall	Side wall	---	---	---	---
DATA SOURCE:	Trench TR6E	Trench TR6E	Trench TR6E	Trench TR6E	Trench TR6E				
SAMPLE DATE:	07/23/97	08/04/97	08/04/97	08/14/97	08/14/97				
SEMIVOLATILES	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**				
acenaphthene	900	n/a	n/a	n/a	n/a				
acenaphthylene	770 U	n/a	n/a	n/a	n/a				
anthracene	210	n/a	n/a	n/a	n/a				
benz(a)anthracene	670	n/a	n/a	n/a	n/a				
benzo(a)pyrene	960	n/a	n/a	n/a	n/a				
benzo(b)fluoranthene	750	n/a	n/a	n/a	n/a				
benzo(g,h,i)perylene	510	n/a	n/a	n/a	n/a				
benzo(k)fluoranthene	430	n/a	n/a	n/a	n/a				
chrysene	660	n/a	n/a	n/a	n/a				
dibenz(a,h)anthracene	150	n/a	n/a	n/a	n/a				
fluoranthene	1500	n/a	n/a	n/a	n/a				
fluorene	77 U	n/a	n/a	n/a	n/a				
indeno(1,2,3-cd)pyrene	580	n/a	n/a	n/a	n/a				
naphthalene	380 U	n/a	n/a	n/a	n/a				
phenanthrene	690	n/a	n/a	n/a	n/a				
pyrene	1400	n/a	n/a	n/a	n/a				
PESTICIDES/PCBS	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**	**ug/kg**				
Aroclor-1016	760 U	450 U	190 U	38 U	38 U				
Aroclor-1221	760 U	450 U	190 U	38 U	38 U				
Aroclor-1232	760 U	450 U	190 U	38 U	38 U				
Aroclor-1242	760 U	450 U	190 U	38 U	38 U				
Aroclor-1248	6600	450 U	190 U	65	250 J				
Aroclor-1254	3100	6900	1200 J	74	380				
Aroclor-1260	760 U	6900	190 U	84 J	290 J				

NOTES:

J -- Value is considered estimated due to exceedance of technical quality control criteria or because result is less than the Contract Required Quantitation Limit (CRQL).
U -- Value is a non-detected result as reported by the laboratory.
UJ -- Non-detected result is considered estimated due to exceedance of technical quality control criteria.
UL -- Non-detected result is considered biased low due to exceedance of technical quality control criteria.
UR -- Non-detected result is considered unusable due to exceedance of technical quality control criteria.
L -- Positive result is considered biased low due to exceedance of technical quality control criteria.
K -- Positive result is considered biased high due to exceedance of technical quality control criteria.
B -- Positive result is considered to be an artifact of blank contamination, and should not be considered present.
R -- Positive result is considered unusable due to exceedance of technical quality control criteria.

APPENDIX D
TOXICITY PROFILES AND EXAMPLE CALCULATIONS

APPENDIX D

TOXICOLOGICAL PROFILES FOR NAWC WARMINSTER SITE 6 COPCS

D.1 ALUMINUM

Noncancer Toxicity

Aluminum is not generally regarded as an industrial poison. Inhalation of finely divided powder has been reported as a cause of pulmonary fibrosis. Aluminum in aerosols has been implicated in Alzheimer's disease. As with other metals, the powder and dust are the most dangerous forms (Sax and Lewis, 1989). Most hazardous exposures to aluminum occur in refining and smelting processes. Aluminum dust is a respiratory and eye irritant (Genium, 1990).

D.2 ANTIMONY

Pharmacokinetics

Ingested antimony is absorbed slowly and incompletely from the gastrointestinal (GI) tract (Iffland 1988). Within a few days of acute exposure, highest tissue concentrations are found in the liver, kidney, and thyroid. Organs of storage include skin, bone, and teeth. Highest concentrations in deceased smelter workers (inhalation exposure) occurred in the lungs and skeleton. Excretion is largely via the urine or feces, although some is incorporated into the hair.

Noncancer Toxicity

Acute intoxication from ingestion of large doses of antimony induces GI disturbances, dehydration, and cardiac effects in humans (Iffland 1988). Chronic effects from occupational exposure include irritation of the respiratory tract, pneumoconiosis, pustular eruptions of the skin called "antimony spots," allergic contact dermatitis, and cardiac effects, including abnormalities of the electrocardiograph (ECG) and myocardial changes. Cardiac effects were also observed in rats and rabbits exposed by inhalation for six weeks and in animals (dogs, and possibly other species) treated by intravenous injection (Elinder and Friberg 1986a).

Chronic oral exposure studies in laboratory animals include two briefly reported lifetime drinking water studies in rats and mice (Kanisawa and Schroeder 1969; Schroeder et al. 1970). The only dose tested, 5 ppm potassium antimony tartrate, resulted in reduced longevity in both species and in reduced mean heart weight in the rats. The EPA (1997a) verified an RfD of 0.0004 mg/kg/day for chronic oral exposure to antimony from the LOAEL of 5 ppm potassium antimony tartrate (0.35 mg antimony/kg body weight-day) in the lifetime study in rats (Schroeder et al. 1970). An uncertainty factor of 1000 was applied; factors of 10 each for inter- and intraspecies variation and to estimate an NOAEL from an LOAEL. The heart is considered a likely target organ for chronic oral exposure of humans.

Carcinogenicity

Data were not located regarding the carcinogenicity of antimony to humans. Antimony fed to rats did not produce an excess of tumors (Goyer 1991), but a high frequency of lung tumors was observed in rats exposed by inhalation to antimony trioxide for one year (Elinder and Friberg 1986). Antimony is classified in EPA cancer weight-of-evidence Group D (not classifiable as to carcinogenicity to humans) (EPA, 1997a).

D.3 ARSENIC

Pharmacokinetics

Several studies confirm that soluble inorganic arsenic compounds and organic arsenic compounds are almost completely (>90 percent) absorbed from the GI tract in both animals and humans (Ishinishi et al. 1986). The absorption efficiency of insoluble inorganic arsenic compounds depends on particle size and stomach pH. Initial distribution of absorbed arsenic is to the liver, kidneys, and lungs, followed by redistribution to hair, nails, teeth, bone, and skin, which are considered tissues of accumulation. Arsenic has a longer half-life in the blood of rats, compared with other animals and humans, because of firm binding to the hemoglobin in erythrocytes.

Metabolism of inorganic arsenic includes reversible oxidation-reduction so that both arsenite (valence of 3) and arsenate (valence of 5) are present in the urine of animals treated with arsenic of either valence (Ishinishi et al. 1986). Arsenite is subsequently oxidized and methylated by a saturable mechanism to form mono- or dimethylarsenate; the latter is the predominant metabolite in the urine of animals or humans. Organic arsenic compounds (arsenilic acid, cacodylic acid) are not readily converted to inorganic arsenic. Excretion of organic or inorganic arsenic is largely via the urine, but considerable species variation exists. Continuously exposed humans appear to excrete 60 to 70 percent of their daily intake of arsenate or arsenite via the urine.

Noncancer Toxicity

A lethal dose of arsenic trioxide in humans is 70 to 180 mg (approximately 50 to 140 mg arsenic; Ishinishi et al. 1986). Acute oral exposure of humans to high doses of arsenic produce liver swelling, skin lesions, disturbed heart function, and neurological effects. The only noncancer effects in humans clearly attributable to chronic oral exposure to arsenic are dermal hyperpigmentation and keratosis, as revealed by studies of several hundred Chinese exposed to naturally occurring arsenic in well water (Tseng 1977; Tseng et al. 1968; EPA 1997a). Similar effects were observed in persons exposed to high levels of arsenic in water in Utah and the northern part of Mexico (Cebrian et al. 1983; Southwick et al. 1983). Occupational (predominantly inhalation) exposure is also associated with neurological deficits, anemia, and cardiovascular effects (Ishinishi et al. 1986), but concomitant exposure to other chemicals cannot be ruled out. The EPA (1997a) derived an RfD of 0.3 mg/kg/day for chronic oral exposure, based on an NOAEL of 0.8 mg/kg/day for skin lesions from the Chinese data. The principal target organ for arsenic appears to be the skin. The nervous system and cardiovascular systems appear to be less significant target organs. Inorganic arsenic may be an essential nutrient, exerting beneficial effects on growth, health, and feed conversion efficiency (Underwood 1977).

Carcinogenicity

Inorganic arsenic is clearly a carcinogen in humans. Inhalation exposure is associated with increased risk of lung cancer in persons employed as smelter workers, in arsenical pesticide applicators, and in a population residing near a pesticide manufacturing plant (EPA 1997a). Oral exposure to high levels in well water is associated with increased risk of skin cancer (Tseng 1977; EPA 1997a). Extensive animal testing with various forms of arsenic given by many routes of exposure to several species, however, has not demonstrated the carcinogenicity of arsenic (International Agency for Research on Cancer [IARC] 1980). The EPA (1997a) classifies inorganic arsenic in cancer weight-of-evidence Group A (human carcinogen) and derived an oral slope factor of 1.5 per mg/kg/day. The EPA (1997a) notes that the uncertainties associated with the oral unit risk are considerably less than those for most carcinogens, so that the unit risk might be reduced an order of magnitude. An inhalation unit risk of 0.0043 per mg/m^3 was derived for inorganic arsenic from the incidence of lung cancer in occupationally exposed men (EPA 1997a), which is equivalent to a RfD of 15.1 per mg/kg/day, assuming a 70 kg adult inhales 20 m^3 of air/day.

D.4 BARIUM

Noncancer Toxicity

Barium is a naturally occurring alkaline earth metal that comprises approximately 0.04 percent of the earth's crust (Reeves 1986a). Acute oral toxicity was manifested by GI upset, altered cardiac performance, and transient hypertension, convulsions, and muscular paralysis. Repeated oral exposures were associated with hypertension. Occupational exposure to insoluble barium sulfate induced benign pneumoconiosis (ACGIH 1991). The EPA (1995) presented a verified chronic oral RfD of 0.07 mg/kg/day, based on an NOAEL of 0.21 mg/kg/day in a ten-week study in humans exposed to barium in drinking water and an uncertainty factor of 3. The EPA (1997) presented the same value as a provisional RfD for subchronic oral exposure. A provisional chronic inhalation reference concentration (RfC) of 0.0005 mg/m^3 and a provisional subchronic inhalation RfC of 0.005 were based on a no observed effect level (NOEL) for fetotoxicity in a four-month intermittent-exposure inhalation study in rats (EPA 1995). Uncertainty factors of 1000 and 100 were used for the chronic and subchronic RfC values, respectively. The chronic and subchronic inhalation RfC values are equivalent to 0.0001 and 0.001 mg/kg/day, assuming a human inhalation rate of 20 m^3/day and body weight of 70 kg. Barium is principally a muscle toxin. Its targets are the GI system, skeletal muscle, the cardiovascular system, and the fetus.

Carcinogenicity

The EPA (1995) classifies barium as a cancer weight-of-evidence Group D substance (not classifiable as to carcinogenicity in humans). Cancer risk is not estimated for Group D substances.

D.5 BERYLLIUM

Noncancer Toxicity

Beryllium has a low order of toxicity when ingested because it is poorly absorbed from the GI tract (Reeves 1986b). Occupational exposure was associated with dermatitis, acute pneumonitis, and chronic pulmonary granulomatosis (berylliosis). Berylliosis was also observed in humans living in the vicinity of a beryllium plant. Similar pulmonary effects were observed in laboratory animals subjected to inhalation exposure. A verified chronic oral RfD value of 0.005 mg/kg/day was based on an NOAEL in a lifetime drinking water study in rats and an uncertainty factor of 100 (EPA 1995). The EPA (1995) presented the same value as a provisional subchronic oral RfD. The target organ for inhalation exposure appears to be the lung; a target organ is not identified for oral exposure.

Carcinogenicity

The EPA (1995) classifies beryllium in cancer weight-of-evidence Group B2 (probable human carcinogen) based on inadequate human (occupational) cancer data and sufficient animal data. A significant increase in lung tumors occurred in rats and in rhesus monkeys subjected to inhalation exposure or intratracheal instillation of a variety of beryllium compounds. Osteogenic sarcomas were induced in rabbits and mice, but not in rats or guinea pigs, injected intravenously with various beryllium compounds. Oral studies in animals yielded inconclusive results. The EPA (1997a) derived an oral slope factor of 4.3 per mg/kg/day from a statistically nonsignificant increase in total tumors in a lifetime drinking water study in rats. An inhalation unit risk of 0.0024 per mg/m^3, equivalent to 8.4 per mg/kg/day (assuming an inhalation rate of 20 m^3/day and body weight of 70 kg for humans), was derived from an occupational study.

D.6 CADMIUM

Pharmacokinetics

Estimates of cadmium uptake by the respiratory tract range from 10 to 50 percent; uptake is greatest for fumes and small particles and least for large dust particles (Friberg et al. 1986; Goyer 1991). GI absorption of ingested cadmium is ordinarily 5 to 8 percent, but may reach 20 percent in cases of serious dietary iron deficiency. Highest tissue levels are normally found in the kidneys followed by the liver, although levels in the liver may exceed those in the kidneys of persons suffering from cadmium-induced renal dysfunction. The half-life of cadmium in the kidneys and liver may be as long as 10 to 30 years. Fecal and urinary excretion of cadmium are approximately equivalent in normal humans exposed to small amounts. Urinary excretion increases markedly in humans with cadmium-induced renal disease.

Noncancer Toxicity

Acute inhalation exposure to fumes or particles of cadmium induces respiratory symptoms, general weakness, and, in severe cases, respiratory insufficiency, shock, and death (Friberg et al. 1986). Acute oral exposure induces GI disturbances. Chronic inhalation exposure induces pulmonary emphysema, and chronic exposure by either route consistently produces renal tubular disease in humans and laboratory animals. Proteinuria is a reliable early indicator of cadmium-induced kidney disease. The combination of pulmonary emphysema and renal tubular disease, if severe, may result in early mortality. Painful osteomalacia and osteoporosis may arise from altered metabolism of bone minerals secondary to renal damage. The combination of renal and skeletal damage is called itai-itai disease in Japan. Cadmium exposure has been associated with liver damage, but the liver appears to be less sensitive than the kidney.

The kidney is the primary target organ of cadmium toxicity. The EPA (1997a) derived chronic oral RfD values of 0.5 mg/kg/day for cadmium ingested in water and 1 mg/kg/day for cadmium ingested in food, based on a toxicokinetic model that predicted NOAELs from renal cortical concentrations of cadmium. The different RfD values reflect assumed differences in GI absorption of cadmium from water (5 percent) and food (2.5 percent).

Carcinogenicity

Carcinogenicity data in humans consist of several occupational studies that associate cadmium exposure with lung cancer, but concomitant exposure to other carcinogenic chemicals and smoking were not adequately controlled. Other occupational studies reported significantly increased risk of prostatic cancer, but this effect was not observed in the largest occupational study of workers exposed to high levels (Thun et al. 1985). The animal data consist of an inhalation study in rats that showed a significant increase in lung tumors, and several parenteral injection studies that produced injection site tumors. No evidence of carcinogenicity, however, was observed in seven oral studies in rats and mice. The EPA (1995) classifies cadmium a cancer weight-of-evidence Group B1 substance for inhalation exposure on the basis of limited evidence of carcinogenicity in humans and sufficient evidence in animals. The data were insufficient to classify cadmium as carcinogenic to humans exposed by the oral route. The EPA (1997a) derived an inhalation unit risk of 0.0018 mg/m^3 from the occupational exposure study by Thun et al. (1985).

D.7 CHROMIUM

Noncancer Toxicity

In nature, chromium (III) predominates over chromium (VI) (Langård and Norseth 1986). Little chromium (VI) exists in biological materials, except shortly after exposure, because reduction to chromium (III) occurs rapidly. Chromium (III) is considered a nutritionally essential trace element and is considerably less toxic than chromium (VI). No effects were observed in rats consuming 1800 mg chromium (III)/kg/day in the diet for over two years (EPA 1995). The NOEL of 1800 mg/kg/day and an uncertainty factor of 1000 was the basis for a verified chronic oral RfD of 1 mg/kg/day (EPA 1997a). The same NOEL and an uncertainty factor of 100 was the basis for a provisional subchronic oral RfD of 1 mg/kg/day (EPA 1995).

Acute oral exposure of humans to high doses of chromium (VI) induced neurological effects, GI hemorrhage and fluid loss, and kidney and liver effects. Parenteral dosing of animals with chromium (VI) is selectively toxic to the kidney tubules. An NOAEL of 2.4 mg chromium (VI)/kg/day in a one-year drinking water study in

rats and an uncertainty factor of 500 was the basis of a verified RfD of 0.005 mg/kg/day for chronic oral exposure (EPA 1997a). The same NOAEL and an uncertainty factor of 100 was the basis of a provisional subchronic oral RfD of 0.02 mg/kg/day (EPA 1995).

Occupational (inhalation and dermal) exposure to chromium (III) compounds induced dermatitis (ACGIH 1991). Similar exposure to chromium (VI) induced ulcerative and allergic contact dermatitis, irritation of the upper respiratory tract including ulceration of the mucosa and perforation of the nasal septum, and possibly kidney effects. Inhalation RfC values were not located.

A target organ was not identified for chromium (III). The kidney appears to be the principal target organ for repeated oral dosing with chromium (VI). Additional target organs for dermal and inhalation exposure include the skin and respiratory tract.

Carcinogenicity

Data were not located regarding the carcinogenicity of chromium (III). The EPA (1997a) classifies chromium (VI) in cancer weight-of-evidence Group A (human carcinogen), based on the consistent observation of increased risk of lung cancer in occupational studies of workers in chromate production or the chrome pigment industry. Parenteral dosing of animals with chromium (VI) compounds consistently induced injection-site tumors. There is no evidence that oral exposure to chromium (VI) induces cancer. An inhalation unit risk of 0.012 per mg/m^3, equivalent to 42 per mg/kg/day, assuming humans inhale 20 m^3/day and weigh 70 kg, was based on increased risk of lung cancer deaths in chromate production workers.

D.8 COPPER

Non-carcinogenic Toxicity

Copper is a nutritionally essential element that functions as a cofactor in several enzyme systems (Aaseth and Norseth 1986). Acute exposure to large oral doses of copper salts was associated with GI disturbances, hemolysis, and liver and kidney lesions. Chronic oral toxicity in humans has not been reported. Chronic oral exposure of animals was associated with an iron-deficiency type of anemia, hemolysis, and lesions in the liver and kidneys. Occupational exposure may induce metal fume fever, and, in cases of chronic exposure to high levels, hemolysis and anemia (ACGIH 1991). Neither oral nor inhalation RfD or RfC values were located for copper. The target organs for copper are the erythrocyte, liver, and kidney, and, for inhalation exposure, the lung.

Carcinogenicity

Copper is classified in cancer weight-of-evidence Group D (not classifiable as to carcinogenicity to humans) (EPA 1997a). Quantitative risk estimates are not derived for Group D chemicals.

D.9 IRON

Noncancer Toxicity

Iron is moderately toxic through ingestion and inhalation of iron dusts and powders. Inhalation may be irritating to the respiratory tract. The inhalation of large amounts of iron dust results in iron pneumoconiosis (arc welders lung) (Sax and Lewis, 1989). Chronic inhalation can produce mottling (spotting) of lungs (siderosis). Ingestion of greater than 50 to 100 mg of iron per day may result in pathological iron deposition in body tissues the symptoms of which are fibrosis of the pancreas, diabetes mellitus, and liver cirrhosis. Eye contact may cause conjunctivitis. The LDLO intraperitoneal for rabbits is 20 mg/kg with no toxic effect observed. The ACGIH TLV for iron oxide fumes is 5 mg/m^3.

Carcinogenicity

IARC, National Toxicology Program (NTP), and Occupational Safety and Health Association (OSHA) do not list iron as a carcinogen although the mining of one particular ore, hematite, may be associated with an increased risk of lung cancer in miners. No other iron ores are identified specifically as a carcinogen.

D.10 LEAD

Pharmacokinetics

Studies in humans indicate that an average of 10 percent of ingested lead is absorbed, but estimates as high as 40 percent were obtained in some individuals (Tsuchiya 1986). Nutritional factors have a profound effect on GI absorption efficiency. Children absorb ingested lead more efficiently than adults; absorption efficiencies up to 53 percent were recorded for children three months to eight years of age. Similar results were obtained for laboratory animals; absorption efficiencies of 5 to 10 percent were obtained for adults and ³50 percent were obtained for young animals. The deposition rate of inhaled lead averages approximately 30 to 50 percent, depending on particle size, with as much as 60 percent deposition of very small particles (0.03 mm) near highways. All lead deposited in the lungs is eventually absorbed.

Approximately 95 percent of the lead in the blood is located in the erythrocytes (EPA 1990a). Lead in the plasma exchanges with several body compartments, including the internal organs, bone, and several excretory pathways. In humans, lead concentrations in bone increase with age (Tsuchiya, 1986). About 90 percent of the body burden of lead is located in the skeleton. Neonatal blood concentrations are about 85 percent of maternal concentrations (EPA 1990a). Excretion of absorbed lead is principally through the urine, although GI secretion, biliary excretion, and loss through hair, nails, and sweat are also significant.

Noncancer Toxicity

The noncancer toxicity of lead to humans has been well characterized through decades of medical observation and scientific research. The principal effects of acute oral exposure are colic with diffuse paroxysmal abdominal pain (probably due to vagal irritation), anemia, and, in severe cases, acute encephalopathy, particularly in children (Tsuchiya 1986). The primary effects of long-term exposure are neurological and hematological. Limited occupational data indicate that long-term exposure to lead may induce kidney damage. The principal target organs of lead toxicity are the erythrocyte and the nervous system. Some of the effects on the blood, particularly changes in levels of certain blood enzymes, and subtle neurobehavioral changes in children, appear to occur at levels so low as to be considered nonthreshold effects.

EPA (1995) presents no inhalation RfC for lead, but referred to the National Ambient Air Quality Standard (NAAQS) for lead, which could be used in lieu of an inhalation RfC. The NAAQSs are based solely on human health considerations and are designed to protect the most sensitive subgroup of the human population. The NAAQS for lead is 1.5 mg/m^3, averaged quarterly (EPA 1995). The NAAQS is equivalent to 0.00043 mg/kg/day, assuming a body weight of 70 kg and an inhalation rate of 20 m^3/day.

The EPA (1990a) determined that it is inappropriate to derive an RfD for oral exposure to lead for several reasons. First, the use of an RfD assumes that a threshold for toxicity exists, below which adverse effects are not expected to occur; however, the most sensitive effects of lead exposure, impaired neurobehavioral development in children and altered blood enzyme levels associated with anemia, may occur at blood lead concentrations so low as to be considered practically nonthreshold in nature. Second, RfD values are specific for the route of exposure for which they are derived. Lead, however, is ubiquitous, so that exposure occurs from virtually all media and by all pathways simultaneously, making it practically impossible to quantify the contribution to blood lead from any one route of exposure. Finally, the dose-response relationships common to many toxicants, and upon which derivation of an RfD is based, do not hold true for lead. This is because the fate of lead within the body depends, in part, on the amount and rate of previous exposures, the age of the recipient, and the rate of exposure. There is, however, a reasonably good correlation between

blood lead concentration and effect. Therefore, blood lead concentration is the appropriate parameter on which to base the regulation of lead.

The EPA Integrated Exposure and Uptake Biokinetic (IEUBK) lead model is an iterated set of equations that estimate blood lead concentration in children aged 0 to 7 years (EPA 1990a; 1994b). The biokinetic part of the model describes the movement of lead between the plasma and several body compartments and estimates the resultant blood lead concentration. The rate of the movement of lead between the plasma and each compartment is a function of the transition or residence time (i.e., the mean time for lead to leave the plasma and enter a given compartment, or the mean residence time for lead in that compartment). Compartments modeled include the erythrocytes, liver, kidneys, all the other soft tissue of the body, cortical bone, and trabecular bone. Excretory pathways and their rates are also modeled. These include the mean time for excretion from the plasma to the urine, from the liver to the bile, and from the other soft tissues to the hair, skin, sweat, etc. The model permits the user to adjust the transition and residence times.

EPA guidance (EPA 1994a) recommends a residential screening level for lead of 400 ppm to be applied at Superfund and RCRA sites. This value is considered by EPA to be protective for direct contact with lead-contaminated soils in residential settings. The guidance adopts recommendations of the Centers for Disease Control and is to be followed when current or predicted land use is residential.

The residential screening level for lead described in this directive has been calculated with the EPA's IEUBK using default parameters (EPA 1994b).

Carcinogenicity

EPA (1997a) classifies lead in cancer weight-of-evidence Group B2 (probable human carcinogen), based on inadequate evidence of cancer in humans and sufficient animal evidence. The human data consist of several epidemiologic occupational studies that yielded confusing results. All of the studies lacked quantitative exposure data and failed to control for smoking and concomitant exposure to other possibly carcinogenic metals. Rat and mouse bioassays showed statistically significant increases in renal tumors following dietary and subcutaneous exposure to several soluble lead salts. Various lead compounds were observed to induce chromosomal alterations in vivo and in vitro, sister chromatid exchange in exposed workers, and cell transformation in Syrian hamster embryo cells; to enhance simian adenovirus induction; and to alter molecular processes that regulate gene expression. EPA (1997a) declined to estimate risk for oral exposure to lead because many factors (e.g., age, general health, nutritional status, existing body burden and duration of exposure) influence the bioavailability of ingested lead, introducing a great deal of uncertainty into any estimate of risk.

D.11 MANGANESE

Noncancer Toxicity

Manganese is nutritionally required in humans for normal growth and health (EPA 1997a) Humans exposed to approximately 0.8 mg manganese/kg/day in drinking water exhibited lethargy, mental disturbances (1/16 committed suicide), and other neurologic effects. The elderly appeared to be more sensitive than children. Oral treatment of laboratory rodents induced biochemical changes in the brain, but rodents did not exhibit the neurological signs exhibited by humans. Occupational exposure to high concentrations in air induced a generally typical spectrum of neurological effects, and increased incidence of pneumonia (ACGIH 1986).

Very recently, a chronic oral water RfD of 0.005 mg/kg/day has been made available for manganese based on a drinking water study (EPA 1997a) and a chronic oral food RfD of 0.14 mg/kg/day (EPA 1997a) was adopted based on a NOAEL of 0.14 mg/kg/day for humans in a dietary study. An inhalation RfD of 0.0143 µg/kg/day was presented for manganese. The subchronic oral RfDs presented by EPA (1995) was the same value as the chronic oral RfDs. The EPA (1997a) presented a verified chronic inhalation RfC of 0.00005 mg/m^3 based on an LOAEL for respiratory symptoms and psychomotor disturbances in occupationally exposed humans and an uncertainty factor of 1000. The EPA (1997a) presented the same value as a subchronic inhalation RfC. The inhalation RfC is equivalent to 0.000014 mg/kg/day, assuming humans inhale 20 m^3 of air/day and weigh 70 kg. The CNS and respiratory tract are target organs of inhalation exposure to manganese.

Carcinogenicity

The EPA (1997a) classifies manganese in cancer weight-of-evidence Group D (not classifiable as to carcinogenicity to humans). Quantitative cancer risk estimates are not derived for Group D chemicals.

D.12 MERCURY

Mercury occurs in three forms: elemental, organic, and inorganic. Although the toxicity of all forms is mediated by the mercury cation, the extent of absorption and pattern of distribution within the body, which determines the effects observed, depends on the form to which the organism is exposed (Goyer 1991). Bacterial activity in the environment converts inorganic mercury to methyl mercury (Berlin 1986a). It is likely that either inorganic mercury or methyl mercury may be taken up by plants and enter the food chain, and this discussion will focus on inorganic and methyl mercury. Exposure to elemental mercury, which is more likely to occur in an occupational setting, is not discussed herein.

Pharmacokinetics

The GI absorption of inorganic mercury salts is about 2 to 10 percent in humans, and slightly higher in experimental animals (Berlin 1986a; Goyer 1991). Inorganic mercury in the blood is roughly equally divided between the plasma and erythrocytes. Distribution is preferentially to the kidney, with somewhat lower concentrations found in the liver, and even lower levels found in the skin, spleen, testes, and brain (Berlin 1986a). Inorganic mercury is excreted principally through the feces and urine, with minor pathways including the secretions of exocrine glands and exhalation of elemental mercury vapor.

Methyl mercury is nearly completely (90 to 95 percent) absorbed from the GI tract (Berlin 1986a). The concentration of methyl mercury in the erythrocytes is about 10 times that in the plasma. Methyl mercury leaves the blood slowly, showing particular affinity for the brain, particularly in primates. In rats, 1 percent of the body burden of methyl mercury is found in the brain, but in humans, 10 percent of the body burden is found in the brain. Somewhat lower levels are found in the liver and kidney. During pregnancy, methyl mercury accumulates in the fetal brain, often at levels higher than in the maternal brain. Most tissues except the brain transform methyl mercury to inorganic mercury. Excretion of methyl mercury is principally via the bile, with a half-life of 70 days in humans not suffering from toxicity. Following exposure to methyl mercury, some of the mercury in the bile exists as methyl mercury and some as the inorganic form. The inorganic form is largely passed in the feces, but methyl mercury is subject to enterohepatic recirculation. Another important excretory pathway for methyl mercury is lactation.

Non-carcinogenic Toxicity

Target organs for inorganic or methyl mercury include the kidney, nervous system, fetus, and neonate. Acute oral exposure to high doses of inorganic mercury causes severe damage to the GI mucosa because of the corrosive nature of mercury salts, which may lead to bloody diarrhea, shock, circulatory collapse, and death (Berlin 1986a; Goyer 1991). Acute sublethal poisoning induces severe kidney damage. Chronic exposure induces an autoimmune glomerular disease and renal tubular injury. The EPA (1995) presented a verified RfD of 0.3 μg/mg-day for chronic oral exposure to inorganic mercury, based on kidney effects in rats.

Acute or chronic exposure to methyl mercury leads to neurologic dysfunction (Berlin 1986a; Goyer 1991). The region of the nervous system affected is species-dependent. Methyl mercury poisoning in rats induces peripheral nerve damage and kidney effects. In humans, the sensory cortex appears to be the most sensitive. The brain of the fetus and the neonate may be unusually sensitive to methyl mercury; retarded neurologic development was observed in prenatally exposed children whose mothers showed no clinical signs of poisoning. The EPA (1997a) derived an RfD of 0.1 μg/kg/day for chronic oral exposure to methyl

mercury based on neurological effects in environmentally exposed humans. An intake of 3 μg/kg/day was the LOAEL corresponding to a blood level of 200 ng/mL, which was associated with CNS effects. An uncertainty factor of 10 was used to estimate an NOAEL from an LOAEL. An inhalation RfC of 0.0003 mg/kg/day (uncertainty factor of 30) has been established for inorganic mercury based on neurotoxic effects in humans. This translates into a chronic RfD of 0.086 ug/kg/day (EPA 1995).

Carcinogenicity

The EPA (1997a) classifies inorganic mercury in cancer weight-of-evidence Group D (not classifiable as to carcinogenicity to humans), based on no data regarding cancer in humans, and inadequate animal and supporting data. In an intraperitoneal injection study with metallic mercury in rats, sarcomas developed only in those tissues in direct contact with the test material (Druckrey et al. 1957). A two-year dietary study in rats with mercuric acetate (inorganic mercury) yielded no evidence of carcinogenicity (Fitzhugh et al. 1950). In mice, however, dietary exposure to high doses of mercury chloride for up to 78 weeks induced renal adenomas and adenocarcinomas (Mitsumori et al. 1981). The EPA has not yet evaluated the carcinogenicity of organic mercury. No carcinogenic effect, however, was observed in a two-year feeding study with phenylmercuric acetate in rats (Fitzhugh et al. 1950).

D.13 NICKEL

Noncancer Toxicity

In a subchronic gavage study with nickel chloride in water, clinical signs of toxicity in rats included lethargy, ataxia, irregular breathing, reduced body temperature, salivation, and discolored extremities (EPA 1995). Inhalation exposure was associated with asthma and pulmonary fibrosis in welders using nickel alloys (ACGIH 1986). Lung effects were observed in laboratory animals exposed by inhalation. The EPA (1997a) presented a verified RfD of 0.02 for chronic oral exposure to nickel, based on an NOAEL for decreased organ and body weights in a two-year dietary study with nickel sulfate in rats and an uncertainty factor of 300. The CNS appears to be the target organ for the oral toxicity of nickel. The lung is clearly the target organ for inhalation exposure.

Carcinogenicity

Occupational exposure to nickel was associated with increased risk of nasal, laryngeal and lung cancer (ATSDR 1995a). Inhalation exposure of rats to nickel subsulfide increased the incidence of lung tumors. The EPA (1997a) presents a cancer weight-of-evidence Group A classification (human carcinogen) for

nickel, and presents an inhalation unit risk of 0.00024 per mg/m^3 for nickel refinery dust. The unit risk is equivalent to 0.84 per mg/kg/day, assuming humans inhale 20 m^3 of air/day and weigh 70 kg. The quantitative estimate was derived from the human occupational studies

D.14 POLYAROMATIC HYDROCARBONS

Polynuclear aromatic hydrocarbons (PAHs) are a large class of ubiquitous natural and anthropogenic chemicals, all with similar chemical structures (ATSDR 1990). There are eleven individual PAHs listed among the chemicals of potential concern (COPCs) for Key West.

Pharmacokinetics

Although quantitative absorption data for the PAHs were not located, benzo(a)pyrene was readily absorbed across the GI (Rees et al. 1971) and respiratory epithelia (Kotin et al. 1969; Vainich et al. 1976). The high lipophilicity of other compounds in this class suggests that other PAHs also would be readily absorbed across GI and respiratory epithelia.

Benzo(a)pyrene was distributed widely in the tissues of treated rats and mice, but primarily to tissues high in fat, such as adipose tissue and mammary gland (Kotin et al. 1969; Schlede et al. 1970a). Patterns of tissue distribution of other PAHs would be expected to be similar because of the high lipophilicity of the members of this class.

Studies of the metabolism of benzo(a)pyrene provide information relevant to other PAHs because of the structural similarities of all members of the class. Metabolism involves microsomal mixed function oxidase hydroxylation of one or more of the phenyl rings with the formation of phenols and dihydrodiols, probably via formation of arene oxide intermediates (EPA 1979a). The dihydrodiols may be further oxidized to diol epoxides, which, for certain members of the class, are known to be the ultimate carcinogens (LaVoie et al. 1982). Conjugation with glutathione or glucuronic acid, and reduction to tetrahydrotetrols are important detoxification pathways. Metabolism of naphthalene resulted in the formation of 1,2-naphthoquinone, which induced cataract formation and retinal damage in rats and rabbits.

Excretion of benzo(a)pyrene or dibenzo(a,h)anthracene residues was reported to be rapid, although quantitative data were not located (EPA 1979b). Excretion occurred mainly via the feces, probably largely due to biliary secretion (Schlede et al. 1970a, 1970b). The EPA (1980a) concluded that accumulation in the body tissues of PAHs from chronic low level exposure would be unlikely.

Noncancer Toxicity

Oral noncancer toxicity data are available for acenaphthene, anthracene, fluoranthene, fluorene, and naphthalene. Newborn infants, children, and adults exposed to naphthalene by ingestion, inhalation, or possibly by skin contact developed hemolytic anemia with associated jaundice and occasionally renal disease (EPA 1979c). In a 13-week gavage study in rats, treatment with 50 mg naphthalene/kg, 5 days/week for 13 weeks (35.7 mg/kg/day) induced no effects; higher doses presumably reduced the growth rate (NTP 1980). Application of an uncertainty factor of 1000 yielded a provisional RfD for chronic oral exposure of 0.04 mg/kg/day (EPA 1995) which has recently been withdrawn. The very mild effect (decreased growth rate) apparently observed at higher doses suggests that the RfD is very conservatively protective.

Acenaphthene appears to be a mild hepatotoxicant, and possibly a nephrotoxicant, in rodents (EPA 1997a). In a comprehensive 90-day toxicity study in mice, gavage treatment with 175 mg/kg/day was an NOAEL; liver weight changes accompanied by hepatocellular hypertrophy and elevated cholesterol levels occurred in mice treated with 350 or 700 mg/kg/day (EPA 1989a). Oral treatment of rats and mice for 32 days with 2,000 mg/kg/day resulted in weight loss and mild liver and kidney lesions (Knobloch et al. 1969). The EPA (1997a) verified a chronic oral RfD for acenaphthene of 0.06 mg/kg/day based on an NOAEL for liver effects in a subchronic gavage study in mice and an uncertainty factor of 3000. An uncertainty factor of 3000 was used with factors of 10 each for inter- and intraspecies variation and to expand from subchronic to chronic exposure, and a factor of 3 to reflect gaps in the database, namely lack of adequate data in a second species and lack of developmental and reproductive data. Confidence in the database was low because of the data gaps. Confidence in the critical study was low because the effects were considered adaptive, rather than adverse, which implies that the RfD is extremely conservative. The EPA (1995) presented a provisional subchronic oral RfD of 0.6 based on the same NOAEL and an uncertainty factor of 300. Target organs for acenaphthene include the liver and kidney.

The toxic potency of anthracene appears to be very low. In a chronic study in rats, doses of 5 to 15 mg/rat (16 to 48 mg/kg/day) via the diet had no effect on longevity or gross or histopathologic appearance on unspecified tissues (Schmahl 1955). Gavage treatment of mice with 1000 mg/kg/day for at least 90 days had no effects on a comprehensive range of toxicologic parameters. The NOEL of 1000 mg/kg/day in mice and an uncertainty factor of 3000 (10 each for inter- and intraspecies variation, and 30 for the use of a subchronic study and an incomplete database) yielded a verified RfD for chronic oral exposure of 0.3 mg/kg/day (EPA 1997a). The EPA (1995) presented a subchronic oral RfD of 3 mg/kg/day based on the same NOEL and an uncertainty factor of 300. The data were inadequate to define target organs for the toxicity of anthracene.

Fluoranthene appears to be toxic to the liver, kidney, and blood. In a comprehensive 13-week gavage study in mice, 125 mg/kg/day was an NOAEL and 250 mg/kg/day was an LOAEL (EPA 1988). The verified chronic oral RfD for fluoranthene is 0.04 mg/kg/day, based on the NOAEL in a comprehensive 13-week gavage study of 125 mg/kg/day in mice and an uncertainty factor of 3000 (EPA 1997a). The uncertainty factor of 3000 includes factors of 10 each for inter- and intraspecies variation, and a factor of 30 to expand from subchronic to chronic exposure and to reflect an incomplete database. A provisional subchronic oral RfD of 0.4 mg/kg/day was derived from the same NOAEL and an uncertainty factor of 300. The liver, kidney, and blood appear to be the target organs for the toxicity of fluoranthene.

The critical effects of oral exposure to fluorene appear to be hemolytic anemia and CNS effects. In mice treated by gavage for 13 weeks, 125 mg/kg/day was an NOAEL and 250 mg/kg/day was an LOAEL (EPA 1989b). A verified chronic oral RfD for fluorene of 0.04 mg/kg/day was based on the NOAEL of 125 mg/kg/day for hemolytic anemia in mice (EPA 1997a). An uncertainty factor of 3000 was used with factors of 10 each for inter- and intraspecies variation and to expand from subchronic to chronic exposure, and a factor of 3 to reflect gaps in the database. The EPA (1995) presented a provisional subchronic oral RfD of 0.4 mg/kg/day based on the same NOAEL and an uncertainty factor of 300. The target organs of fluorene toxicity are the erythrocyte and the CNS.

Newborn infants, children, and adults exposed to naphthalene by ingestion, inhalation, or possibly by skin contact developed hemolytic anemia with jaundice and, occasionally, renal disease (EPA 1980a). In a 13-week gavage study in rats, treatment with naphthalene reduced the growth rate (EPA 1995). Application of an uncertainty factor of 1000 to the rat NOEL yielded a provisional RfD for subchronic and chronic oral exposure of 0.04 mg/kg/day (EPA 1995). The erythrocyte and the kidney appear to be the target organs for the toxicity of naphthalene.

Mild kidney lesions appear to be the critical effects of pyrene. In mice treated by gavage for 13 weeks, 75 mg/kg/day was an NOAEL and 125 mg/kg/day was an LOAEL (EPA 1989c). Even in mice treated with 250 mg/kg/day the lesions were considered minimal to mild. The EPA (1997) verified a chronic oral RfD for pyrene of 0.03 mg/kg/day based on the NOAEL in mice and an uncertainty factor of 3000 (10 each for inter- and intraspecies variation and to expand from subchronic to chronic exposure, and a factor of 3 to reflect gaps in the database). The EPA (1995) presented a provisional subchronic oral RfD of 0.3 mg/kg/day based on the same NOAEL and an uncertainty factor of 300. The kidney is the target organ for the toxicity of pyrene.

Carcinogenicity

The PAHs are ubiquitous, being released to the environment from anthropogenic as well as from natural sources (ATSDR 1987). Benzo(a)pyrene is the most extensively studied member of the class, inducing tumors in multiple tissues of virtually all laboratory species tested by all routes of exposure. Although epidemiology studies suggested that complex mixtures that contain PAHs (coal tar, soots, coke oven emissions, cigarette smoke) are carcinogenic to humans, the carcinogenicity cannot be attributed to PAHs alone because of the presence of other potentially carcinogenic substances in these mixtures (ATSDR 1987). In addition, recent investigations showed that the PAH fraction of roofing tar, cigarette smoke, and coke oven emissions accounted for only 0.1 to 8 percent of the total mutagenic activity of the unfractionated complex mixture in *Salmonella* (Lewtas 1988). Aromatic amines, nitrogen heterocyclic compounds, highly oxygenated quinones, diones, and nitrooxygenated compounds, none of which would be expected to arise from in vivo metabolism of PAHs, probably accounted for the majority of the mutagenicity of coke oven emissions and cigarette smoke. Furthermore, coal tar, which contains a mixture of many PAHs, has a long history of use in the clinical treatment of a variety of skin disorders in humans (ATSDR 1987).

Because of the lack of human cancer data, assignment of individual PAHs to EPA cancer weight-of-evidence groups was based largely on the results of animal studies with large doses of purified compound. Frequently, unnatural routes of exposure, including implants of the test chemical in beeswax and trioctanoin in the lungs of female Osborne-Mendel rats, intratracheal instillation, and subcutaneous or intraperitoneal injection, were used. Of the PAHs of concern, no EPA cancer weight-of-evidence group classification was provided for acenaphthene (EPA 1997a). Anthracene, benzo(g,h,i)perylene, fluoranthene, fluorene, and naphthalene were classified in Group D (not classifiable as to carcinogenicity to humans), and benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene were classified in Group B2 (probable human carcinogens).

The EPA (1997a) verified a slope factor for oral exposure to benzo(a)pyrene of 7.3 per mg/kg/day, based on several dietary studies in mice and rats. Neither verified nor provisional quantitative risk estimates were available for the other PAHs in Group B2. The EPA (1980a) promulgated an ambient water quality criterion for "total carcinogenic PAHs," based on an oral slope factor derived from a study with benzo(a)pyrene, as being sufficiently protective for the class. Largely because of this precedent, the quantitative risk estimates for the other carcinogenic PAHs were based on benzo(a)pyrene when quantitative estimates were needed.

Recent reevaluations of the carcinogenicity and mutagenicity of the Group B2 PAHs suggest that there are large differences between individual PAHs in cancer potency (Krewski et al., 1989). Based on the available cancer and mutagenicity data, and assuming that there is a constant relative potency between different

carcinogens across different bioassay systems and that the PAHs under consideration have similar dose-response curves, Thorslund and Charnley (1988) derived relative potency values for several PAHs. A more recent Relative Potency Factor (RPF) scheme for the Group B2 PAHs was based only on the induction of lung epidermoid carcinomas in female Osborne-Mendel rats in the lung-implantation experiments (Clement International 1990). The most defensible RPFs and the associated oral and inhalation slope factors are presented in Table G.3-2 in Appendix G of the Supplemental RCRA Facility Investigation/Remedial Investigation (RFI/RI) Report.

Listed below are individual PAH toxicological profiles, if available.

BENZO(B)FLUORANTHENE

Noncancer Toxicity

Little information is available on benzo(b)fluoranthene. However based on the similarities of chemical structures, most properties should be similar to benzo(a)pyrene.

Carcinogenicity

A Clement's RFP has been developed (Clement International, 1990) for benzo(b)fluoranthene which allows the estimation of Slope Factors (SFs) of 7.3E-01 and 6.1E-01 per mg/kg/day for the oral and inhalation routes respectively. The EPA (1995) has classified benzo(b)fluoranthene in cancer weight-of-evidence Group B2 (Probable Human Carcinogen, sufficient evidence of carcinogenicity in animals with inadequate or lack of evidence in humans) based on lung tumors in mice.

BENZO(G,H,I)PERYLENE

Noncancer Toxicity

Little information is available on benzo(g,h,i)perylene. However based on the similarities of chemical structures, most properties should be similar to benzo(a)pyrene.

Carcinogenicity

The EPA (1995) has classified benzo(g,h,i)perylene in cancer weight-of-evidence Group D (Not classifiable as to Human Carcinogenicity, inadequate or no evidence).

BENZO(K)FLUORANTHENE

Noncancer Toxicity

Little information is available on benzo(k)fluoranthene. However, based on the similarities of the chemical structures, most properties should be similar to benzo(a)pyrene.

Carcinogenicity

A Clement's RFP has been developed (Clement International, 1990) for benzo(k)fluoranthene which allows the estimation of 7.3E-02 and 6.1E-02 per mg/kg/day for the SF for the oral and inhalation route respectively. The EPA (1997a) has classified benzo(k)fluoranthene in cancer weight-of-evidence Group B2 (Probable Human Carcinogen, sufficient evidence of carcinogenicity in animals with inadequate or lack of evidence in humans) based on lung tumors in mice.

CHRYSENE

Noncancer Toxicity

Chrysene is absorbed by the oral route of exposure. Absorption may also occur following dermal exposure. Data are not available to determine whether chrysene is absorbed via the lungs. Absorbed chrysene is distributed to several tissues, i.e. it was found in five tissues in a study reported in 1983. It is accumulated preferentially in the adipose and mammary tissue.

There is no information on other toxic effects of chrysene in human and laboratory animals following inhalation, oral and dermal exposures. (ATSDR 1987, draft).

Carcinogenicity

A Clement's RFP has been developed for chrysene. This allows the estimation of SFs of 7.3E-03 and 6.1E-03 per mg/kg/day for the oral and inhalation routes respectively.

The EPA (1997a) has classified chrysene in cancer weight-of-evidence Group B2 (Probable Human Carcinogen, sufficient evidence of carcinogenicity in animals with inadequate or lack of evidence in humans) based on tumors and malignant lymphoma in mice and chromosomal abnormalities in hamsters.

INDENO(1,2,3-CD)PYRENE

Noncancer Toxicity

Little information was found on the toxicity of indeno(1,2,3-cd)pyrene. Because of its structural similarity its properties should resemble benzo(a)pyrene.

Carcinogenicity

A Clement's RFP has been developed for indeno(1,2,3-cd)pyrene. This allows the estimation of SFs of 7.3E-01 and 6.1E-01 per mg/kg/day for the oral and inhalation routes respectively. The EPA (1997a) has classified indeno(1,2,3-cd)pyrene in cancer weight-of-evidence Group B2 (Probable Human Carcinogen, sufficient evidence of carcinogenicity in animals with inadequate or lack of evidence in humans) based on tumors in mice following lung implants.

D.15 POLYCHLORINATED BIPHENYLS

Noncancer Toxicity

Epidemiologic studies of women in the United States associated oral polychlorinated biphenyl (PCB) exposure with low birth weight or retarded musculoskeletal or neurobehavioral development of their infants (ATSDR 1991a). Oral studies in animals established the liver as the target organ in all species, and the thyroid as an additional target organ in the rat. Effects observed in monkeys included gastritis, anemia, chloracne-like dermatitis, and immunosuppression. Oral treatment of animals induced developmental effects, including retarded neurobehavioral and learning development in monkeys. An oral RfD of 0.07 µg/kg/day was presented for Arochlor-1016. A chronic RfD of 0.02 µg/kg/day derived from a LOAEL of 0.005 mg/kg/day based on a 5-year study with monkeys was presented for Arochlor-1254 (EPA 1997a) and a subchronic oral RfD of 0.05 µg/kg/day with an uncertainty factor of 100 (EPA 1995). The target organ was the immune system.

Occupational exposure to PCBs was associated with upper respiratory tract and ocular irritation, loss of appetite, liver enlargement, increased serum concentrations of liver enzymes, skin irritation, rashes and chloracne, and, in heavily exposed female workers, decreased birth weight of their infants (ATSDR 1991a). Concurrent exposure to other chemicals confounded the interpretation of the occupational exposure studies. Laboratory animals exposed by inhalation to Arochlor-1254 vapors exhibited moderate liver degeneration,

decreased body weight gain and slight renal tubular degeneration. Neither subchronic nor chronic inhalation RfC values were available.

Target organs for PCBs include the skin, liver, fetus, and neonate.

Carcinogenicity

The EPA (1995) classifies the PCBs as EPA cancer weight-of-evidence Group B2 substances (probable human carcinogens), based on inadequate data in humans and sufficient data in animals. The human data consist of several epidemiologic occupational and accidental oral exposure studies with serious limitations, including poorly quantified concentrations of PCBs and durations of exposure, and probable exposures to other potential carcinogens.

The animal data consist of several oral studies in rats and mice with various arochlors, kanechlors, or clophens (commercial PCB mixtures manufactured in the United States, Japan and Germany, respectively) that reported increased incidence of liver tumors in both species (EPA 1997a).

The EPA (1997a) presents a verified oral slope factor of 7.7 per mg/kg/day for all PCBs based on liver tumors in rats treated with Arochlor-1260.

D.16 SILVER

Pharmacokinetics

The GI absorption of ingested silver in animals was estimated at £10 percent; however, absorption of 18 percent was estimated for one human subject given silver acetate (Fowler and Nordberg 1986). Highest tissue levels are located in the liver; lower levels are located in the lungs, brain, spleen, bone marrow, muscle, and skin (Fowler and Nordberg 1986; Goyer 1991). Excretion is virtually entirely through the bile. The excretion kinetics appear to be species- and organ-dependent. In humans, the apparent half-life for silver in the liver is approximately 50 days. Silver in skin also appeared to have a long half-life (not quantified).

Noncancer Toxicity

Silver compounds have been used in dentistry, medicinally in the treatment of burns, as a local disinfectant, and as a drinking water disinfectant (Fowler and Nordberg 1986). The classical syndrome of toxicity, called

argyria, is a blue-gray to nearly black discoloration of areas of the skin or the viscera resulting from deposition of microscopic granules of silver compounds in the affected tissues. Argyria results from occupational (inhalation), parenteral, or oral exposure. The EPA (1997a) derived an RfD of 0.005 mg/kg/day for chronic oral exposure based on a 2 to 9 year human i.v. study, where a total i.v. dose of 1g metallic silver (in the form of 4g silver arsphenamine) resulted in minimal observed effects (argyria) in patients. This total i.v. dose for metallic silver was converted into an oral dose (LOAEL) of 0.014 mg/kg/day. The chronic oral RfD was derived by dividing the LOAEL by an uncertainty factor of 3, which was applied to account for minimal effects in a subpopulation that has exhibited an increased propensity for the development of argyria.

Carcinogenicity

The EPA (1997a) classifies silver in cancer weight-of-evidence Group D (not classifiable as to carcinogenicity to humans). The human data consist of no evidence in the literature of cancer despite frequent medical use of silver compounds. The animal data are limited to studies of implanted silver foil or injected metallic silver that provided unconvincing indications of a carcinogenic response relevant to humans.

D.17 THALLIUM

Noncancer Toxicity

Thallium is highly toxic; acute ingestion by humans or laboratory animals induced gastroenteritis, neurological dysfunction, and renal and liver damage (Kazantzis, 1986). Chronic ingestion of more moderate doses characteristically caused alopecia. Thallium was used medicinally to induce alopecia in cases of ringworm of the scalp, sometimes with disastrous results. In industrial (inhalation, oral, dermal) exposure, neurologic signs preceded alopecia, suggesting that the nervous system is more sensitive than the hair follicle. The EPA (1994c) presented verified chronic oral RfD values for several thallium compounds (thallium acetate, thallium acetate, thallium carbonate, thallium chloride, thallium nitrate, thallium sulfate, and thallic oxide) based on increased incidence of alopecia and increased serum levels of liver enzymes indicative of hepatocellular damage in rats treated with thallium sulfate for 90 days. An oral RfD for thallium alone was not located. That for thallium sulfate is 8.00E-05 (EPA 1997b), based on a lack of effects from an oral subchronic study in which rats received 0.25 mg/kg/day. The uncertainty factor was 3000 and the confidence level was low.

Carcinogenicity

Several thallium compounds (thallic oxide, thallium acetate, thallium carbonate, thallium chloride, thallium nitrate, thallium sulfate) were classified as cancer weight-of-evidence Group D substances (not classifiable as to carcinogenicity to humans) (EPA 1997a). No weight-of-evidence classification was located for thallium alone.

D.18 VANADIUM

Noncancer Toxicity

The oral toxicity of vanadium compounds to humans is very low (Lagerkvist et al. 1986), probably because little vanadium is absorbed from the GI tract. Effects in humans exposed by inhalation include upper and lower respiratory tract irritation. A provisional subchronic and chronic oral RfD of 0.007 mg/kg/day was derived from a NOEL of 5 ppm in rats in a lifetime drinking water study with an uncertainty factor of 100 (EPA 1995). A target organ could not be identified for oral exposure. The respiratory tract is the target organ for inhalation exposure.

Carcinogenicity

No information was located regarding the carcinogenicity of vanadium.

D.19 ZINC

Pharmacokinetics

Zinc is a nutritionally required trace element. Estimates of the efficiency of GI absorption of zinc in animals range from <10 to 90 percent (Elinder 1986b). Estimates in normal humans range from approximately 20 to 77 percent (Elinder 1986b; Goyer 1991). The net absorption of zinc appears to be homeostatically controlled, but it is unclear whether GI absorption, intestinal secretion, or both are regulated. Distribution of absorbed zinc is primarily to the liver (Goyer 1991), with subsequent redistribution to bone, muscle, and kidney (Elinder 1986b). Highest tissue concentrations are found in the prostate. Excretion appears to be principally through the feces, in part from biliary secretion, but the relative importance of fecal and urinary excretion is species-dependent. The half-life of zinc absorbed from the GI tracts of humans in normal zinc homeostasis is approximately 162 to 500 days.

Noncancer Toxicity

Humans exposed to high concentrations of aerosols of zinc compounds may experience severe pulmonary damage and death (Elinder 1986b). The usual occupational exposure is to freshly formed fumes of zinc, which can induce a reversible syndrome known as metal fume fever. Orally, zinc exhibits a low order of acute toxicity. Animals dosed with 100 times dietary requirement showed no evidence of toxicity (Goyer 1991). In humans, acute poisoning from foods or beverages prepared in galvanized containers is characterized by GI upset (Elinder 1986b). Chronic oral toxicity in animals is associated with poor growth, GI inflammation, arthritis, lameness, and a microcytic, hypochromic anemia (Elinder 1986b), possibly secondary to copper deficiency (Underwood 1977). The EPA (1995) presented a verified RfD of 0.3 mg/kg/day for chronic oral exposure to zinc, based on anemia in humans.

Carcinogenicity

The EPA (1997a) classifies zinc in cancer weight-of-evidence Group D (not classifiable as to carcinogenicity to humans) based on inadequate evidence for carcinogenicity in humans and animals. The human data consist largely of occupational exposure studies not designed to detect a carcinogenic response, and of reports that prostatic zinc concentrations were lower in cancerous than in noncancerous tissue. The animal data consist of several dietary, drinking water, and zinc injection studies, none of which provided convincing data for a carcinogenic response.

REFERENCES FOR TOXICOLOGICAL PROFILES

Aaseth, J., and T. Norseth, 1986, "Copper," Handbook on the Toxicology of Metals, Vol. II, L. Friberg, G. F. Nordberg, and V. B. Vouk, eds., Elsevier Science Publishers B. V., New York, pp. 233-254.

ACGIH (American Conference of Governmental Industrial Hygienists), 1986, *Documentation of Threshold Limit Values and Biological Exposure Indices*, fifth edition, Cincinnati, Ohio.

ACGIH, 1991, *Documentation of the Threshold Limit Values and Biological Exposure Indices*, sixth edition, Cincinnati, Ohio.

Agency for Toxic Substances and Disease Registry (ATSDR), 1992c, Toxicological Profile for Selected PCBs (Aroclor-1260, -1254, -1248, -1242, -1232, -1221, and -1016), Draft for Public Comment, U.S. Public Health Service, Atlanta, GA.

ATSDR, 1987, *Draft Toxicological Profile for Benzo(a)pyrene*, U.S. Public Health Service, Atlanta, Georgia.

ATSDR, 1990, *Draft Toxicological Profile for Polycyclic Aromatic Hydrocarbons*, U.S. Public Health Service, Atlanta, Georgia.

ATSDR, 1991a, *Toxicological Profile for Selected PCBs (Arochlor-1260, -1254, -1248, -1242, -1232, -1221, and -1016)*, U.S. Public Health Service, Atlanta, Georgia.

Agency for Toxic Substances and Disease Registry (ATSDR), 1995a, Toxicological Profile for Nickel, U.S. Public Health Service, Atlanta, GA.

Berlin, M., 1986a, "Mercury,"Handbook on the Toxicology of Metals, Friberg, L., G.F. Norfberg and V.B. Vouk, eds., Vol. II 2nd ed., Elsevier Science Publishers, New York, pp. 387-445.

Cebrian, M. E., A. Albores, M. Aguilar, and E. Blakely, 1983, "Chronic Arsenic Poisoning in the North of Mexico," *Human Toxicology*, Volume 2, pp. 121-133.

Clement International, 1990, *Development of Relative Potency Estimates for PAHs and Hydrocarbon Combustion Product Fractions Compared to Benzo(a)pyrene and Their Use in Carcinogen Risk Assessments*, prepared for the U.S. EPA, Washington, D.C.

Druckrey, H., H. Hamperl, and D. Schmahl, 1957, "Carcinogenic Action of Metallic Mercury After Intraperitoneal Administration in Rats," Zeitschrift Fur Krebsforschung und Klinische Onkologie, Vol. 61, pp. 511-519.

Elinder, C. -G., and L. Friberg, 1986a, "Antimony," Handbook on the Toxicology of Metals, L. Friberg, G. F. Nordberg, and V. B. Vouk, eds., Vol. II, 2nd ed., Elsevier Science Publishers B. V., New York, pp. 26-42.

Elinder, C. G. and L. Friberg, 1986b, "Zinc," *Handbook on the Toxicology of Metals*, L. Friberg, G. F. Nordberg, and V.B. Vouk (eds.) Volume II, second edition, Elsevier Science Publishers B.V., New York, New York, pp. 664-679.

EPA (U.S. Environmental Protection Agency), 1979a, "Multimedia Health Assessment Document for Polycyclic Organic Matter," prepared under contract by J. Santodonato, et al., Syracuse Research Corporation.

EPA, 1979b, *Polynuclear Aromatic Hydrocarbons: Ambient Water Quality Criteria* (Draft).

EPA, 1979c, *Naphthalene: Ambient Water Quality Criteria*, (Draft).

EPA, 1980a, "Ambient Water Quality Criteria for Polynuclear Aromatic Hydrocarbons," EPA 440/5-80-069, NTIS PB81-117806, Office of Water Regulations and Standards, Washington, D.C.

EPA, 1988, "13-Week mouse oral subchronic toxicity study," prepared by Toxicity Research Laboratories, Ltd., Muskegon, Michigan for the Office of Solid Waste, Washington, D.C.

EPA, 1989a, "Mouse oral subchronic study with acenaphthene," study conducted by Hazelton Laboratories, Inc., for the Office of Solid Waste, Washington, D.C.

EPA, 1989b, "Mouse oral subchronic toxicity study," prepared by Toxicity Research Laboratories, Ltd., Muskegon, Michigan for the Office of Solid Waste, Washington, D.C.

EPA, 1989c, "Mouse oral subchronic toxicity of pyrene," study conducted by Toxicity Research Laboratories, Muskegon, Michigan for the Office of Solid Waste, Washington, D.C.

EPA, 1990a, *Technical Support Document for Lead*, prepared by the Chemical Hazard Assessment Division, Syracuse Research Corporation, under contract to the Environmental Criteria and Assessment Office, Cincinnati, Ohio.

EPA, 1994a, "Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities," Office of Solid Waste Emergency Response Directive No. 355.4-12.

EPA, 1994b, "Guidance Manual for the Integrated Exposure Uptake Biokinetic Model for Lead in Children," EPA/540/R-93/081 PB 93-963510, February.

EPA, 1995, *Health Effects Assessment Summary Tables (HEAST), Annual Update FY 1995*, EPA 540-R-95-036, prepared by the Office of Health and Environmental Assessment for the Office of Solid Waste and Emergency Response and the Office of Water, Washington, D.C.

EPA, 1997a, "Integrated Risk Information System (IRIS)" online database, Washington, D.C., July.

EPA, 1997b, Roy L. Smith, memorandum, "Risk-Based Concentration Table, January - June 1996," May 10.

Fitzhugh, O. G., A. A. Nelson, E. P. Laug, et al., 1950, "Chronic Oral Toxicities of Mercuri-phenyl and Mercuric Salts," Archives of Industrial Hygiene and Occupational Medicine, Vol. 2, pp. 433-442.

Friberg, L., T. Kjellstrom, and G. F. Nordberg, 1986, "Cadmium," *Handbook on the Toxicology of Metals*, L. Friberg, G. F. Nordberg, and V.B. Vouk (eds.), Volume II, second edition, Elsevier Science Publishers B.V., New York, pp. 130-184.

Fowler, B. A., and G. F. Nordberg, 1986, "Silver," Handbook on the Toxicology of Metals, L. Friberg, G. F. Nordberg, and V. B. Vouk, eds., Vol. II, 2nd ed., Elsevier Science Publishers B. V., New York, pp. 521-531.

Genium Publishing Corporation, 1990, Aluminum Metal/Powder Material Safety Data Sheet, Sheet No. 100, Revision B, issued December 1981, Schenectady, New York.

Goyer, R. A., 1991, "Toxic Effects of Metals," *Casarett and Doull's Toxicology, the Basic Science of Poisons*, M. O. Amdur, J. Doull, and C. D. Klassen (eds.), fourth edition, Pergamon Press, New York, pp. 623 - 680.

Iffland, R., 1988, "Antimony," Handbook on Toxicity of Inorganic Compounds, Seiler, H. G., H. Sigel, and A. Sigel, eds., Marcel Dekker, Inc., New York, pp. 67-76.

IARC (International Agency for Research on Cancer, 1980, *IARC Monographs on the Evaluation of Carcinogenic Risk of Chemicals to Man*, Volume 23, World Health Organization, Lyon, France.

Ishinishi, N., K. Tsuchiya, M. Vahter, and B. A. Fowler, 1986. "Arsenic," *Handbook on the Toxicology of Metals*, L. Friberg, G. F. Nordberg, and V. B. Vouk (eds.), Volume II, second edition, Elsevier Science Publishers B.V., New York, pp. 43-83.

Kanisawa, M., and H. A. Schroeder, 1969, "Life Term Studies on the Effect of Trace Elements on Spontaneous Tumors in Mice and Rats," Cancer Research, Vol. 29, pp. 892-895.

Kazantzis, G., 1986, "Thallium," *Handbook on the Toxicology of Metals*, L. Friberg, G. F. Nordberg, and V. B. Vouk (eds.), Volume II, second edition, Elsevier Science Publishers, New York, New York.

Knobloch, K. S., S. Szendzikowski, and A. Slusarczyk-Zablobona, 1969, "Acute and Subacute Toxicity of Acenaphthene and Acenaphthylene," *Med. Pracy* (Polish), Volume 20, pp. 210-222.

Kotin, P., et al., 1969, "Distribution, Retention, and Elimination of C^{14}-3,4-Benzopyrene After Administration to Mice and Rats, *Journal of the National Cancer Institute*, Volume 23, pp. 541.

Krewski, D., T. Thorslund, and J. Withey, 1989, "Carcinogenic Risk Assessment of Complex Mixtures," *Toxicology and Industrial Health*, Volume 5, pp. 851-867.

La Voie, E. J., S. Amin, S. S. Heaht, K. Furuya, and D. Hoffman, 1982, "Tumor Initiating Activity of Dihydrodiols of Benzo(b)fluoranthene, Carcinogenesis," Volume 3(1), pp. 49 - 52.

Lagerkvist, B., G. F. Nordberg, and V. B. Vouk, 1986, "Vanadium," *Handbook on the Toxicology of Metals*, Volume II, second edition, Elsevier Science Publishers B.V., New York, pp. 638-663.

Langard, S., and T. Norseth, 1986, "Chromium," *Handbook on the Toxicology of Metals*, L. Friberg, G. F. Nordberg, and V. B. Vouk (eds.), Volume II, Elsevier Science Publishers B.V., New York, pp. 185-210.

Lewtas, J., 1988, "Genotoxicity of Complex Mixtures: Strategies for the Identification and Comparative Assessment of Airborne Mutagens and Carcinogens from Combustion Sources," *Fundamentals of Applied Toxicology*, Volume 10, pp. 571-589.

Mitsumori, K., K. Maita, T. Saito, S. Tsuda, and Y. Shikasu, 1981, "Carcinogenicity of Methylmercury Chloride in ICR Mice: Preliminary Note on Renal Carcinogens," Cancer Letter, Vol. 12, pp. 305-310.

NTP (National Toxicology Program), 1980, unpublished subchronic toxicity study, *Naphthalene (c52904), Fisher-344 Rats*, prepared by Battelle's Columbus Laboratories under subcontract No. 76-34-106002.

Rees, E. O., et al., 1971, "A Study of the Mechanism of Intestinal Absorption of Benzo(a)pyrene," *Biochemical and Biophysical Act*, Volume 255, p. 96.

Reeves, A. L., 1986a, "Barium," *Handbook on the Toxicology of Metals*, L. Friberg, G. F. Nordberg, and V. B. Vouk (eds.), Volume II, Elsevier Science Publishers B.V., New York, pp. 84-94.

Reeves, A. L., 1986b, "Beryllium," *Handbook on the Toxicology of Metals*, L. Friberg, G. F. Nordberg, and V. B. Vouk (eds.), Volume II, Elsevier Science Publishers B.V., New York, pp. 95-116.

Sax, N. I. and R. J. Lewis, Sr., 1989, *Dangerous Properties of Industrial Materials*, Volume III, seventh edition, Van Nostrand Reinhold Co., New York, New York.

Schlede, E., et al., 1970a, "Effect of Enzyme Induction on the Metabolism and Tissue Distribution of Benzo(a)pyrene," *Cancer Research*, Volume 30, p. 2893.

Schlede, E., et al., 1970b, "Stimulatory Effect of Benzo(a)pyrene and Phenobarbitol Pretreatment on the Biliary Excretion of Benzo(a)pyrene Metabolites in the Rat," *Cancer Research*, Volume 30, p.2898.

Schroeder, H. A., M. Mitchner, and A. P. Nasor, 1970, "Zirconium, Niobium, Antimony, Vanadium and Lead in Rats: Life Term Studies," Journal of Nutrition, Vol. 100, pp. 59-66.

Schmahl, D., 1955, "Examination of the Carcinogenic Action of Naphthalene and Anthracene in Rats," Z. Krebsfursch, Volume 60, pp. 697-710.

Southwick, J. W., A. E. Western, M. M. Beck, et al., 1983, "An Epidemiological Study of Arsenic in Drinking Water in Millard County, Utah," W. H. Lederer and R. J. Fensterheim (eds.), *Arsenic: Industrial, Biomedical, Environmental Perspectives*, Van Nostrand Reinhold Co., New York, pp. 210-255.

Thorslund, T. and G. Charnley, 1988, "Comparative Potency Approach for Estimating the Cancer Risk Associated with Exposure to Mixtures of Polycyclic Aromatic Hydrocarbons," ICF-Clement Associates, Washington, D.C.

Thun, M. J., T. M. Schnorr, A. B. Smith, and W. E. Halperin, 1985, "Mortality Among a Cohort of U.S. Cadmium Production Workers: An Update," *Journal of the National Cancer Institute*, Volume 74, pp. 325-333.

Tseng, W.P., H. M. Chu, S. W. How, J. M. Fong, C. S. Lin, and S. Yeh, 1968, "Prevalence of Skin Cancer in an Endemic Area of Arsenicism in Taiwan," *Journal of the National Cancer Institute*, Volume 40, pp. 453-463.

Tseng, W. P., 1977, "Effects and Dose-response Relationships of Skin Cancer and Blackfoot Disease with Arsenic," *Environmental Health Perspectives*, Volume 19, pp. 109-119.

Tsuchiya, K., 1986, "Lead," *Handbook on the Toxicology of Metals*, L. Friberg, G. F. Nordberg, and V. B. Vouk (eds.), Volume II, second edition, Elsevier Science Publishers B.V., New York, pp. 298-353.

Underwood, E. J., 1977, *Trace Elements in Human and Animal Nutrition*, fourth edition, Academic Press, New York.

Vainich, et al., 1976, "The Fate of Intratracheally Instilled Benzo(a)pyrene in the Isolated Perfused Rat Lung of Both Control and 20-Methylcholanthrene Pretreated," *Research Communications in Chemical Pathology and Pharmacology*, Volume 13, pp. 259.

RISK ASSESSMENT EXAMPLE CALCULATIONS

Soil Exposure

Two potential exposure routes are associated with theoretical surface and subsurface soil direct contact at the NAWC Warminster Site 6. These exposure routes include ingestion and dermal contact. Example calculations for each of these routes of exposure are presented in the following text.

Ingestion

Incidental surface soil ingestion exposure for arsenic at Site 6 in surface soil is estimated for a future recreational receptor from the following equations (EPA, 1989d):

Cancer:

$$IEX(mg/kg)/day = \frac{CS * IR_{soil-RC} * FI * CF * EF * ED_{RC}}{BW_{RC} * AT_{car}} + \frac{CS * IR_{soil-RY} * FI * CF * EF * ED_{RY}}{BW_{RY} * AT_{car}}$$

Noncancer:

Recreational Child (age 0-5 years):

$$IEX(mg/kg)/day = \frac{CS * IR_{soil-RC} * FI * CF * EF * ED_{RC}}{BW_{RC} * AT_{nncar-RC}}$$

Recreational Youth (age 6-16 years):

$$IEX(mg/kg)/day = \frac{CS * IR_{soil-RY} * FI * CF * EF * ED_{RY}}{BW_{RY} * AT_{noncar-RY}}$$

where:

CS	=	9.88 mg/kg	=	Arsenic rep. conc. in surface soil at Site 6
$IR_{soil-RC}$	=	200 mg soil/day	=	Soil ingestion rate
$IR_{soil-RY}$	=	100 mg soil/day	=	Soil ingestion rate
FI	=	1.0	=	Fraction ingested from contaminated source
EF	=	24 days/yr	=	Exposure frequency
ED_{RC}	=	5 yrs	=	Exposure duration
ED_{RY}	=	11 yrs	=	Exposure duration
BW_{RC}	=	16.6 kg	=	Body weight
BW_{RY}	=	45.2 kg	=	Body weight

AT_{car}	=	25,550 days	=	Averaging time for carcinogens (365 days/yr x 70 yrs)
$AT_{noncar\text{-}RC}$	=	1825 days	=	Averaging time, non-carcinogens (365 days/yr x 5 yrs)
$AT_{noncar\text{-}RY}$	=	4015 days	=	Averaging time, non-carcinogens (365 days/yr x 11 yrs)
CF	=	1.0E-6 kg soil/mg soil	=	Conversion factor
IEX_{car}	=	7.85E-7 mg/kg/day	=	Carcinogenic ingestion exposure
$IEX_{noncar\text{-}RC}$	=	7.83E-6 mg/kg/day	=	Noncarcinogenic ingestion exposure
$IEX_{noncar\text{-}RY}$	=	1.44E-6 mg/kg/day	=	Noncarcinogenic ingestion exposure

As discussed in Section 4.1.3 of the report, the potential receptors for this scenario include future recreational receptors and future residents.

Carcinogenic risks for this pathway are estimated based on procedures outlined in Section 4.1.4 of the report.

The cancer risk for an recreational receptor from incidental ingestion of arsenic in Site 6 surface soil is estimated as follows:

$$CA = IEX_{car} * SF$$

where:

IEX_{car}	=	7.85E-7 (mg/kg)/day	=	Ingestion exposure
SF	=	1.5 $(mg/kg/day)^{-1}$	=	Slope factor
CA	=	1.18E-6	=	Carcinogenic risk

Noncarcinogenic risks for this pathway are estimated based on procedures outlined in Section 4.1.4 of the report.

The non-cancer risk for a recreational child (0-5) from incidental ingestion of arsenic in Site 6 surface soil is estimated as follows:

$$NC = {IEX_{noncar-RC}}/{RfD}$$

where:

$IEX_{noncar\text{-}RC}$	=	7.83E-6 mg/kg/day	=	Ingestion exposure
RfD	=	3E-4 mg/kg	=	Reference dose
NC	=	2.61E-2	=	Noncarcinogenic risk

The non-cancer risk for a recreational youth (6-16) from incidental ingestion of arsenic in Site 6 surface soil is estimated as follows:

$$NC = {IEX_{noncar-RY}}/{RfD}$$

where:

$IEX_{noncar-RY}$	=	1.44E-6 mg/kg/day	=	Ingestion exposure
RfD	=	3E-4 mg/kg	=	Reference dose
NC	=	4.79E-3	=	Noncarcinogenic risk

Dermal Contact

Incidental surface soil dermal contact exposure for arsenic at Site 6 is estimated for a future recreational receptor from the following equation (EPA 1989d; EPA 1992c):

Cancer:

$$DEX_{car}(mg/kg)/day = \frac{CS * AF * ABS * EF * CF}{AT_{car}} * AGEADJ_{RC}$$
$$+ \frac{CS * AF * ABS * EF * CF}{AT_{car}} * AGEADJ_{RY}$$

Noncancer:

Recreational Child (age 0-5 years):

$$DEX_{car}(mg/kg)/day = \frac{CS * AF * ABS * EF * CF}{AT_{noncar-RC}} * AGEADJ_{RC}$$

Recreational Youth (age 6-16 years):

$$DEX_{car}(mg/kg)/day = \frac{CS * AF * ABS * EF * CF}{AT_{noncar-RY}} * AGEADJ_{RY}$$

where:

CS	=	9.88 mg/kg	=	Arsenic rep. conc. in surface soil at Site 1
AF	=	1.0 mg/cm^2	=	Soil-to-skin adherence factor
ABS	=	0.032	=	Fraction from contaminated source for arsenic
EF	=	24 days/yr	=	Exposure frequency

CF	=	1E-06 kg soil/mg soil	=	Conversion factor
BW	=	70 kg	=	Body weight
AT_{car}	=	25,550 days	=	Averaging time for carcinogens (365 days/yr x 70 yrs)
$AT_{noncar\text{-}RC}$	=	1,825 days	=	Averaging time, non-carcinogens (365 days/yr x 5 yrs)
$AT_{noncar\text{-}RY}$	=	4,015 days	=	Averaging time, non-carcinogens (365 days/yr x 11 yrs)
$ADEADJ_{RC}$	=	643.2 cm^2-yr/kg	=	Age adjusted, body weight normalized surface area
$ADEADJ_{RY}$	=	1136.4 cm^2-yr/kg	=	Age adjusted, body weight normalized surface area
DEX_{car}	=	5.29E-7 mg/kg/day	=	Carcinogenic dermal exposure
$DEX_{noncar\text{-}RC}$	=	2.67E-6 mg/kg/day	=	Noncarcinogenic dermal exposure
$DEX_{noncar\text{-}RY}$	=	2.15E-6 mg/kg/day	=	Noncarcinogenic dermal exposure

As discussed in Section 4.1.3 of the report, the potential receptors for this scenario include future recreational and residential receptors.

Carcinogenic risks for this pathway are estimated based on procedures outlined in Section 4.1.4 of the report.

The cancer risk for a recreational receptor from dermal contact with arsenic in Site 6 surface soil is estimated as follows:

$$CA = DEX_{car} * SF/GI$$

where:

DEX_{car}	=	5.29E-7 mg/kg/day	=	Dermal exposure
SF	=	1.5 $(mg/kg/day)^{-1}$	=	Slope factor
GI	=	0.95	=	Gastrointestinal absorption factor
CA	=	8.34E-7	=	Carcinogenic Risk

Noncarcinogenic risks for this pathway are estimated based on procedures outlined in Section 2.4.4 of the RI Report.

The non-cancer risk for a recreational child from dermal contact with arsenic in Site 6 surface soil is estimated as follows:

$$NC = {DEX_{noncar-RC}}/{RfD * GI}$$

where:

$DEX_{noncar-RC}$	=	2.67E-6 mg/kg/day	=	Dermal exposure
RfD	=	3E-4 mg/kg	=	Reference dose
GI	=	0.95	=	Gastrointestinal absorption factor
NC	=	9.38E-3	=	Noncarcinogenic risk

The non-cancer risk for a recreational youth from dermal contact with arsenic in Site 6 surface soil is estimated as follows:

$$NC = {DEX_{noncar-RY}}/{RfD * GI}$$

where:

$DEX_{noncar-RY}$	=	2.15E-6 mg/kg/day	=	Dermal exposure
RfD	=	3E-4 mg/kg	=	Reference dose
GI	=	0.95	=	Gastrointestinal absorption factor
NC	=	7.54E-3	=	Noncarcinogenic risk

APPENDIX E
SOIL BORING AND TEST PIT LOGS

SOIL BORING LOGS

BORING LOG

HALLIBURTON NL

PROJECT NAWC- WARMINSTER BORING NO. S6- SB01
PROJECT NO. CTO-252 /6883 DATE 4-12-96 DRILLER PAUL DAVIS
ELEVATION FIELD GEOLOGIST PAUL DAVIS
WATER LEVEL DATA
(DATE, TIME & CONDITIONS) FROM TR-12 (50, 240)

SAMPLE NO.	DEPTH FT.	BLOWS 6" N/A	SAMPLE RECOVERY LENGTH N/A	LITHOLOGY CHANGE	MATERIAL DESCRIPTION* SOIL DENSITY HARDNESS (N/A)	COLOR	MATERIAL CLASSIFICATION	USCS	REMARKS
						Dark Brown	Silty clay		
	1.0						(Top Soil)		NO HNU
						Light Brown	Silty clay		readings
	2.0								
	3.0								
	4.0								
						Reddish Brown	Silty clay		
	5.0								
	6.0					Light Brown	Fine grained sandy		
							silty clay with some		
	7.0						sandstone pebbles		
						Beige	sandstone (fine grained)		
	8.0					white	very fine grained sandy silt		
							-EOB-		

REMARKS 3"-diameter HAND AUGER
NO subsurface soil samples collected for analysis

S6-SB01
BORING

PAGE 1 OF

* See Legend on back

BORING LOG

HALLIBURTON NU

PROJECT NAWC- WARMINSTER
BORING NO. S6-SB02
PROJECT NO. CTO-252 / 6883
DATE 4-12-96
DRILLER PAUL DAVIS
ELEVATION
FIELD GEOLOGIST PAUL DAVIS
WATER LEVEL DATA
(DATE, TIME & CONDITIONS) From TR-12 (100, 240)

SAMPLE NO.	DEPTH FT.	BLOWS 6" N/A	SAMPLE RECOVERY LENGTH N/A	LITHOLOGY CHANGE	MATERIAL DESCRIPTION* SOIL DENSITY HARDNESS (N/A)	COLOR	MATERIAL CLASSIFICATION	USCS	REMARKS
						Dark Brown	Silty clay		NO HNU
	1.0						(TOP SOIL)		readings
						Brown	Silty clay (some concrete fragments)		
	2.0						some fill material:		
							pink insulation, wood		
	3.0						pieces, tinfoil, shoe		
							lace)		
	4.0								
	5.0								
	6.0								
	7.0								
	8.0					Grayish Maroon	weathered very fine grained		
							sand stone		
							- E O B -		

REMARKS 3"-diameter HAND AUGER
no subsurface soil samples collected for analysis

S6-SB02
BORING

PAGE 1 OF

* See Legend on back

BORING LOG

HALLIBURTON NL

PROJECT NAWC- WARMINSTER BORING NO. S6-SB03
PROJECT NO. CTO-252 / 6883 DATE 4-15-96 DRILLER PAUL DAVIS
ELEVATION FIELD GEOLOGIST PAUL DAVIS
WATER LEVEL DATA
(DATE, TIME & CONDITIONS) From TR-12 (230, 240)

SAMPLE NO.	DEPTH FT.	BLOWS 6" N/A	SAMPLE RECOVERY LENGTH N/A	LITHOLOGY CHANGE	MATERIAL DESCRIPTION* SOIL DENSITY HARDNESS (N/A)	COLOR	MATERIAL CLASSIFICATION	USCS	REMARKS
						Brown	Silty Clay		
	1.0						(TOP Soil)		
						Reddish Brown	very fine grained Sandy		Hnu: 0.8 ppm
	2.0						Silty Clay		
							↓		NO Hnu
	3.0					Brown	Sandy Silty Clay		readings
						Reddish-	very fine grained		
	4.0					Brown	Sandy Silty Clay		
	5.0								
	6.0								
	7.0								
	8.0								
	9.0						↓		
						Brown	Sandy Clay		↓
	10.0						Blocky - Sandstone		
							- EOB -		

REMARKS 3"-diameter HAND AUGER
collected S6-SB03-09 for analysis

S6-SB03
BORING

PAGE 1 OF

* See Legend on back

BORING LOG

HALLIBURTON NU

PROJECT NAWC- WARMINSTER
BORING NO. SE-SB04
PROJECT NO. CTO-252 / 6883
DATE 4-15-96
DRILLER PAUL DAVIS
ELEVATION
FIELD GEOLOGIST PAUL DAVIS
WATER LEVEL DATA
(DATE, TIME & CONDITIONS) FROM TR-6B (250 160)

SAMPLE NO.	DEPTH FT.	BLOWS 6" N/A	SAMPLE RECOVERY LENGTH N/A	LITHOLOGY CHANGE	MATERIAL DESCRIPTION* SOIL DENSITY HARDNESS (N/A)	COLOR	MATERIAL CLASSIFICATION	USCS	REMARKS
						Brown	Silty fine grained		NO HNU
	1.0						Sand with some pebbles		readings
							(Plastic sheeting & metal		
	2.0						Springs)		
							↓		
	3.0					reddish Brown	Sandy silty clay		
						Brown	Silty fine grained		
	4.0						Sand with some clay		
							↓		↓
	5.0								
	6.0						↓		
						grayish maroon	Sandstone		
	7.0								↓
							-EOB-		

REMARKS 3"-diameter HAND AUGER
collected SE-SB04-06 for chemical analysis

SE-SB04
BORING

PAGE 1 OF

* See Legend on back

BORING LOG

HALLIBURTON NL

PROJECT NAWC- WARMINSTER BORING NO. 56-SB05
PROJECT NO. CTO-252 / 6883 DATE 4-15-96 DRILLER PAUL DAVIS
ELEVATION FIELD GEOLOGIST PAUL DAVIS
WATER LEVEL DATA
(DATE, TIME & CONDITIONS) From TR-6C (350, 100)

SAMPLE NO.	DEPTH FT.	BLOWS 6" N/A	SAMPLE RECOVERY LENGTH N/A	LITHOLOGY CHANGE	MATERIAL DESCRIPTION* SOIL DENSITY HARDNESS (N/A)	COLOR	MATERIAL CLASSIFICATION	USCS	REMARKS
						Brown	Silty Clay (Top Soil)		NO HNU
	1.0					Brown	Silty Clay with		readings
							(1) metal ring-pulley		
	2.0								
	3.0								
	4.0					Dark red-brown	Silty Clay		
							Sandstone		
							-EOB-		

REMARKS 3"-diameter HAND AUGER
NO Subsurface soil samples were collected for analysis.

56-SB05
BORING

PAGE 1 OF

* See Legend on back

BORING LOG

HALLIBURTON NL

PROJECT NAWC- WARMINSTER

BORING NO. S6 - SB06

PROJECT NO. CTO-252 / 6883

DATE 4-15-96

DRILLER PAUL DAVIS

ELEVATION

FIELD GEOLOGIST PAUL DAVIS

WATER LEVEL DATA

(DATE, TIME & CONDITIONS) From TR-6C (220, 105)

SAMPLE NO.	DEPTH FT.	BLOWS 6" N/A	SAMPLE RECOVERY LENGTH N/A	LITHOLOGY CHANGE	MATERIAL DESCRIPTION* SOIL DENSITY HARDNESS (N/A)	COLOR	MATERIAL CLASSIFICATION	USCS	REMARKS
						Brown	Silty clay (Top Soil)		NO Hnu
	1.0						↓		readings
						light Brown	Silty clay (some pebbles)		
	2.0					Brown	Silty clay		
							↓		
	3.0								
							↓		
	4.0					reddish Brown	Silty clay - Sandstone frags		
						Gray	Sandstone		↓
							EOB		

REMARKS 3"-diameter HAND AUGER
NO subsurface soil samples were collected for chemical analysis

S6-SB06
BORING

PAGE 1 OF

* See Legend on Back

BORING LOG

HALLIBURTON NU

PROJECT NAWC- WARMINSTER
BORING NO. SB-SB07
PROJECT NO. CTO-252 /6883
DATE 4-15-96
DRILLER PAUL DAVIS
ELEVATION
FIELD GEOLOGIST PAUL DAVIS
WATER LEVEL DATA
(DATE, TIME & CONDITIONS) From TR-11 (150, 110)

SAMPLE NO.	DEPTH FT.	BLOWS 6" N/A	SAMPLE RECOVERY LENGTH N/A	LITHOLOGY CHANGE	MATERIAL DESCRIPTION* SOIL DENSITY HARDNESS (N/A)	COLOR	MATERIAL CLASSIFICATION	USCS	REMARKS
						Reddish Brown	Silty clay		
	1.0						↓		
							(black asphalt layer)		Hnu= 0.8 ppm
	2.0						↓		
						Brown	Silty clay		NO Hnu
	3.0						↓		readings
									↓
	4.0								
							↓		
	5.0					Reddish Brown	Silty clay		
							siltstone		↓
	6.0						— EOB —		

REMARKS 3"-diameter HAND AUGER
NO subsurface soil samples were collected for analysis

SB-SB07
BORING

PAGE 1 OF

* See Legend on back

BORING LOG

HALLIBURTON NU

PROJECT NAWC- WARMINSTER
BORING NO. S6-SB08
PROJECT NO. CTO-252 / 6883
DATE 4-15-96
DRILLER PAUL DAVIS
ELEVATION
FIELD GEOLOGIST PAUL DAVIS
WATER LEVEL DATA
(DATE, TIME & CONDITIONS) From TR-11 (100, 110)

SAMPLE NO.	DEPTH FT.	BLOWS 6" N/A	SAMPLE RECOVERY LENGTH N/A	LITHOLOGY CHANGE	MATERIAL DESCRIPTION* SOIL DENSITY HARDNESS (N/A)	COLOR	MATERIAL CLASSIFICATION	USCS	REMARKS
						Reddish Brown	Silty clay (Top Soil)		NO HNU
	1.0					Brown	Silty clay		readings
							Some asphalt chunks		
	2.0						and concrete		
	3.0								
						Dark reddish Brown	- Silty clay - Some		
	4.0						Sandstone and Silt-		
							stone angular pebbles		
	5.0								
	6.0								
	7.0								
						Maroon	Siltstone Bedrock		
							-EOB-		

REMARKS 3"-diameter HAND AUGER
NO Samples were collected for chemical analysis

S6-SB08
BORING

PAGE 1 OF

* See Legend on back

BORING LOG

HALLIBURTON NL

PROJECT NAWC- WARMINSTER BORING NO. S6-SB09
PROJECT NO. CTO-252 / 6883 DATE 4-15-96 DRILLER PAUL DAVIS
ELEVATION FIELD GEOLOGIST PAUL DAVIS
WATER LEVEL DATA
(DATE, TIME & CONDITIONS) From TR-6D (190, 20)

SAMPLE NO.	DEPTH FT.	BLOWS 6" N/A	SAMPLE RECOVERY LENGTH N/A	LITHOLOGY CHANGE	MATERIAL DESCRIPTION* SOIL DENSITY HARDNESS (N/A)	COLOR	MATERIAL CLASSIFICATION	USCS	REMARKS
						Brown	Silty clay (TOP Soil)		No HNU
	1.0								readings
	2.0					light Brown	Silty clay		
	3.0								
						maroon	Fine grained Sandy Silty Clay		
	4.0					Light Brown	Silty clay		
	5.0								
	6.0								
	7.0					Grayish Brown	Siltstone		
							-EOB-		

REMARKS 3"-diameter HAND AUGER
collected S6-SB09-02 for chemical analysis; taken as a Surface Soil Sample

S6-SB09
BORING

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BORING LOG

HALLIBURTON NL

PROJECT NAWC- WARMINSTER
BORING NO. S6-SB10
PROJECT NO. CTO-252 / 6883
DATE 4-15-96
DRILLER PAUL DAVIS
ELEVATION
FIELD GEOLOGIST PAUL DAVIS
WATER LEVEL DATA
(DATE, TIME & CONDITIONS) From TR-13 (200 00)

SAMPLE NO.	DEPTH FT.	BLOWS 6" N/A	SAMPLE RECOVERY LENGTH N/A	LITHOLOGY CHANGE	MATERIAL DESCRIPTION* SOIL DENSITY HARDNESS (N/A)	COLOR	MATERIAL CLASSIFICATION	USCS	REMARKS
						Grayish Brown	silty clay		NO HNU
	1.0								readings
						light Brown	silty clay		
	2.0						↓		
	3.0					Grayish Brown	silty clay		
							↓		
	4.0								
							↓		
	5.0					reddish Brown	silty clay		
						reddish Brown	Sandstone/siltstone		
							-EOB-		

REMARKS 3"-diameter HAND AUGER
collected S6-SB10-05 for chemical analysis

S6-SB10-
BORING

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BORING LOG

HALLIBURTON NL

PROJECT NAWC- WARMINSTER

BORING NO. S6-SB11

PROJECT NO. CTO-252 / 6883

DATE 4-17-96

DRILLER PAUL DAVIS

ELEVATION

FIELD GEOLOGIST PAUL DAVIS

WATER LEVEL DATA

(DATE, TIME & CONDITIONS) From TR-13 (100, 00)

SAMPLE NO.	DEPTH FT.	BLOWS 6" N/A	SAMPLE RECOVERY LENGTH N/A	LITHOLOGY CHANGE	MATERIAL DESCRIPTION* SOIL DENSITY HARDNESS (N/A)	COLOR	MATERIAL CLASSIFICATION	USCS	REMARKS
						Grayish Brown	Silty Clay		NO HNO
	1.0						↓		readings
						light Brown	Silty Clay		
	2.0						↓		
						Brown	Sandy Clay with		
	3.0						Some siltstone pebbles		
							↓		
	4.0								
						reddish Brown	Sandy silt-w/ sandstone		
	5.0						siltstone pebbles		
							-EOB-		

REMARKS 3"-diameter HAND AUGER
NO Subsurface Soil samples collected for analysis

S6-SB11
BORING

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* See Legend on back

BORING LOG

HALLIBURTON NU

PROJECT NAWC- WARMINSTER
BORING NO. S6-SB12
PROJECT NO. CTO-252 / 6883
DATE 4-17-96
DRILLER PAUL DAVIS
ELEVATION
FIELD GEOLOGIST PAUL DAVIS
WATER LEVEL DATA
(DATE, TIME & CONDITIONS) From TR-6E (240 90)

SAMPLE NO.	DEPTH FT.	BLOWS 6" N/A	SAMPLE RECOVERY LENGTH N/A	LITHOLOGY CHANGE	MATERIAL DESCRIPTION* SOIL DENSITY HARDNESS (N/A)	COLOR	MATERIAL CLASSIFICATION	USCS	REMARKS
						brown	Silty clay		no HNU
	1.0					dark	↓		readings
						reddish brown	Silty clay (some fill mtrl. bricks, net, wire)		↓
	2.0					light brown	Clayey silt - black cinders		
							and asphalt.		
	3.0					light brown	clayey silt		
							↓		
	4.0						(concrete/asphalt)		↓
							Auger refusal		

REMARKS 3"-diameter HAND AUGER
collected S6-SB12-02 for chemical analysis

S6-SB12
BORING

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BORING LOG

HALLIBURTON NL

PROJECT NAWC- WARMINSTER
BORING NO. S6-SB13
PROJECT NO. CTO-252 /6883
DATE 4-17-96
DRILLER PAUL DAVIS
ELEVATION
FIELD GEOLOGIST PAUL DAVIS
WATER LEVEL DATA
(DATE, TIME & CONDITIONS) Background Soil Boring

SAMPLE NO.	DEPTH FT.	BLOWS 6" N/A	SAMPLE RECOVERY LENGTH N/A	LITHOLOGY CHANGE	MATERIAL DESCRIPTION* SOIL DENSITY HARDNESS (N/A)	COLOR	MATERIAL CLASSIFICATION	USCS	REMARKS
						Dark Brown	Silty Clay (TOP Soil)		NO HNU
	1.0					light Brown	Clayey Silt		readings
						dk. reddish Brown	Clayey Silt w/siltstone pebbles		
	2.0					Brown	Clayey Silt		
							↓		
	3.0					light Brown	Clayey Silt		
							↓		
	4.0								
	5.0								
						Maroon	Siltstone/Sandstone		↓
							-EOB-		

REMARKS 3"-diameter HAND AUGER
collected S6-SB13-05 for chemical analysis

S6-SB13
BORING

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Note: Boring log numbers 14 and 15 not used.

BORING LOG

BROWN AND ROOT ENVIRONMENTAL
A Division of Halliburton NUS

PROJECT Vermintsler
PROJECT NO. 6883
ELEVATION
WATER LEVEL DATA
(DATE, TIME & CONDITIONS)

BORING NO. SB-16
DATE 2-24-97
DRILLER
FIELD GEOLOGIST D. Whalen

SAMPLE NO.	DEPTH (FT.)	BLOWS 6"	SAMPLE REC. LENGTH	LITHO. CHANGE	MATERIAL DESCRIPTION* SOIL DENSITY HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS	REMARKS
S-1		1 / 3				dark Brn	clayey silt topsoil		damp 0 ppm
@ 1515	18/24	4 / 3	2			Brn	clayey silt		damp
S-2		3 / 4				Brn mottled	silty clay		0 ppm damp
@ 1520	22/24	5 / 8	4			Brn	sandy silt w/ pieces of weathered silty sandstone		0 ppm
S-3		11 / 12							
@ 1525	18/24	11 / 12	6			red Brn	weathered silty sandstone		damp 0 ppm
S-4		9 / 15				red Brn	clayey silt w/ weathered sandy siltystone		damp 0 ppm
@ 1530	18/24	27 / 21	8			red gray	silty sandstone		dry

REMARKS Sample SB-SB-16[04] collected at 1535
Brn sandy silt / silty clay
from 3.5-4'

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BORING LOG

BROWN AND ROOT ENVIRONMENTAL
A Division of Halliburton NUS

PROJECT Warminster
PROJECT NO. 6883
ELEVATION
WATER LEVEL DATA
(DATE. TIME & CONDITIONS)

BORING NO. SB-17
DATE 2-24-97
DRILLER Raab
FIELD GEOLOGIST D. Whalen

SAMPLE NO.	DEPTH (FT.)	BLOWS 6"	SAMPLE REC. LENGTH	LITHO. CHANGE	MATERIAL DESCRIPTION* SOIL DENSITY HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS	REMARKS
S-1		2 / 4				Brn	clayey silt topsoil		damp 0 ppm
@ 1545	2	5 / 7	14/24			Brn	clayey sandy silt fill piece of weathered tan ss in shoe		damp
S-2		6 / 34				Brn	clay/silt/sand fill		damp
@ 1550	4	9 / 50+				gray	concrete		0 ppm
				T.D.					

REMARKS location is 10' N of SB-16

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BORING LOG

BROWN AND ROOT ENVIRONMENTAL
A Division of Halliburton NUS

PROJECT Warminster
PROJECT NO. 6883
ELEVATION
WATER LEVEL DATA
(DATE, TIME & CONDITIONS)

BORING NO. SB-18
DATE 2-24-97
DRILLER Raab
FIELD GEOLOGIST D. Whalen

SAMPLE NO.	DEPTH (FT.)	BLOWS 6"	SAMPLE REC. LENGTH	LITHO. CHANGE	MATERIAL DESCRIPTION* SOIL DENSITY HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS	REMARKS
S-1		2 / 2				Brn	clayey silt		0 ppm
@ 1600	2	7 / 8	20/24			Black	Sand/silt/clay Fill Piece of asphalt		damp 0 ppm
S-2		7 / 7				Brn/ tan/ red-Brn	clay/silt/sand Fill		damp 0 ppm
@ 1608	4	11 / 10	15/24				piece of weathered asphalt piece of concrete		damp
S-3		6 / 2				red	soft clay material sludge-like		moist ~~damp~~ to wet
@ 1628	6	2 / 2	22/24						0 ppm
S-4		1/2 / 1/2							
@ 1632	8	2 / 14	14/24			gray-Brn	silty clay		damp 0 ppm
S-5 @ 1647	9	21 / 35 / 25				Brn-gray	weathered sandstone		damp

REMARKS 1640 sample SG-SB-1805 collected of red sludge

1655 sample SG-SB-1807 collected Gray-Brn silty clay

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BORING LOG

BROWN AND ROOT ENVIRONMENTAL
A Division of Halliburton NUS

PROJECT Warminster
PROJECT NO. 6883
ELEVATION
WATER LEVEL DATA
(DATE, TIME & CONDITIONS)

BORING NO. SB-19 110/150
DATE 2-25-96
DRILLER Raab
FIELD GEOLOGIST D. Whalen

SAMPLE NO.	DEPTH (FT.)	BLOWS 6"	SAMPLE REC. LENGTH	LITHO. CHANGE	MATERIAL DESCRIPTION* SOIL DENSITY HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS	REMARKS
S-1 @ 1013	1	3 / 6	24/24			red Brn	clayey silt topsoil		damp
	2	11 / 11				Brn	silty clay fill pieces of asphalt		damp
S-2		11 / 6				Brn	silty clay fill		damp
@ 1018	4	6 / 4	15/24			red	clay sludge material		moist
S-3		3 / 3				Brn	clayey silt		damp
@ 1022	6	5 / 12	18/24			red Brn	sandy silt weathered arkosic sandstone		damp
S-4		16 / 16				gray	silty sand/sandy silt		
@ 1026	8	12 / 9	18/24			Brn	w/ some weathered SS pieces		
S-5		11 / 24							
@ 1033	10	22 / 39	12/24	11=112ft		gray Brn	weathered FGR arkosic SS		

REMARKS 1030 sample SG-SB-1004 collected: red sludge

1040 sample SG-SB-1006 collected from 6' gray Brown sandy silt

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BROWN AND ROOT ENVIRONMENTAL
A Division of Halliburton NUS

PROJECT Warminster
PROJECT NO. 6883
ELEVATION
WATER LEVEL DATA
(DATE, TIME & CONDITIONS)

BORING NO. SB-20
DATE 2-25-97
DRILLER Raab
FIELD GEOLOGIST D. Whalen

TFII 110/230

SAMPLE NO.	DEPTH (FT.)	BLOWS 6"	SAMPLE REC. LENGTH	LITHO. CHANGE	MATERIAL DESCRIPTION* SOIL DENSITY HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS	REMARKS
S-1 @ 1208	2	2 / 6 / 6 / 6	22/24			Brn	sandy clayey silt Fill		damp
							aa		0 ppm
S-2 @ 1212	4	7 / 6 / 6 / 3	12/24			red	clay concrete pieces, glass fragments		damp
							piece of red brick or in the shape terra cotta		0 ppm
S-4 @ 1216	6	2 / 7 / 6 / 9	22/24			Brn	silt		moist
						Brn	silty sand		damp 0 ppm
S-5 @ 1236	8	7 / 7 / 9 / 13	24/24			gray-Brn	silty sand / sandy silt some weathered FGR SS		damp/moist 0 ppm
S-6 @ 1243	10	8 / 9 / 9 / 11				Brn	silty sand		0 ppm damp
						Brn and gray	clay w/ flecks of purple VFGR SS		damp 0 ppm
S-7 @ 1250	12	8 / 8 / 8 / 44				yellow gray to rust tan	clay / weathered siltstone		0 ppm
							FGR SS		damp 0 ppm

REMARKS 1222 sample SG-SB-2005 collected from 5' below debris layer; Brn silt to silty sand

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BROWN AND ROOT ENVIRONMENTAL
A Division of Halliburton NUS

PROJECT Warminster
PROJECT NO. 6883
ELEVATION
WATER LEVEL DATA
(DATE, TIME & CONDITIONS)

BORING NO. SB-21 TRU 110/270
DATE 2-25-97
DRILLER Raab
FIELD GEOLOGIST D. Whalen

SAMPLE NO.	DEPTH (FT.)	BLOWS 6"	SAMPLE REC. LENGTH	LITHO. CHANGE	MATERIAL DESCRIPTION* SOIL DENSITY HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS	REMARKS
S-1		2 / 3				Brn	clayey silt topsoil		damp 0ppm
@	2	6 / 6	24/24			Brn	clayey silt/silty clay fill		damp 0ppm
S-2		4 / 4				red-black	clay trace rotto fragments		damp 0ppm
@	4	6 / 5	16/24						0ppm
S-3		4 / 5				Brn	silt to sandy silt		damp
@	6	9 / 10	24/24			Brn	sandy silt/silty sand		0ppm damp
S-4		6 / 8				Brn	clay/weathered siltstone		0ppm damp
@	8	9 / 7	20/24			gray			0ppm
S-5 @		10 / 9				Bra-gray to red tan tan	weathered siltstone		0ppm damp
M18	10	8 / 9	20/24				weathered FGL SS		0ppm
S-6		21 / 26				tan	weathered FGL SS		0ppm
@		40		refusal		l. brown			

REMARKS 1415 Sample SB-SB-2164 collected from 4' red-black to red-Brn clay

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BROWN AND ROOT ENVIRONMENTAL
A Division of Halliburton NUS

PROJECT Warminster
PROJECT NO. 6883
ELEVATION
WATER LEVEL DATA
(DATE, TIME & CONDITIONS)

BORING NO. SB-22 TPM 110/310
DATE 2-25-98
DRILLER Raab
FIELD GEOLOGIST D. Whalen

SAMPLE NO.	DEPTH (FT.)	BLOWS 6"	SAMPLE REC. LENGTH	LITHO. CHANGE	MATERIAL DESCRIPTION* SOIL DENSITY HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS	REMARKS
S-1 @ 1500	1	3 / 3	24/24			Brn	clayey silt/silty clay		damp 0ppm
	2	2 / 2				Brn	aa		
S-2 @ 1505	4	2 / 2	20/24			Brn	clayey silt		0ppm
		4 / 6				mod Brn	silty clay		damp
S-3 @ 1508	6	17 / 11	18/24			Brn-Gray	weathered SS		damp 0ppm
		6 / 8				Brn gray	clay/weathered siltstone		damp 0ppm
S-3 @ 1515	7	10 / 9				Brn-tan	weathered siltstone		damp 0ppm
		45		11=11=11		Brn	VFGR sandstone		

REMARKS 1520 sample SB-SB-2204 collected from 4' Brn silty clay

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BORING LOG

BROWN AND ROOT ENVIRONMENTAL
A Division of Halliburton NUS

PROJECT Warminster
PROJECT NO. 6883
ELEVATION
WATER LEVEL DATA
(DATE. TIME & CONDITIONS)

BORING NO. SB-23
DATE 2-25-97
DRILLER Raab
FIELD GEOLOGIST D. Whalen

TH11 110/310 5' South

SAMPLE NO.	DEPTH (FT.)	BLOWS 6"	SAMPLE REC. LENGTH	LITHO. CHANGE	MATERIAL DESCRIPTION* SOIL DENSITY HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS	REMARKS
S-1		2 / 3				Brn	clayey silt		damp
@ 1525	2	3 / 3	24/24			Brn	aa ss fragment		0 ppm damp
S-2		4 / 5				Brn	clayey silt		damp
@ 1528	4	5 / 7	22/24			Brn	silty clay		0 ppm
S-3		6 / 5				Brn Brn	silty clay silty sand		damp
@ 1532	6	7 / 15				gray and tan	clay / weathered siltstone		damp
S-4		50+		WEIRD		very poo	weathered sandstone		
@ 1538									

REMARKS 1540 Sample SB-SB-2303 collected
Brn clayey silt

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BORING LOG

BROWN AND ROOT ENVIRONMENTAL
A Division of Halliburton NUS

PROJECT Warminster
PROJECT NO. 6883
ELEVATION
WATER LEVEL DATA
(DATE, TIME & CONDITIONS)

BORING NO. SB-24 TR11 110/310 5' west
DATE 2-25-97
DRILLER Raab
FIELD GEOLOGIST D. Whalen

SAMPLE NO.	DEPTH (FT.)	BLOWS 6"	SAMPLE REC. LENGTH	LITHO. CHANGE	MATERIAL DESCRIPTION* SOIL DENSITY HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS	REMARKS
S-1		2 / 2				Brn	silty clay		damp 0 ppm
@ 1552	2	2 / 3				red ~~red~~ Brn	clay silty sand		moist
S-2		3 / 3				Brn	clayly silt		damp 0 ppm
@ 1555	4	5 / 6				Brn	Sandy silt		0 ppm damp
S-3 @ 1559	6	6 / 6				Brn			
		7 / 12				Brn-gray	clay / weathered siltstone		damp
S-4 @ 1604	8	11 / 12					aa		damp
		12 / 28				tan	weathered sandstone		0 ppm

REMARKS no sample taken

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BORING LOG

BROWN AND ROOT ENVIRONMENTAL
A Division of Halliburton NUS

PROJECT Warminster
PROJECT NO. 6883
ELEVATION
WATER LEVEL DATA
(DATE, TIME & CONDITIONS)

BORING NO. SB-25
DATE 2-25-97
DRILLER Raab
FIELD GEOLOGIST D. Whalen

TR 11 110/310
15' west

SAMPLE NO.	DEPTH (FT.)	BLOWS 6"	SAMPLE REC. LENGTH	LITHO. CHANGE	MATERIAL DESCRIPTION* SOIL DENSITY HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS	REMARKS
S-1		1 / 3				Brn	clayey silt		damp
@ 1625	2	2 / 3	22/24			Dark red / Brn	clay / clayey silt		offm / damp
S-2		2 / 3				Brn	clayey silt		damp
@ 1628	4	3 / 4	16/24			Brn	clayey silt		offm / damp
S-3		4 / 6				Brn	clayey silt		damp
@ 1633	6	8 / 6	24/24			Brn	sandy silt / silty sand		
S-4		6 / 9				Gray/brn	clay/weathered siltstone		damp
@ 1638	8	11 / 27				Gray/tan / tan	weathered siltstone / FGR sandstone		

REMARKS 1640 Sample SB-SB-2504 collected from 4' Brn clayey silt

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BORING LOG

BROWN AND ROOT ENVIRONMENTAL
A Division of Halliburton NUS

PROJECT Warminster
PROJECT NO. 6883
ELEVATION
WATER LEVEL DATA
(DATE, TIME & CONDITIONS)

BORING NO. SB 26 ~160 fr 285
3' towards center of trench
DATE 2-26-95
DRILLER
FIELD GEOLOGIST

SAMPLE NO.	DEPTH (FT.)	BLOWS 6"	SAMPLE REC. LENGTH	LITHO. CHANGE	MATERIAL DESCRIPTION* SOIL DENSITY HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS	REMARKS
S-1		1 / 2				Brn	clayey silt Fill		damp
@ 1043	2	2 / 3	16/24			Brn	clayey silt		damp
S-2		2 / 3				red Brn	(sandy) clayey silt a few pieces of weathered sandstone		damp
@ 1046	4	4 / 4	16/24			red Brn	aa		damp
S-3		8 / 27				Brn to	silty sand and weathered sandstone		damp
@ 1052	6	35	18/24	U=1=11		Gray Brn	FGR arkosic sandstone		dry to damp

REMARKS 1055 sample S6-SB-2603 collected from 3' (midpoint) red Brn clayey silt

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BORING LOG

BROWN AND ROOT ENVIRONMENTAL
A Division of Halliburton NUS

PROJECT Warminster
PROJECT NO. 6883
ELEVATION
WATER LEVEL DATA
(DATE, TIME & CONDITIONS)

BORING NO. SB-27 180/380
DATE 2-26-97
DRILLER Raab
FIELD GEOLOGIST D. Whalen

SAMPLE NO.	DEPTH (FT.)	BLOWS 6"	SAMPLE REC. LENGTH	LITHO. CHANGE	MATERIAL DESCRIPTION* SOIL DENSITY HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS	REMARKS
S-1		1 / 2				Brn	clayey silt		damp
@ 1122	2	2 / 3	18/24			Brn	silty sand / sandy silt Fill		damp
S-2		2 / 2				Brn and gray	fragments of weathered siltstone and sandstone		damp 0ppm
@ 1125	4	2 / 2	14/24				in clay/silt/sand Fill		------
S-3		1 / 2				Brn/			0ppm
@ 1127	6	2 / 2	12/24			rd Brn/ gray	mix of sand, clay, rock fragments Fill		damp
S-4		1 / 2				Brn/ rd Brn/	clayey silt/sand w/		0ppm damp
@ 1130	8	3 / 4	18/24			tan	rock fragments - siltstone and sandstone		
S-5		7 / 7				Brn tan	silty clay weathered sandstone		
@ 1136	10	14 / 16	24/24			gray	siltstone, weathered		0ppm
S-6 @ 1142		16 / 35+				gray	siltstone		damp
									—

REMARKS
1125 sample S6-SB-2702 collected at 2'
1200 sample S6-SB-2705 collected at 5'
no waste found

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BORING LOG

BROWN AND ROOT ENVIRONMENTAL
A Division of Halliburton NUS

PROJECT Warminster
PROJECT NO. 6883
ELEVATION
WATER LEVEL DATA
(DATE, TIME & CONDITIONS)

BORING NO. SB-28
DATE 2-26-97
DRILLER Raab
FIELD GEOLOGIST D. Whalla

220/380

SAMPLE NO.	DEPTH (FT.)	BLOWS 6"	SAMPLE REC. LENGTH	LITHO. CHANGE	MATERIAL DESCRIPTION* SOIL DENSITY HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS	REMARKS
S-1 @ 1258	2	5 / 3	22/24			Brn / mld Brn	clayly silt topsoil / silty clay		damp / opfm
		2 / 4					aa		opfm
S-2 @ 1302	4	5 / 7	24/24			Brn to vld Brn	aa / sandy clayly silt		damp / opfm
		12 / 12					sandy silt/silty sand / silty sand		damp
S-3 @ 1307	6	43 / 26				Brn	weathered sandstone		
		15 / 22				gray Brn	weathered sandstone		opfm / damp

REMARKS
1305 Sample SG-SB-2802 collected
1315 sample SG-SB-2804 collected
no waste found

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BORING LOG

BROWN AND ROOT ENVIRONMENTAL
A Division of Halliburton NUS

PROJECT Warminster
PROJECT NO. 6883
ELEVATION
WATER LEVEL DATA
(DATE, TIME & CONDITIONS)

BORING NO. SB-29
DATE 2-26-97
DRILLER Raab
FIELD GEOLOGIST D. Whalen

SAMPLE NO.	DEPTH (FT.)	BLOWS 6"	SAMPLE REC. LENGTH	LITHO. CHANGE	MATERIAL DESCRIPTION* SOIL DENSITY HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS	REMARKS
S-1 @		2 / 2				Brn	clayey silt aa		damp 0 ppm
1324	2	4 / 1	14/24			Brn	aa		
S-2		3 / 4				tan Brn	weathered SS frag clayey silt		damp 0 ppm
@ 1327	4	4 / 5	16/24			medium Brn	silty clay		damp 0 ppm
S-3		4 / 7				red Brn	clayey silt/silty clay		damp 0 ppm
@ 1330	6	7 / 11	24/24			Brn Brn	silty sand clay		damp
S-4		12 / 50+				tan	weathered CGR sandstone		
@ 1333	8								
									—

REMARKS
1340 sample SS-SB-2903 collected
Brn clayey silt/silty clay
no waste found

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BROWN AND ROOT ENVIRONMENTAL
A Division of Halliburton NUS

PROJECT NAWC Warminster
PROJECT NO. 6883
ELEVATION
WATER LEVEL DATA
(DATE, TIME & CONDITIONS)

BORING NO. SB-30
DATE 2-26-97
DRILLER Raab
FIELD GEOLOGIST D. Whalen

SAMPLE NO.	DEPTH (FT.)	BLOWS 6"	SAMPLE REC. LENGTH	LITHO. CHANGE	MATERIAL DESCRIPTION* SOIL DENSITY HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS	REMARKS
S-1		1 / 1				Brn	clayey silt		damp 0 ppm
@ 1350	2	4 / 4	18/24			Brn	clayey silt/silty clay		damp 0 ppm
S-2		5 / 8				lt. Brn tan	Fine-med. gr. sand/ weathered sandstone		damp 0 ppm
@ 1353	4	8 / 9	18/24				aa		----
S-3		15 / 14				Brn	silty sand		damp 0 ppm
@ 1358	6	15 / 30	24/24			tan	weathered F-mgr sandst		

REMARKS 1400 sample SG-SB-3003 collected F-mgr sand
1405 sample SG-SS-~~30~~ 105 collected Brn clayey silt
no waste found

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BORING LOG

BROWN AND ROOT ENVIRONMENTAL
A Division of Halliburton NUS

PROJECT NAWC Warminster
PROJECT NO. 6883
ELEVATION
WATER LEVEL DATA
(DATE, TIME & CONDITIONS)

BORING NO. SB-31
DATE 2-26-97
DRILLER Raab
FIELD GEOLOGIST D. Whalen

SAMPLE NO.	DEPTH (FT.)	BLOWS 6"	SAMPLE REC. LENGTH	LITHO. CHANGE	MATERIAL DESCRIPTION* SOIL DENSITY HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS	REMARKS
S-1		2 / 5				medium brn	clayey silt / silty clay		damp open
@ 1420	2	6 / 4	15/24			Dark Blk	charred debris, glass		
S-2		5 / 10							
@ 1422	4	10 / 6	2/24				?		Insufficient Recovery
S-3		3 / 4							
@ 1424	6	3 / 4	2/24				?		
S-4		3 / 3							
@ 1427	8	4 / 20	12/24			Brn	clayey silt		
									—

REMARKS

Change 2 spoons

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BORING LOG

BROWN AND ROOT ENVIRONMENTAL
A Division of Halliburton NUS

PROJECT NAWC Warminster
PROJECT NO. 6883
ELEVATION
WATER LEVEL DATA
(DATE, TIME & CONDITIONS)

BORING NO. SB-31a
DATE 2-26-97
DRILLER Raab
FIELD GEOLOGIST

SAMPLE NO.	DEPTH (FT.)	BLOWS 6"	SAMPLE REC. LENGTH	LITHO. CHANGE	MATERIAL DESCRIPTION: SOIL DENSITY HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS	REMARKS
S-1		3 / 7				Brn	silty clay / clayey silt		damp odor
@ 1442	2	3 / 4	18/24			Brn-Black	charred material in fill		damp
S-2		3 / 4				Brn / Brn-	clayey silt fill		odor / damp
@ 1445	4	3 / 4	20/24			red Brn	clay/silt/sand/root fragments Fill		----
S-3		2 / 1				Brn	clayey silt - some rotted wood and plant matter		damp
@ 1448	6	3 / 4					ca		
S-4		3 / 11				Brn	silty clay, clayey silt		damp
@ 1450	8	9 / 6	20/24			rusty Brn / Brn	piece of sandstone / clayey silt		damp
S-5		7 / 10				Brn	silty clay		
@ 1506	10	14 / 25				Brn / l. Brn	sandy clay / weathered FGR sandstone		damp

REMARKS 1509 Sample SG-SB-3105
clayey silt

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BORING LOG

BROWN AND ROOT ENVIRONMENTAL
A Division of Halliburton NUS

PROJECT NAWC Warminster
PROJECT NO. 6883
ELEVATION
WATER LEVEL DATA
(DATE. TIME & CONDITIONS)

BORING NO. SB-32 TR 6D
DATE 2-26-97
DRILLER Roob
FIELD GEOLOGIST D. Whalen

SAMPLE NO.	DEPTH (FT.)	BLOWS 6"	SAMPLE REC. LENGTH	LITHO. CHANGE	MATERIAL DESCRIPTION: SOIL DENSITY HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS	REMARKS
S-1		2 / 2				Brn	clayly silt		damp 0 ppm
@ 1525	2	2 / 3	16/24			Brn	small piece of concrete sandy clayly silt		damp
S-2		2 / 2				Brn	clayly silt		wet
@ 1528	4	3 / 3	22/24				loose material - rocks concrete fragments in Brn silt		0 ppm wet
S-3		8 / 4					aa		wet
@ 1529	6	2 / 4	19/24			Brn	silty clay fill		damp/moist 0 ppm
S-4		4 / 3				lt. ppm gray	clay		damp
@ 1531	8	3 / 3	20/24			Dk-gray	clay w/ black organic remains		damp 0 ppm
S-5		1 / 2				lt. Brn.	silty clay		damp/moist
@ 1552	10	3 / 4					aa		
S-6		2 / 4				Brn	silt to clayly silt		damp
@ 1556	12	7 / 7					aa		
S-7		13 / 12				lt. Brn	FGR sand, silty		damp/moist
@ 1606	14	14 / 23				Dark red	weathered siltstone		—

REMARKS 1615 sample SG-SB-3211 collected from 11' Brn silt

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BROWN AND ROOT ENVIRONMENTAL
A Division of Halliburton NUS

PROJECT
PROJECT NO. 6883
ELEVATION
WATER LEVEL DATA
(DATE, TIME & CONDITIONS)

BORING NO. SB-33 TR13
DATE 3/11/97
DRILLER
FIELD GEOLOGIST D. Whalen

SAMPLE NO.	DEPTH (FT.)	BLOWS 6"	SAMPLE REC. LENGTH	LITHO. CHANGE	MATERIAL DESCRIPTION* SOIL DENSITY HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS	REMARKS
	1.0					Brn	clayey silt		damp
	2.0					lt. Brn	silty clay		damp
	3.0					tan to beige	silty clay some pieces of weathered ss		damp
	4.0					lt. Brn	clayey silt		damp
	5.0					lt. Brn to red Brn	clayey silt w/ pieces of weathered sandy siltstone		damp
	6.0								
	7.0					red Brn	sandy silt to clayey sandy silt		damp
	8.0								

REMARKS Hand auger
1140 Sample S6-SB-3304 collected at 4'
lt. Brn. clayey silt

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BROWN AND ROOT ENVIRONMENTAL
A Division of Halliburton NUS

PROJECT Warminster
PROJECT NO. 6883
ELEVATION
WATER LEVEL DATA
(DATE, TIME & CONDITIONS)

BORING NO. SB-34
DATE 3-11-97
DRILLER Raab
FIELD GEOLOGIST D. Whalen

SAMPLE NO.	DEPTH (FT.)	BLOWS 6"	SAMPLE REC. LENGTH	LITHO. CHANGE	MATERIAL DESCRIPTION* SOIL DENSITY HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS	REMARKS
	1					Brn	clayey silt		damp
	2					dark red	clay		damp
	3								
	4					red-Brn dark	sandy silty clay clay		damp
	5					red gray-Brn lt red	silty clay, pieces of weathered red-gray sandy siltstone clay		damp to moist mixture - Fill
	6					lt. Brn	silty clay w/ SS pieces		damp
						buff	weathered sandstone		

REMARKS 1255 sample SG-SB-3404 collected at 4'
1305 sample SG-SB-3406 collected at 6'
Boring made with hand auger.

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BORING LOG

BROWN AND ROOT ENVIRONMENTAL
A Division of Halliburton NUS

PROJECT Warminster
PROJECT NO. 6883
ELEVATION
WATER LEVEL DATA
(DATE. TIME & CONDITIONS)

BORING NO. SB-35
DATE 3-11-97
DRILLER
FIELD GEOLOGIST D. Whalen

SAMPLE NO.	DEPTH (FT.)	BLOWS 6"	SAMPLE REC. LENGTH	LITHO. CHANGE	MATERIAL DESCRIPTION* SOIL DENSITY HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS	REMARKS
	1					Brn	clayey silt topsoil		damp
	2					lt. Brn	silty clay Fill Sandstone chunk at 1.5'		damp
	3						small rock pieces throughout, some red clay		damp
	4					red	sandy clayey silt Fill		damp
	5					brn + tan dark red	clay - (waste?)		
	6					lt Brn	silty clay, homogeneous		damp
	7					lt. Brn	clayey silt		damp
	8					to beige	some plant roots rotted		
						tan	FGR sandstone		

REMARKS 1445 sample SB-SB-3505 collected from 5' dark red clay

Boring made with hand auger.

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BROWN AND ROOT ENVIRONMENTAL
A Division of Halliburton NUS

PROJECT Warminster
PROJECT NO. 6883
ELEVATION
WATER LEVEL DATA
(DATE, TIME & CONDITIONS)

BORING NO. SB-36
DATE 3-11-97
DRILLER —
FIELD GEOLOGIST D. Whalen

SAMPLE NO.	DEPTH (FT.)	BLOWS 6"	SAMPLE REC. LENGTH	LITHO. CHANGE	MATERIAL DESCRIPTION* SOIL DENSITY HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS	REMARKS
	1					lt. Brn	clayey silt		damp
	2					dark red	clay		damp
						gray-Brn	clayey silt Fill		damp
	3					dark red	clay		moist
	4					red gray	sandy silt Fill		wet at 3.5'
	5					Brn to	sandy clayey silt Fill		
	6					red-Brn			
	7					lt. Brn	clayey silt w/ some rotted plant roots		damp
	8					gray	clayey silt/silty clay w/		damp
	9						black, decomposed plant matter; small patch of green grass		
	10					olive-gray to Brn-gray	clayey silt		damp
				11'=11=11			FGR sandstone		
									—

REMARKS 1545 Sample 96-SB-3605 collected
red-Brn sandy clayey silt
Boring made with hand auger.

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BROWN AND ROOT ENVIRONMENTAL
A Division of Halliburton NUS

PROJECT Warminster
PROJECT NO. 6883
ELEVATION
WATER LEVEL DATA
(DATE. TIME & CONDITIONS)

BORING NO. SB-37 TRGB 160/190
DATE 3-11-97
DRILLER
FIELD GEOLOGIST D. Whalen

SAMPLE NO.	DEPTH (FT.)	BLOWS 6"	SAMPLE REC. LENGTH	LITHO. CHANGE	MATERIAL DESCRIPTION* SOIL DENSITY HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS	REMARKS
	1					Brn	clayey silt		damp/moist
	2						aa		
	4					H. Brn	clayey silt		damp
	5					red Brn	sandy silty clay		damp
	6						aa		
							FER Sandstone		

REMARKS no waste encountered, no sample collected
Boring made with hand auger.

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BROWN AND ROOT ENVIRONMENTAL
A Division of Halliburton NUS

PROJECT Warminster
PROJECT NO. 6883
ELEVATION
WATER LEVEL DATA
(DATE, TIME & CONDITIONS)

BORING NO. SB-37a
DATE 3-11-97
DRILLER —
FIELD GEOLOGIST D. Whalen

SAMPLE NO	DEPTH (FT.)	BLOWS 6"	SAMPLE REC. LENGTH	LITHO. CHANGE	MATERIAL DESCRIPTION* SOIL DENSITY HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS	REMARKS
	1					Brn	clayey silt		damp/moist
	2								
	3					lt. Brn	clayey silt		damp
	4					Brn red	clayey silt sandy clayey silt		damp
	5					Brn red-gray	w/weathered sandstone fragments silty sand		damp
	6					red-Brn	clay sandy clayey silt		damp
						red gray	FGR sandstone		
									—

REMARKS 1700 Sample S6-SB-3703 collected from 3'
Brn clayey silt
Boring made with hand auger

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BORING LOG

BROWN AND ROOT ENVIRONMENTAL
A Division of Halliburton NUS

PROJECT NAWC Warminster
PROJECT NO. 6883
ELEVATION
WATER LEVEL DATA
(DATE, TIME & CONDITIONS)

BORING NO. SB-38 TR 12 240/330
DATE 3-12-97
DRILLER —
FIELD GEOLOGIST D. Whalen

SAMPLE NO	DEPTH (FT.)	BLOWS 6"	SAMPLE REC. LENGTH	LITHO. CHANGE	MATERIAL DESCRIPTION* SOIL DENSITY HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS	REMARKS
	1					Brn	clayey silt / silty clay		damp
	2					vdk-Brn + lt. Brn	clayey silt fill		
	3					lt. Brn	silty clay		damp
	4					lt. Brn	clayey silt		—
	5					vdk Brn / vdk-Brn	clayey silt / sandy clayey silt		damp / damp
1050	6					vdk-Brn	clayey silt / silty clay w/ siltstone fragments		

REMARKS No waste encountered, move 5' along trench axis

Boring made with hand auger.

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BORING LOG

BROWN AND ROOT ENVIRONMENTAL
A Division of Halliburton NUS

PROJECT Warminster
PROJECT NO. 6883
ELEVATION
WATER LEVEL DATA
(DATE. TIME & CONDITIONS)

BORING NO. SB-38A
DATE 3-12-97
DRILLER —
FIELD GEOLOGIST D. Whalen

SAMPLE NO.	DEPTH (FT.)	BLOWS 6"	SAMPLE REC. LENGTH	LITHO. CHANGE	MATERIAL DESCRIPTION* SOIL DENSITY HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS	REMARKS
	1					Brn / Pale-Brn	silty clay / clayey silt fill		damp
	2					dark Red	clay material (sing c ?)		
	3								damp/moist
	4								
	5								
	6					lt. Brn	clayey silt		damp
	7					red	clay material w/ red gray silty clay		
	8					lt. Brn	silty clay / clayey silt		damp

REMARKS 1110 sample SB-SB-3804 collected at 4' - red clay
1120 Sample SB-SB-3806 collected at 6' lt. Brn. clayey silt

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Boring made with hand auger.

BORING LOG

BROWN AND ROOT ENVIRONMENTAL
A Division of Halliburton NUS

PROJECT Warminster
PROJECT NO. 6883
ELEVATION
WATER LEVEL DATA
(DATE. TIME & CONDITIONS)

BORING NO. SB-39 TR12 240/280
DATE 3-12-97
DRILLER —
FIELD GEOLOGIST D. Whalen

SAMPLE NO.	DEPTH (FT.)	BLOWS 6"	SAMPLE REC. LENGTH	LITHO. CHANGE	MATERIAL DESCRIPTION* SOIL DENSITY HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS	REMARKS
1155	1					Brn	silty clay / clayey silt		damp
	2						aa + small pieces of asphalt		
	3						aa		
	4					dark red	clay material		damp
	5					Brn	silty clay		damp
	6					Brn-gray red	silty clay clay material		damp
	7					lt. Brn	silty clay		
	8					red red Brn	clay silty clay w/ siltstone pieces		piece of asphalt at 7.5'
	9					red-Brn	clayey silt, micaceous aa		damp
1247						red gry	siltstone, micaceous		
									—

REMARKS 1225 sample SG-SB-3904 collected from 4' red clay material
1245 sample SG-SB-3909 collected from 9' red-Brn clayey silt

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BORING LOG

BROWN AND ROOT ENVIRONMENTAL
A Division of Halliburton NUS

PROJECT Warminster
PROJECT NO. 6883
ELEVATION
WATER LEVEL DATA
(DATE, TIME & CONDITIONS)

BORING NO. SB-40 TR12 240/110
DATE 3-12-97
DRILLER —
FIELD GEOLOGIST D. Whalen

SAMPLE NO	DEPTH (FT.)	BLOWS 6"	SAMPLE REC. LENGTH	LITHO. CHANGE	MATERIAL DESCRIPTION* SOIL DENSITY HARDNESS	COLOR	MATERIAL CLASSIFICATION	[illegible]	REMARKS
1400	1					Brn	clayey silt piece of green asbestos shingle		damp wet
	2					Brn-Blk	waste material in clayey silt seeds?, plastic, hair or fibers		wet
	3						aa		damp
	4					Brn Brn	sandy silt sandy clayey silt		damp/moist damp
	5						some soft & pale green material - clay?		
	6					Brn	sandy clayey silt		damp
				T.D.		beige and tan	clay		damp
									hole caves in at ~ 6.5'

REMARKS 1455 sample 56-SB-4002 collected
1520 sample 56-SB-4005 collected
Brn sandy clayey silt
Boring made with hand auger

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BORING LOG

BROWN AND ROOT ENVIRONMENTAL
A Division of Halliburton NUS

PROJECT Warminster
PROJECT NO. 6883
ELEVATION
WATER LEVEL DATA
(DATE. TIME & CONDITIONS)

BORING NO. SB-41 TR12 2401 .195
DATE 3-12-97
DRILLER
FIELD GEOLOGIST D. Whalen

SAMPLE NO.	DEPTH (FT.)	BLOWS 6"	SAMPLE REC. LENGTH	LITHO. CHANGE	MATERIAL DESCRIPTION: SOIL DENSITY HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS	REMARKS
1550	1					Brn	clayey silt		damp
	2						ad		
	3					Brn	da pieces of rotten wood		moist
	4					Brn	clayey silt rotten plywood, white plastic pieces		damp/moist
	5					Brn	plastic, wood, wire ~~Sandy~~ silt/VFGR sand		damp
	6					Brn-gray	silt to sandy silt		
	7					light gray Brn	sandy silt piece of wire		damp
	8					Brn	silt/VFGR sand wire		
						vdk-gray	FGR orkosie sand stone		

REMARKS 1620 Sample S6-SB-4104 collected from 4'
1640 Sample S6-SB-4106 collected from 6'

BORING NO.
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Boring made with hand auger.

TEST PIT LOGS

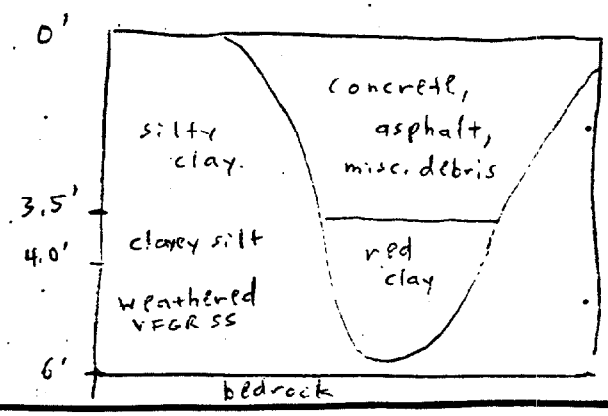
TEST PIT LOG

Brown & Root Environmental

PROJECT: NAWC Warminster TEST PIT NO.: S6-TP-01
PROJECT NO.: DATE: 4-10-96
LOCATION: Site 6, Trench 11 at Grid location S125, P110
FIELD GEOLOGIST: D. Whalen

DEPTH (FT.)	LITHOLOGY CHANGE (Depth, ft.)	MATERIAL DESCRIPTION (Soil Density / Consistency, Color)	USCS	REMARKS
0.		red-brown clayey silt with grass roots		damp/moist 0ppm
		brown clayey silt to silty clay		0ppm
2.0		large slabs of asphalt and pieces		
		of concrete; small amount of		
		miscellaneous debris (beer bottle		damp 0ppm
		cap, plastic lid to a cup, thin metal		
		bar ~4' long, crushed metal can) - in		0ppm
		brown clayey silt matrix		
3.5				
		red clay, wet/moist		0ppm
6				
		bedrock - red gray VFGR		
		sandstone		

Test Pit Cross Section and / or Plan View



REMARKS no sample taken
trench length: 33'

PHOTO LOG no photo

TEST PIT

PAGE OF

TEST PIT LOG

Brown & Root Environmental

PROJECT: NAWC Warminster TEST PIT NO.: S6-TP02

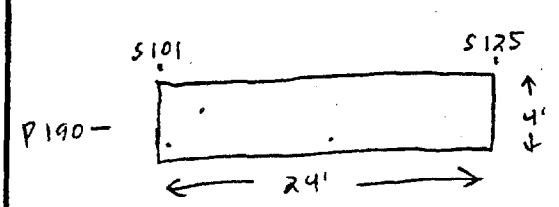
PROJECT NO.: 6883 DATE: 4/10/96

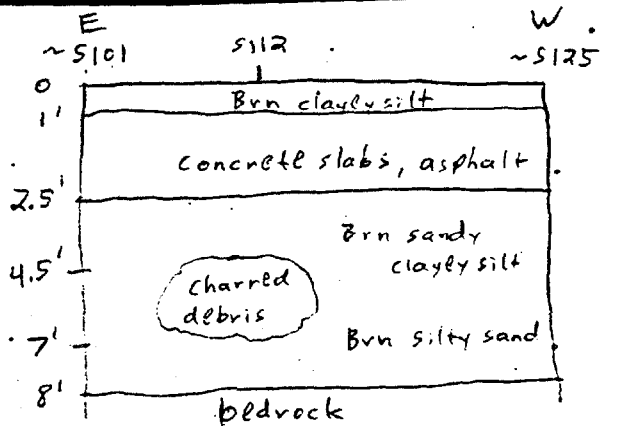
LOCATION: Area B, Site 6 TB 11 Station 110, Profile 190

FIELD GEOLOGIST: D. Whalen

DEPTH (FT.)	LITHOLOGY CHANGE (DESCRIPT.)	MATERIAL DESCRIPTION (Soil Density / Consistency, Color)	USCS	REMARKS
0.0		Brn clayey silt		damp / moist 0 ppm
1.0		concrete slabs, pieces of asphalt		
		pavement		
		rocky lt. brown sandy clayey silt		damp
2.5		some red clay		
		rocky sandy clayey silt		
4.5		soda bottle, light green crystalline		
		material (small pocket), charred		
		material: transistors, metal scrap,		
		ceramic, glass pieces, metal screen,		
		roof tiles (terra cotta and asbestos),		
		wire, part of tree trunk		
5.5		Brn silty sand, chunks of weathered		
		sandstone		
8.0		bedrock - FGR sandstone		

Test Pit Cross Section and / or Plan View





REMARKS 1250 sample S6-TP02-01 taken; depth 4.5', app. 11' from E end of test pit; dark brn to black clayey sandy silt containing various charred debris - ceramic, glass, transistors, metal

PHOTO LOG R1P1 of N wall of pit
R1P2 of S wall of pit

TEST PIT

TEST PIT LOG — **Brown & Root Environmental**

PROJECT: NAWC Warminster — TEST PIT NO.: S6-TP03

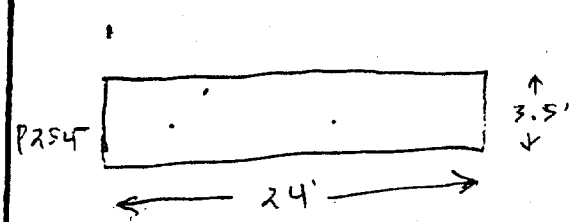
PROJECT NO.: 6883 — DATE: 4/10/96

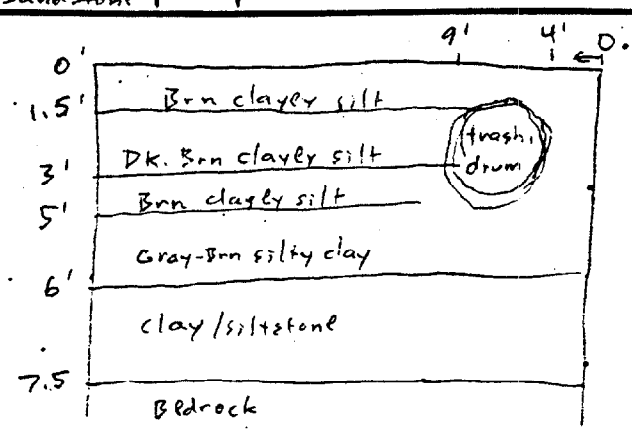
LOCATION: Area B, Site 6 Poss. TR 6C (TR 11 Ext.) S100, P250

FIELD GEOLOGIST: D. Whalen

DEPTH (ft.)	LITHOLOGY CHANGE (Depth ft.)	MATERIAL DESCRIPTION (Soil Density / Consistency, Color)	USCS	REMARKS
0		Brn clayey silt, grass roots		
				damp/moist
2		Dark Brn clayey silt, some lt. green		
		crystalline material, crushed red 55-gal		
		drum (empty) w/ words "Fire Only"		may have read "Chemical Fire
		visible on it		only" or "Wood Fire Only"
		steel rail connector		
3'		large chunks of what looks like solidified		damp
		tar stuck on pieces of wood		
4		large pieces of native weathered FGR		
		sandstone		damp
		Gray-Brn silty clay		
6		lt. orange-Brn to lt. gray brn clay /		
		siltstone		
7.5				
	ıl=ıl=ıl	weathered gray-Brn FGR sandstone		

Test Pit Cross Section and / or Plan View





REMARKS: no sample taken

PHOTO LOG: RIP3 of N wall of pit — TEST PIT

TEST PIT LOG

Brown & Root Environmental

PROJECT: NAWC Warminster TEST PIT NO.: S6-TP04

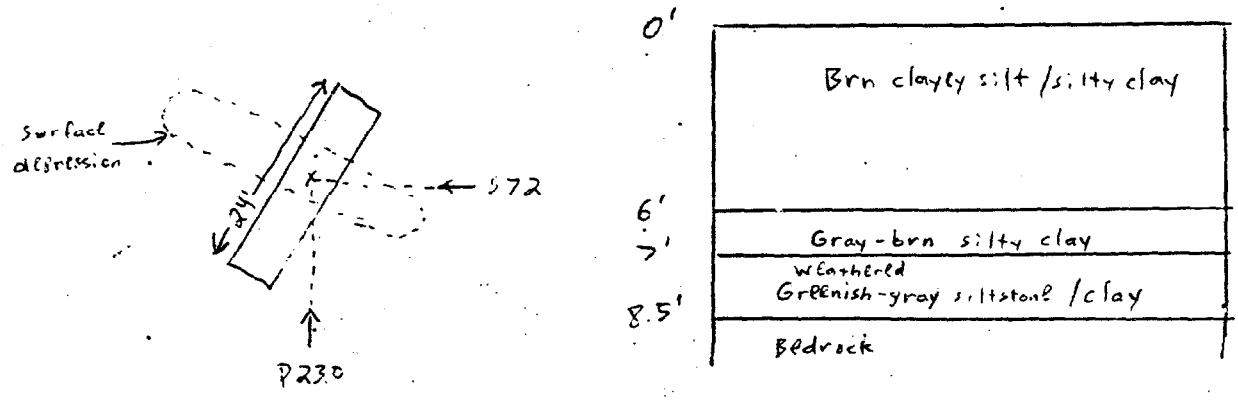
PROJECT NO.: 6883 DATE: 4-11-96

LOCATION: Area B, Site 6, TR11/12 area Surface depression at S72, P230

FIELD GEOLOGIST: D. Whalen

DEPTH (FT.)	LITHOLOGY CHANGE (Depth ft.)	MATERIAL DESCRIPTION (Soil Density / Consistency, Color)	USCS	REMARKS
0.0		Brn clayey silt to silty clay		damp 0ppm
				damp 0ppm
5.0				
6.0		Gray-Brn silty clay, some pieces of		damp 0 ppm
		weathered gray-Brn FGR sandstone		
7.0		weathered greenish-gray siltstone		very soft, waxy
		some weathered red-gray VFGR sandstone		damp 0ppm
8.5		bedrock - beige MGR to CGR		
		sandstone, almost conglomeritic,		
		angular quartz pebbles		

Test Pit Cross Section and / or Plan View



REMARKS No waste materials encountered

0840 Sample S6-TP04-01 collected; 18" deep Brn clayey silt damp 0ppm

PHOTO LOG R1 P4 of N wall of pit TEST PIT

PAGE OF

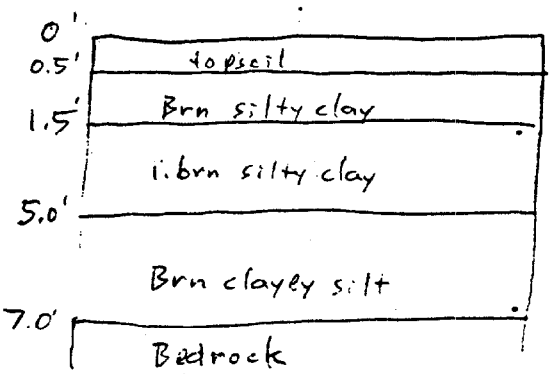
TEST PIT LOG

Brown & Root Environmental

PROJECT: NAWC Warminster TEST PIT NO.: S6-TP05
PROJECT NO.: DATE: 4/11/96
LOCATION: Area B, Site 6 TR 6B S160, P210
FIELD GEOLOGIST: D. Whalen

DEPTH (ft.)	LITHOLOGY CHANGE (Depth ft.)	MATERIAL DESCRIPTION (Soil Density / Consistency, Color)	USCS	REMARKS
0		Brn clayey silt topsoil, grass roots		damp/moist
0.5		Brn silty clay		0 ppm
1.5		lt. Brn silty clay, micaceous		stiff, compacted damp
				0 ppm
5.0		Brn clayey silt		0 ppm
		pieces of red-gray FGR sandstone		
6.0		weathered gray-brn FGR sandstone		
		in sandy clayey silt		damp 0 ppm
7.0		red-gray FGR sandstone		bedrock

Test Pit Cross Section and / or Plan View



REMARKS No sample taken
No waste encountered
Trench length: 24'

PHOTO LOG 1100 R1P5 and R1P6 of test pit TEST PIT

TEST PIT LOG

Brown & Root Environmental

PROJECT: NAWC Warminster TEST PIT NO.: S6-TP06

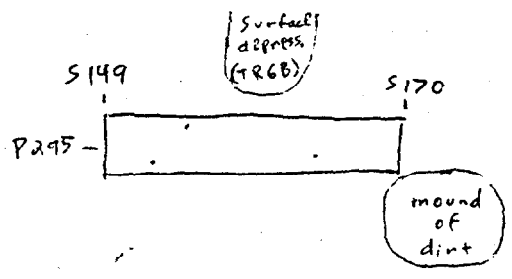
PROJECT NO.: 6833 DATE: 4-11-96

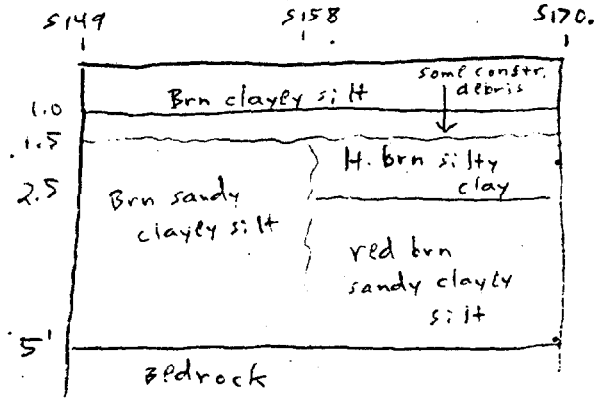
LOCATION: Area B, site 6 TR 6B S 160, P 295

FIELD GEOLOGIST.

DEPTH (FT.)	LITHOLOGY CHANGE (Depth, ft.)	MATERIAL DESCRIPTION (Soil Density / Consistency, Color)	USCS	REMARKS
0.0		large concrete block ~4'x4'x0.5'		0 ppm
		Brn clayey silt		
		roof shingles pieces of asbestos		
		sheeting		
1.0		lt. brn silty clay micaceous		stiff 0 ppm
2.5		red-brn sandy clayey silt		
3.5		large slabs of gray-brn FGR		0 ppm
		sandstone		
5.0		gray-brn FGR sandstone		bedrock

Test Pit Cross Section and / or Plan View





REMARKS no sample taken

PHOTO LOG RIP7 of pit N wall TEST PIT

PAGE OF

TEST PIT LOG

Brown & Root Environmental

PROJECT: NAWC Warminster TEST PIT NO.: S6-TP07

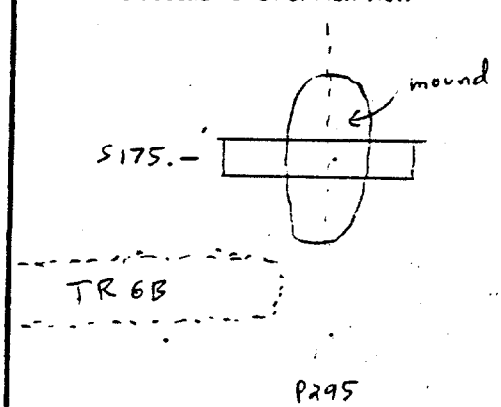
PROJECT NO.: DATE:

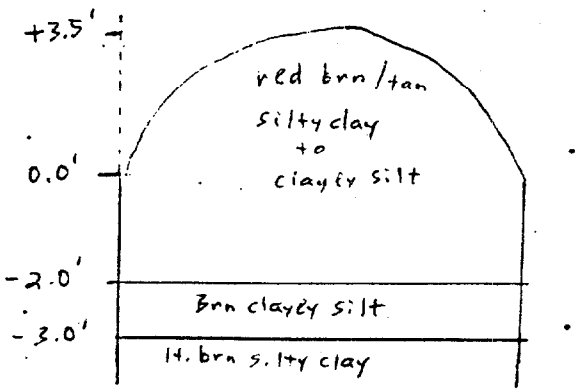
LOCATION: Area B, Site 6, Mound S175, P295

FIELD GEOLOGIST.

DEPTH (FT.)	LITHOLOGY CHANGE (DESCRIPT.)	MATERIAL DESCRIPTION (Soil Density / Consistency, Color)	USCS	REMARKS
+3.5		red brn/tan silty clay to clayey silt		damp 0 ppm
-2.0		brn clayey silt		damp 0 ppm
-3.0		lt. brn silty clay		damp 0 ppm
	T.D.			

Test Pit Cross Section and / or Plan View





REMARKS 1405 sample S6-TP07-01 collected; depth: 18"-24" (from top of mound) red brn silty clay 0 ppm

PHOTO LOG

TEST PIT

TEST PIT LOG

Brown & Root Environmental

PROJECT: NAWC Warminster TEST PIT NO.: S6-TP08

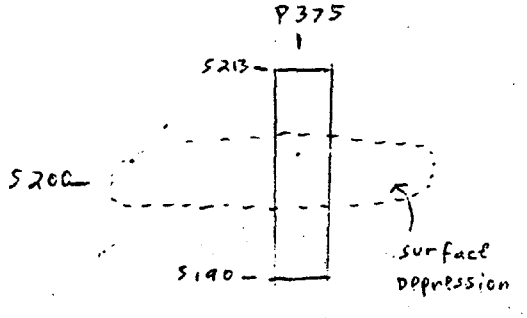
PROJECT NO.: 6783 DATE: 4-11-96

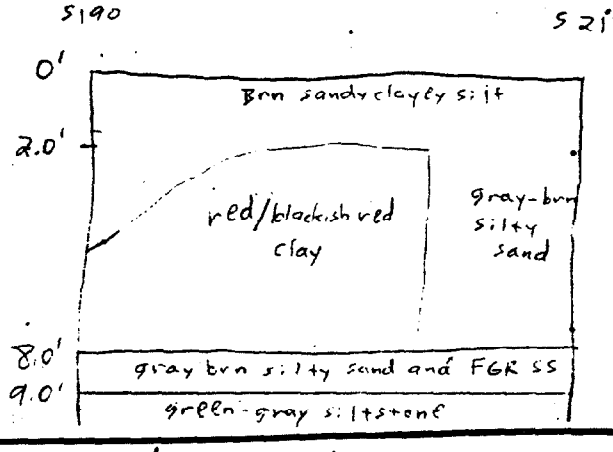
LOCATION: Area B, Site 6, TR11/12 Area Surface Depression at S200, P375

FIELD GEOLOGIST: D. Whalen

DEPTH (ft.)	LITHOLOGY CHANGE (Depth, ft.)	MATERIAL DESCRIPTION (Soil Density / Consistency, Color)	USCS	REMARKS
0.0		Brn sandy clayey silt		damp 0 ppm
		tree roots		
2.0		dark red / blackish red clay		
2.5		shovel head		
4.5		5' long piece of timber		
		2' long piece of rebar		
				moist 0 ppm
8.0		gray brn silty sand and pieces of		0 ppm
		weathered gray-brn FGR sandstone		
9.0		greenish-gray weathered siltstone		

Test Pit Cross Section and / or Plan View





REMARKS 1515 sample S6-TP08-01 collected from 2' deep red to red-black clay ; 0 ppm

PHOTO LOG

TEST PIT

PAGE OF

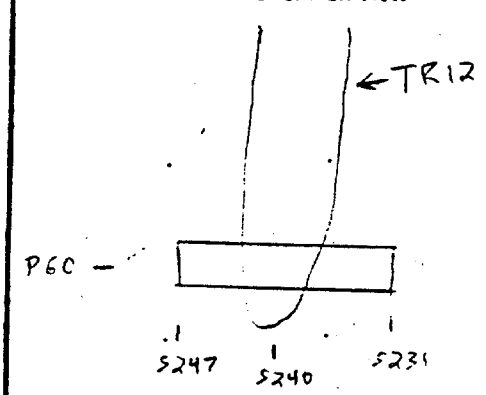
TEST PIT LOG

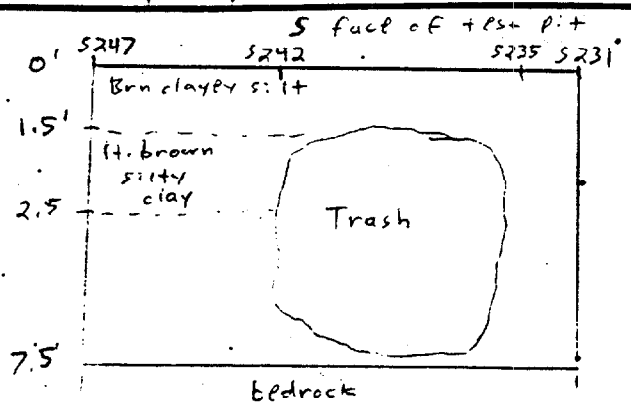
Brown & Root Environmental

PROJECT: NAWC Warminster TEST PIT NO.: S6-TP09
PROJECT NO.: 6883 DATE: 4/12/96
LOCATION: Area 5, site 6 Trench 12 S240, P60
FIELD GEOLOGIST: D. Whalen

DEPTH (ft.)	LITHOLOGY CHANGE (Boundary)	MATERIAL DESCRIPTION (Soil Density / Consistency, Color)	USCS	REMARKS
0.0		Brn clayey silt topsoil, grass roots		damp 0 ppm
1.0		lt. brn silty clay		damp/moist 0 ppm
2.5		asphalt pieces, remains of a chair (cloth, springs) burnt wood		
		metal post w/concrete footer		
		pieces of plastic, metal bed frame		
		foam rubber, styrofoam cup, plastic pretzel		
		bag, 1/2" rubber-coated wire cable, egg		
		carton, pierced metal plank (		
		Soda cans, alum. foil, metal scrap, bottles		
		can of tar compound (solidified) for laying		
		tile		
7.5		weathered lt. brn FGR sandstone		

Test Pit Cross Section and/or Plan View





REMARKS 0945 Sample S6-TP09-01 taken from 6.5' deep at bottom of trash, brn sandy silt w/ red brn clayey silt, 0 ppm, damp

PHOTO LOG R1 P10 of pit wall
R1 P11 of pit S wall

TEST PIT

TEST PIT LOG

Brown & Root Environmental

PROJECT: NAWC Warminster TEST PIT NO.: S6-TP10
PROJECT NO.: 6883 DATE: 4-12-96
LOCATION: Area B Site 6 Trench 13 at S 240, P 150
FIELD GEOLOGIST: D. Whalen

DEPTH (ft.)	LITHOLOGY CHANGE (Depth ft.)	MATERIAL DESCRIPTION (Soil Density / Consistency, Color)	USCS	REMARKS
0.0		Brn clayey silt grass roots		
		concrete block; crushed, non-intact		
		55-gal drum containing black tarry		HNU 500ppm inside drum
		waste		
1.5		a few transite (asbestos) chips		
2.5		piece of wood soda can metal		
		bar, small patch of green crystalline material		
		crumpled aluminum sheet		
		cylindrical metal object ~2' dia. x		Stop Excavating because
		~3' long, painted red		of possible safety threat posed
3.5'				by cylindrical object (ordnance?)
	T.D.			Call Navy.

Test Pit Cross Section and / or Plan View

REMARKS 1115 sample S6-TP10-01 taken black waste inside drum HNU 500ppm
and dup S6-TP10-03 (TCLP only)
S6-TP10-02 taken of soil beneath drum ~2' deep

PHOTO LOG R1 P12 of pit showing red cylindrical metal object TEST PIT S6-TP10

PAGE 05

TEST PIT LOG

Brown & Root Environmental

PROJECT: NAWC Warminster TEST PIT NO.: S6-TP11

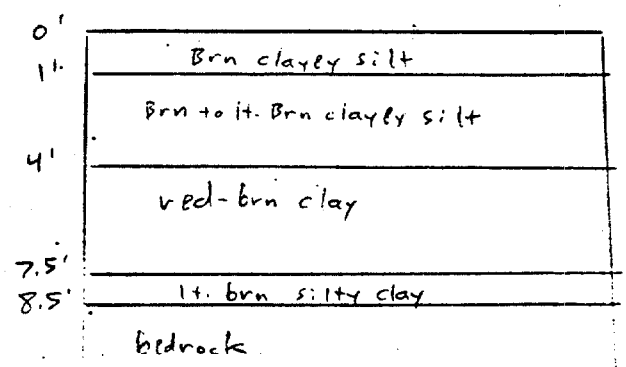
PROJECT NO.: 6733 DATE: 4-12-96

LOCATION: Area B, Site 6 Trench 17 at Station 240 Profile 300

FIELD GEOLOGIST: D. Whalen

DEPTH (ft.)	LITHOLOGY CHANGE (Depth/ft.)	MATERIAL DESCRIPTION (Soil Density / Consistency, Color)	USCS	REMARKS
0		Brn clayey silt		
1.0		Brn - lt. brn clayey silt		0 ppm
4.0		red-brn clay		damp 0 ppm
7.5		lt. brn. silty clay		0 ppm
8.5		weathered purple siltstone		0 ppm damp/moist

Test Pit Cross Section and/or Plan View



REMARKS no waste encountered
Trench length: 16'

PHOTO LOG R1 P13 of pit looking west

TEST PIT S6-TP11

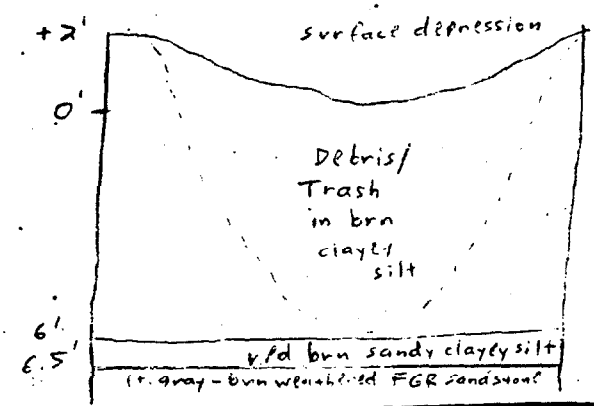
TEST PIT LOG

Brown & Root Environmental

PROJECT: NAWC Warminster TEST PIT NO.: S6-TP12
PROJECT NO.: 6883 DATE: 4-12-96
LOCATION: Area B, Site 6, Prob. PEA S205, P275
FIELD GEOLOGIST: D. Whalen

DEPTH (ft.)	LITHOLOGY CHANGE (Boundaries)	MATERIAL DESCRIPTION (Soil Density / Consistency, Color)	USCS	REMARKS
0		red-brn clayey silt silty clay		dome 0 ppm
		rubber floor mat, manhole w/		
		concrete frame, pieces of chain-		
		link fence, scrap metal		0 ppm
3.5		more floor mat and chain-link fence		
		concrete block (1'x3'x4') styrofoam,		
		tree parts		
4.5		5 metal cans ~paint can size		
		- rectangular can, tr. open 7ppm inside		
		- red can ~1' high, 9" dia. some white		Printed on can: "Poison Diazinon Dust"
		- 2 crushed small cans 0 ppm		
		- red can ~1.5' high, 1' dia.		"Poison Malathion"
5.0		charred wood, plastic sheeting		
		empty vehicle fuel tank (0 ppm inside)		
		pieces of asphalt roofing, concrete blocks		
		non-intact empty 55 gal drum (0 ppm)		T.D. = 6.5' (see below)

Test Pit Cross Section and / or Plan View



REMARKS 1610 sample S6-TP12-01 taken; depth 4.5' (soil around sand)
1630 sample S6-TP12-02 taken; depth ~5', pale green clay-like material

PHOTO LOG R1 P14 TEST PIT

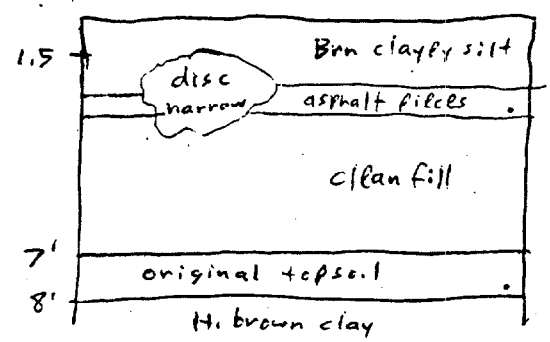
TEST PIT LOG

Brown & Root Environmental

PROJECT: NAWC Warminster TEST PIT NO.: S6-TP13
PROJECT NO.: 6883 DATE: 4/15/96
LOCATION: Area B, Site 6 Pass TR 6D Station 25, Profile 270
FIELD GEOLOGIST: D. Whalen

DEPTH (ft.)	LITHOLOGY CHANGE (Depth ft.)	MATERIAL DESCRIPTION (Soil Density / Consistency, Color)	USCS	REMARKS
0		DarkBrn clayey silt		damp 0ppm
1.5		rusted pieces of a disc harrow		
		(farm implement)		
3.0		pieces of asphalt pavement		damp 0ppm
		reddish-brown sandy clayey silt		
		piece of broken china		
6.0		lt. brn sandy clayey silt, pieces of		damp 0ppm
		sandstone		
7.0		Gray-brn clayey silt with rotted weeds		original topsoil
		and grass, some black decomposed plant		0ppm
		matter		
8.0		lt. brn silty clay		
10.5				
	T.D.			

Test Pit Cross Section and / or Plan View



REMARKS no sample collected
Trench length: 23'

PHOTO LOG R2 P1 of disc harrow
R2 P2 of test pit N wall facing NW

TEST PIT

TEST PIT LOG

Brown & Root Environmental

PROJECT: NAWC Warminster TEST PIT NO.: S6-TP14

PROJECT NO.: 6883 DATE: 4/15/96

LOCATION: Area B, Site 6 pass TR 6D Station 0, Profile 170

FIELD GEOLOGIST: D. Whalen

DEPTH (ft.)	LITHOLOGY CHANGE (Depth, ft.)	MATERIAL DESCRIPTION (Soil Density / Consistency, Color)	USCS	REMARKS
0.0		Dark Brn clayey silt topsoil		damp 0 ppm
		Brn clayey silt		
2.0		slab of concrete, five bricks,		
		tiles, a tire		
		2 - 55 gal drums, no lids, partially		
		crushed - contain beige pasty material		1-5 ppm inside drums
3.0		perched water zone		water pouring into
	T.D.			pit at 3' depth - stop
				excavating

Test Pit Cross Section and / or Plan View

REMARKS 1200 sample S6-TP14-01 collected; beige paste inside drum

1210 sample S6-TP14-02 and dup S6-TP14-04 collected, tan clayey silt beneath drums; 0 ppm

1220 sample S6-TP14-03 collected, saturated soil at 3.5'

PHOTO LOG R2 P3 of test pit looking N

R2 P4 of 2 drums

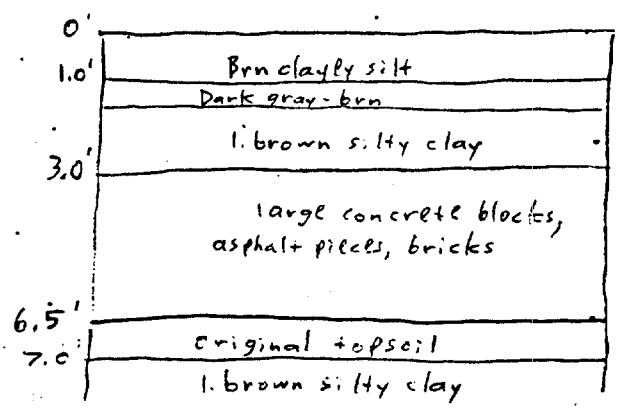
TEST PIT

TEST PIT LOG — **Brown & Root Environmental**

PROJECT: NAWC Warminster — TEST PIT NO.: S6-TP15
PROJECT NO.: 6883 — DATE: 4/15/96
LOCATION: Area B, Site 6, TR — Station 200, Profile 0
FIELD GEOLOGIST: D. Whalen

DEPTH (FT.)	LITHOLOGY CHANGE (Begin/Ft.)	MATERIAL DESCRIPTION (Soil Density / Consistency, Color)	USCS	REMARKS
1.0		Brn clayey silt, grass roots		damp
		dark brn clayey silt, melted coke		
		bottle, some blue-green crystalline material		0 ppm
		lt. brn silty clay		
3.0		large concrete blocks, rebar, pieces		0 ppm
		of plastic, wire, bottles		
4.0		wood, asphalt pavement pieces		0 ppm
		scrap metal		
6.5		gray-brn clayey silt		original topsoil
7.0		lt. brown silty clay		damp

Test Pit Cross Section and / or Plan View



REMARKS: 1500 sample S6-TP15-01 collected; depth 18" brn clayey silt, damp 0 ppm

PHOTO LOG: R2P4 of pit, looking N
R2P5 of pile of excavated dirt/concrete blocks

TEST PIT

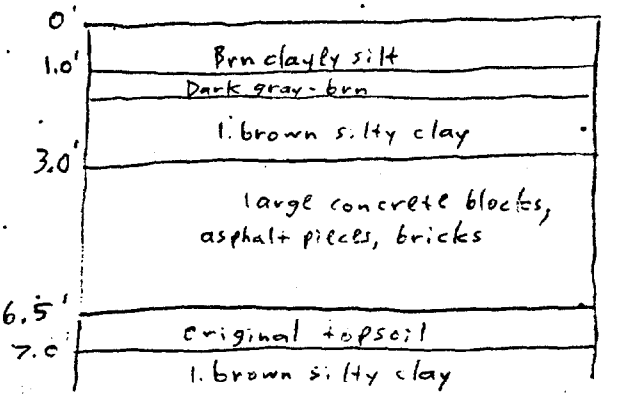
TEST PIT LOG

Brown & Root Environmental

PROJECT: NAWC Warminster TEST PIT NO.: S6-TP15
PROJECT NO.: 6883 DATE: 4/15/96
LOCATION: Area B, Site 6, TR Station 200 Profile 0
FIELD GEOLOGIST: D. Whalen

DEPTH (ft.)	LITHOLOGY CHANGE (Depth ft.)	MATERIAL DESCRIPTION (Soil Density / Consistency, Color)	USCS	REMARKS
1.0		Brn clayey silt, grass roots		damp
		dark brn clayey silt, melted coke		
		bottle, some blue-green crystalline material		0 ppm
		lt. brn silty clay		
3.0		large concrete blocks, rebar, pieces		0ppm
		of plastic, wire, bottles		
4.0		wood, asphalt pavement pieces		0 ppm
		scrap metal		
6.5		gray-brn clayey silt		original topsoil
7.0		lt brown silty clay		damp

Test Pit Cross Section and / or Plan View



REMARKS 1500 sample S6-TP15-01 collected; depth 18" brn clayey silt, damp 0 ppm

PHOTO LOG RZ P4 of pit, looking N
RZ P5 of pile of excavated dirt/concrete blocks

TEST PIT

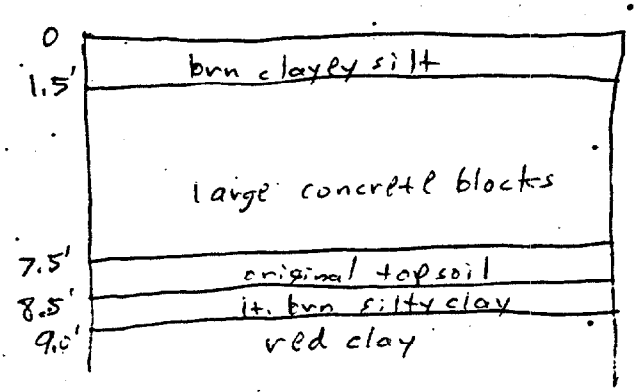
TEST PIT LOG

Brown & Root Environmental

PROJECT: NAWC Warminster TEST PIT NO.: S6-TP17
PROJECT NO.: 6883 DATE: 4/17/96
LOCATION: Area B, Site 6, TR 6G S 200, P 45
FIELD GEOLOGIST: D. Whalen

DEPTH (ft.)	LITHOLOGY CHANGE (Depth ft.)	MATERIAL DESCRIPTION (Soil Density / Consistency, Color)	USCS	REMARKS
		Brn clayey silt / silty clay		damp 0ppm
1.5'		pieces of scrap metal, wire, broken		
		glass, asphalt pieces		
3.0'		chunk of concrete, bricks		0ppm
		asphalt pieces		
		large concrete blocks		0ppm
7.5'		Brn-gray clayey silt w/ grass roots		original topsoil
				0ppm
8.5'		lt. brn clayey sil		
9.0		red clay		0ppm
	T.P.			

Test Pit Cross Section and / or Plan View



REMARKS 1105 sample S6-TP17-01 and duplicate S6-TP17-02 collected from 18" depth, dark brn clayey silt

PHOTO LOG 1155 R2P8 of pit looking SE

TEST PIT

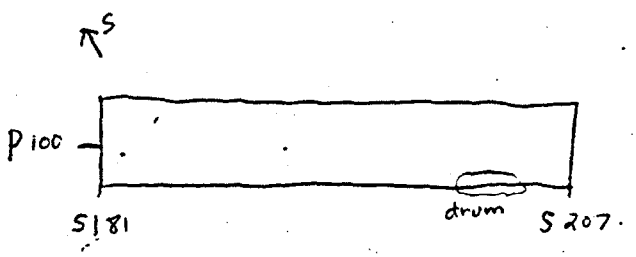
TEST PIT LOG

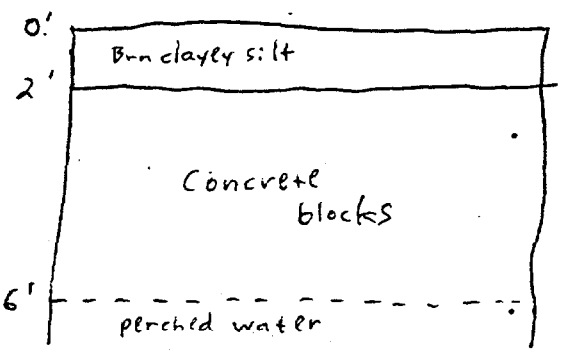
Brown & Root Environmental

PROJECT: NAWC Warminster TEST PIT NO.: S6-TP18
PROJECT NO.: 6883 DATE: 4/17/96
LOCATION: Area B, Site 6, TR 66 S 190, P 100
FIELD GEOLOGIST: D. Whalen

DEPTH (ft.)	LITHOLOGY CHANGE (Depth ft.)	MATERIAL DESCRIPTION (Soil Density / Consistency, Color)	USCS	REMARKS
0.0		Brn clayey silt, some broken glass		damp 0ppm
		1" dia. wire cable near surface ~20' long		
		lt. brown silty clay		
2.0		flattened 55 gal. drum, black, semi-		
		hard sandy / tar-like material accessible		0ppm
		from top		
2.5		large concrete slab ~5'x4'x9"		
		concrete blocks, some		
		metal scrap		
6.0		water seeps into pit		0ppm stop
	T.D.			excavating due

Test Pit Cross Section and / or Plan View





REMARKS 1430 sample S6-TP18-01 taken from drum
1440 S6-TP18-02 collected from soil beneath drum

PHOTO LOG R2P9 of inside of pit facing S
R2P10 of drum on ground

TEST PIT

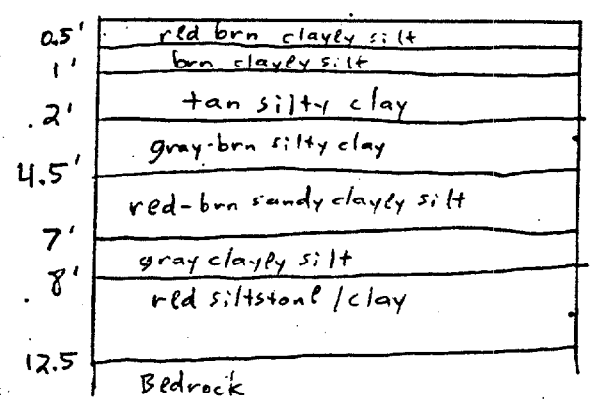
TEST PIT LOG

Brown & Root Environmental

PROJECT: NAWC Warminster TEST PIT NO.: S6-TP19
PROJECT NO.: 6883 DATE: 4/17 and 18/96.
LOCATION: Area B, Site 6 TR 6G S 185, P 150
FIELD GEOLOGIST: D. Whalen

DEPTH (ft.)	LITHOLOGY CHANGE (Depth ft.)	MATERIAL DESCRIPTION (Soil Density / Consistency, Color)	USCS	REMARKS
0.0		red-brn clayey silt empty crushed drum		0 ppm
0.5		brn clayey silt		
1.0		tan silty clay non-intact metal container containing tarry clay-like material		
2.0		various metal scrap		0 ppm
		gray-brn clayey silt w/ rotted plant matter		slight odor of decaying organic matter
4.0		rotted plant matter		
4.5		red-brn sandy clayey silt, some plant		0 ppm
		roots, small stones		
7.0		gray clayey silt w/ black decomposed		
		plant matter		0 ppm, damp
		gray-brn clayey silt		poss. original topsoil
8.0		red silty clay w/ red		
10.0		water seep		0 ppm
12.5				
	||=||=||	red-gray VFGR silty sandstone		

Test Pit Cross Section and / or Plan View



REMARKS 1625 sample S6-TP19-01 collected from metal container at 1' depth
4/18 0905 sample S6-TP19-02 collected 2' deep brn clayey silt

PHOTO LOG R2 P11 of pit, looking N TEST PIT

TEST PIT LOG

Brown & Root Environmental

PROJECT: NAWC Warminster TEST PIT NO.: S6-TP20

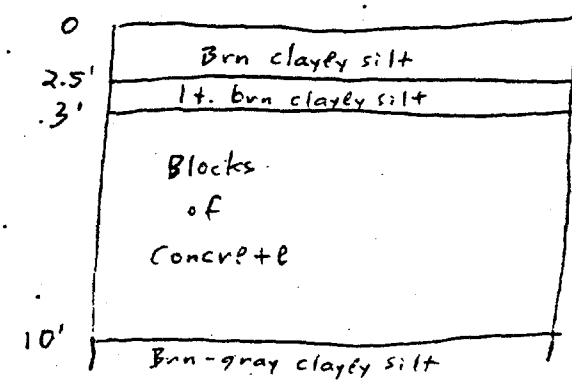
PROJECT NO.: 6883 DATE: 4/18/96

LOCATION: Area B, Site 6 Poss TR 6E Station 100, Profile 270

FIELD GEOLOGIST: D. Whalen

DEPTH (FT.)	LITHOLOGY CHANGE (Depth ft.)	MATERIAL DESCRIPTION (Soil Density / Consistency, Color)	USCS	REMARKS
0.0		Brn clayey silt		damp
2.5		lt. brn clayey silt		damp 0 ppm
3.0		scrap metal, pieces of asphalt,		
		concrete chunks, piece of plastic		0 ppm
		large blocks of concrete		
8.5		water		0 ppm
10.0		Brn-gray clayey silt with		original topsoil
10.5		plant roots		
	T.D.			

Test Pit Cross Section and / or Plan View



REMARKS

PHOTO LOG RZ P12 of pit, facing N TEST PIT

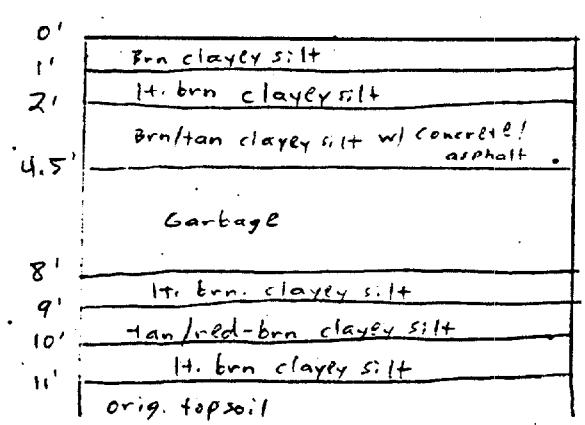
TEST PIT LOG

Brown & Root Environmental

PROJECT: NAWC Warminster TEST PIT NO.: S6-TP21
PROJECT NO.: 6883 DATE: 4/18/96
LOCATION: Area B, Site 6 Pass TR 6E Station 65, Profile 210
FIELD GEOLOGIST: D. Whalen

DEPTH (FT.)	LITHOLOGY CHANGE (Depth,ft.)	MATERIAL DESCRIPTION (Soil Density / Consistency, Color)	USCS	REMARKS
0.0		Brn clayey silt		damp 0 ppm
1.0		lt. brn clayey silt		
2.0		Brn/tan/red-brn clayey silt		very tight compacted
		asphalt, concrete pieces		
4.5		dark gray-brn sandy clayey silt		0 ppm
		trash/debris: ceramic, bricks		
		glass, wire, metal scrap, cans		0 ppm
		styrofoam, welding rod, plastic		
8.0		lt. brn clayey silt		damp 0 ppm
9.0		tan/red-brn clayey silt w/ weathered		
		VFGR sandstone fragments		
10.0		lt. brn clayey silt		
11.0		dark Brn-gray clayey silt w/ black		original topsoil
		decomposed plant matter, roots, stalks		
12.0		light gray silty clay		

Test Pit Cross Section and / or Plan View



REMARKS 1410 sample S6-TP21-01 and dup. sample S6-TP21-02 collected depth 2', sandy clayey silt

PHOTO LOG R2 P13 of inside of pit TEST PIT

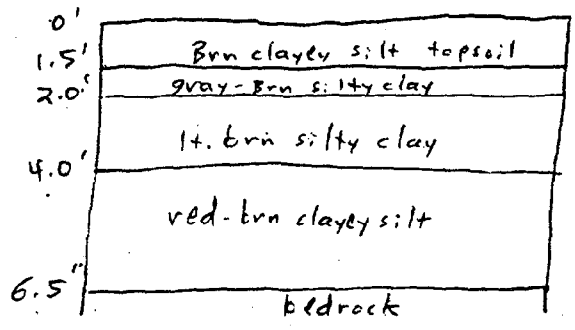
TEST PIT LOG

Brown & Root Environmental

PROJECT: NAWC Warminster TEST PIT NO.: S6-TP22
PROJECT NO.: 6783 DATE: 4/18/96
LOCATION: Area B, Site 6 TR 4 area S 75 P 335
FIELD GEOLOGIST: D. Whalen

DEPTH (FT.)	LITHOLOGY CHANGE (Depth, ft.)	MATERIAL DESCRIPTION (Soil Density / Consistency, Color)	USCS	REMARKS
		Brn clayey silt		damp
1.5		gray-Brn clayey silt/silty clay w/roots		damp 0ppm
2.0		light-brn silty clay		damp 0ppm
4.0		red-brn clayey silt/silty clay		damp 0ppm
6.5		weathered red-gray VFGR silty		
	=|=|=|=	sandstone micaceous		
				Natural soil profile
				no fill

Test Pit Cross Section and / or Plan View



REMARKS 1535 Sample S6-TP22-01 MS/MSD collected; depth: 2'; lt. Brn silty clay

PHOTO LOG 1555 R2 P14 of pit facing N TEST PIT

PAGE OF

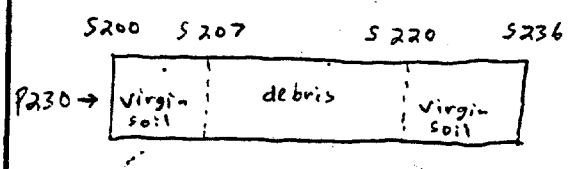
TEST PIT LOG

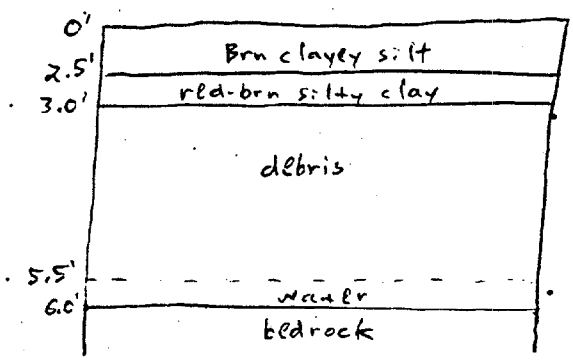
Brown & Root Environmental

PROJECT: NAWC Warminster TEST PIT NO.: S6-TP23
PROJECT NO.: 6883 DATE: 4/19/96
LOCATION: P6F Station 230, Profile 230 to S 200, P230
FIELD GEOLOGIST: D. Whalen

DEPTH (FT.)	LITHOLOGY CHANGE (Depth ft.)	MATERIAL DESCRIPTION (Soil Density / Consistency, Color)	USCS	REMARKS
		Brn clayey silt, grass roots		0 ppm, damp
2.5		red-brn silty clay		0 ppm
3.0		gray-brn silt, sand rocks, cinders w/		
		various debris: broken glass, wires, partially		
		melted bottles, pockets of green-blue		0 ppm
		crystalline material, chunk of concrete,		
		rusted metal scrap, china cups, bricks		
5.5		water		
6.0		red-gray VFGR silty sandstone,		
	||=||=||	micaceous		

Test Pit Cross Section and / or Plan View





REMARKS Sample S6-TP23-01 collected; 5' deep; gray-brn sand silt, cinders, glass

PHOTO LOG P3 P1, P2, P3 of pit from various angles
P3 P4: Excavated pile of dirty fill material

TEST PIT

TEST PIT LOG

Brown & Root Environmental

PROJECT: NAWC Warminster TEST PIT NO.: S6-TP24

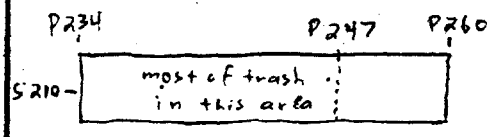
PROJECT NO.: 6883 DATE: 4/19/96

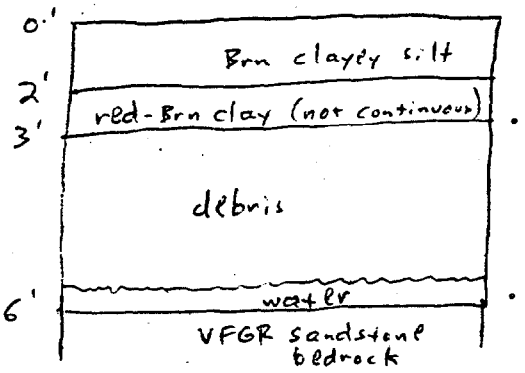
LOCATION: P6F along Station #210 from Profile 230 to 260

FIELD GEOLOGIST: D. Whalen

DEPTH (ft.)	LITHOLOGY CHANGE (Depth ft.)	MATERIAL DESCRIPTION (Soil Density / Consistency, Color)	USCS	REMARKS
0.0		Brn clayey silt		damp 0 ppm
2.0		red-brn clay		0 to 3 ppm
3.0		some lt. blue crystalline material,		Dirty fill material
		assorted debris/refuse: soda bottles,		
		china cups, small bottles, cans, wire,		0 to 3 ppm, damp
		small pieces of rusted metal in a gray-		
		Brn mix of sand, silt, stones, cinders:		
		chunk of concrete, bricks		
5.5		water		
6.0		weathered red-gray VFGR		
	||=||=||=	silty sandstone		

Test Pit Cross Section and / or Plan View





REMARKS 1120 Sample S6-TP24-01 collected; depth 2.5'; red-brn silty clay; ~3 ppm location: S210, P236

1210 Sample S6-TP24-02 collected; depth 5.5'; wet, silt/sand, rocks, cinders, glass

PHOTO LOG R3.25 of pit facing W

TEST PIT

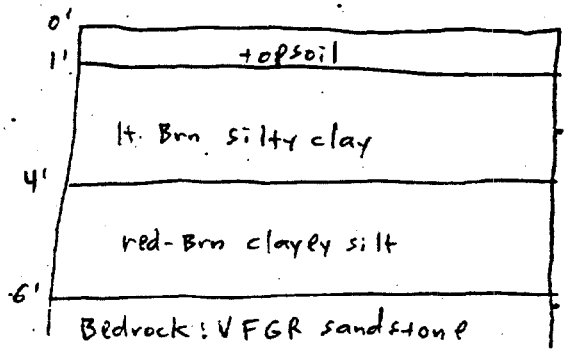
TEST PIT LOG

Brown & Root Environmental

PROJECT: NAWC Warminster TEST PIT NO.: S6-TP25
PROJECT NO.: 6883 DATE: 4/19/96
LOCATION: middle of TR 13 (area of pond/d surface water) 150.0
FIELD GEOLOGIST: D. Whalen

DEPTH (FT.)	LITHOLOGY CHANGE (Depth ft.)	MATERIAL DESCRIPTION (Soil Density / Consistency, Color)	USCS	REMARKS
1.0		Brn / Gray-Brn clayey silt topsoil		moist! grass roots
3.0		lt. Brn silty clay		damp 0 ppm
4.0		red-Brn clayey silt w/ pieces of red-gray VFGR silty sandstone		damp 0 ppm
				water
6.0		weathered VFGR silty sandstone		
	T.D.			

Test Pit Cross Section and / or Plan View



REMARKS natural soil profile - no fill encountered
Trench length 22'

PHOTO LOG R3 P6 of pit facing NW
R3 P7 of pit facing N

TEST PIT

TEST PIT LOG

Brown & Root Environmental

PROJECT: NAWC Warminster TEST PIT NO.: S6-TP26
PROJECT NO.: 6883 DATE: 4/19/96
LOCATION: Area B, Site 6 Prob. TR 12 S 240, P 165
FIELD GEOLOGIST: D. Whalen

DEPTH (ft.)	LITHOLOGY CHANGE (Depth, ft.)	MATERIAL DESCRIPTION (Soil Density / Consistency, Color)	USCS	REMARKS
		Brn clayey silt		0ppm
1.0.5		metal sign post w/ concrete footer		
		3 crushed 55-gal drums; 2 appear		0ppm inside drums
		to be empty, one (which was torn open)		
		contains what appears to be black-stained soil		
		6" dia. flexible air duct, scrap metal		
		folding vinyl curtain w/ steel wires		
		6 steel sign posts w/ concrete footers		
3.0		red-gray sandy silt		0ppm
6.0		weathered VFGR sandstone		
	T.D.			

Test Pit Cross Section and/or Plan View

Middle of Pit

Ends of Pit

REMARKS 1530 Sample S6-TP26-01 collected from drum contents: black silty sand

1545 Sample S6-TP26-02 collected; depth 4' (bottom of print); brown clayey silt 0ppm

PHOTO LOG R3 P8 of pit showing torn open drum
R3 P9 of pit at completion of excavation

TEST PIT S6-TP26

PAGE OF

TEST PIT LOG

HALLIBURTON NUS

PROJECT: NAWC Warminster TEST PIT NO.: TP-27

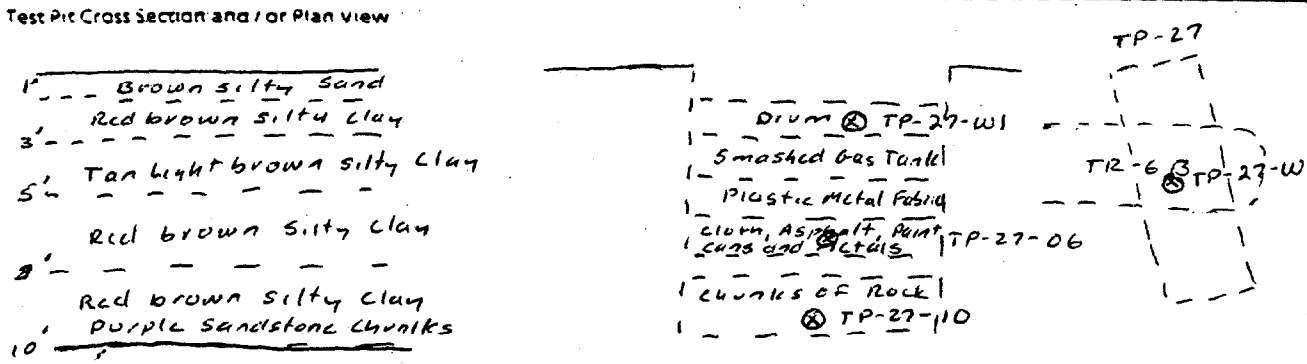
PROJECT NO.: 6883 4010 DATE: February 17, 1997

LOCATION: Site 6

FIELD GEOLOGIST: Charles Meyer

DEPTH (ft.)	LITHOLOGY CHANGE (Depth, ft.)	MATERIAL DESCRIPTION (Soil Density / Consistency, Color)	USCS	REMARKS
1		Brown Silty Sand		
2		Red Brown Silty Clay		Intact Drum Center of Pit
3		Red Brown Silty Clay		Smashed Gas tank Center of Pit
4		Tan Light Brown Silty Clay		Plastic Metal Fabric
5		Tan Light Brown Silty Clay		
6		Red Brown Silty Clay		cloth, asphalt, paint, cans and metal
7		Red Brown Silty Clay		
8		Red Brown Silty Clay		Chunks of Rock
9		Red Brown Silty Clay Purple Sandstone		Chunks of Rock
10		Red Brown Silty Clay Purple Sandstone		Bedrock

Test Pit Cross Section and / or Plan view



REMARKS 55 gallon drum from center of the pit was labeled Jefferson Chemical Company Houston Texas 77052 DSA-400-74-0-6372

PHOTO LOG

TEST PIT TP-27

PAGE 1 OF 1

TEST PIT LOG **HALLIBURTON NUS**

PROJECT: NAWC Warminster TEST PIT NO.: TP-28

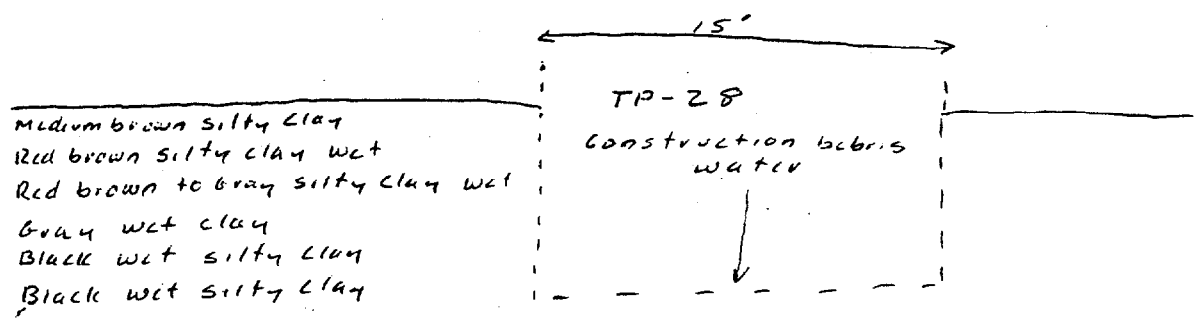
PROJECT NO.: 6883-4010-CT0252 DATE: 2/17/97

LOCATION: Site 6

FIELD GEOLOGIST: Chuck Meyer

DEPTH (ft.)	LITHOLOGY CHANGE (Depth,ft.)	MATERIAL DESCRIPTION (Soil Density / Consistency, Color)	USCS	REMARKS
1		Medium Brown Silty Clay		Bricks, steel pipe 2" diameter Hit water
2		Red Brown silty clay wet		Bricks, steel pipe, wood
3		Red Brown to Gray Silty Clay wet		Sheet metal, wood, bricks pipe.
4		Gray Clay wet		wood, plastic sheeting, metal Bricks.
5		Black silty clay wet		Plywood stumps Brick
6		Black silty clay wet		Glass bottles, sheet metal Bricks

Test Pit Cross Section and / or Plan View



REMARKS The test pit was 15 feet long 6 feet deep and 8 feet wide. Water was encountered at a depth of 1 foot. No samples were taken.

PHOTO LOG

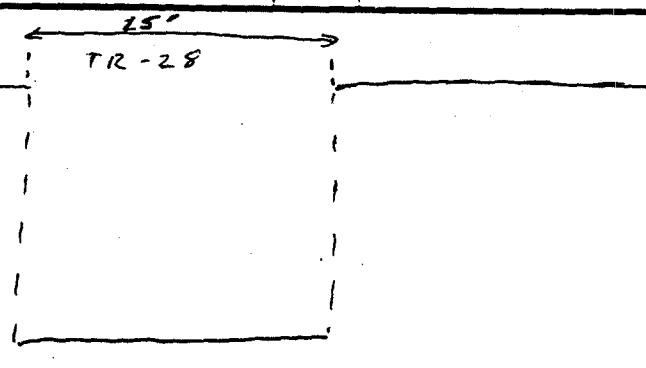
TEST PIT

TEST PIT LOG **HALLIBURTON NUS**

PROJECT: NAWC Warminster TEST PIT NO.: TP-28
PROJECT NO.: 6863-4010 DATE: 2/17/97
LOCATION: Site 6
FIELD GEOLOGIST: Chuck Meyer

DEPTH (ft.)	LITHOLOGY CHANGE (Depth, ft.)	MATERIAL DESCRIPTION (Soil Density / Consistency, Color)	USCS	REMARKS
1		Brown silty clay		Vegitated
2		Light Brown silty clay		OAC PCICC pipe present
3		Light Brown silty clay		
4		Brown silty clay		
5		Brown silty clay		
6		Light Brown silty clay		
7		Light Brown to Gray clay		

Test Pit Cross Section and / or Plan View



REMARKS Test pit was 15 feet long 5 feet wide and 7 feet deep. No samples were collected

PHOTO LOG

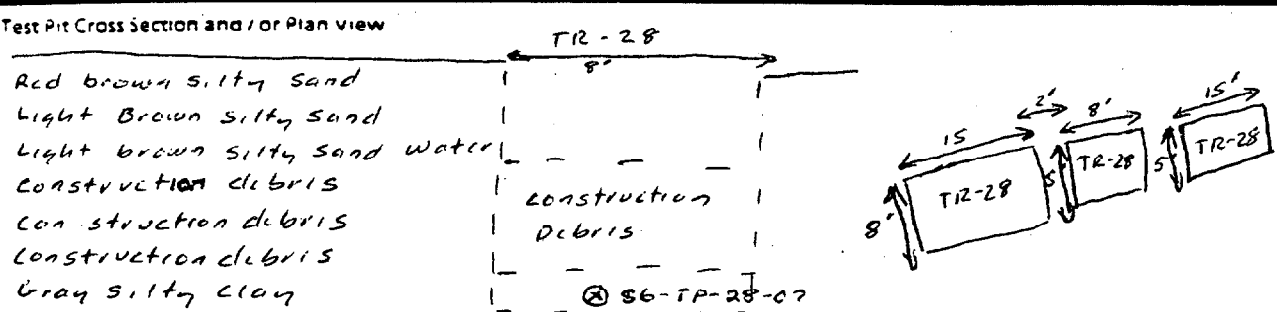
TEST PIT

TEST PIT LOG **HALLIBURTON NUS**

PROJECT: N.A. WC Warminster TEST PIT NO.: TP-28
PROJECT NO.: 6883-4010 CTO252 DATE: 2/17/97
LOCATION: Site 6
FIELD GEOLOGIST: Chuck Meyer

DEPTH (ft.)	LITHOLOGY CHANGE (Depth ft.)	MATERIAL DESCRIPTION (Soil Density / Consistency, Color)	USCS	REMARKS
1		Red Brown Silty Sand		Vegitated
2		Light brown Silty Sand		
3		Light brown Silty Sand water		wood shingles construction Debris
4		construction debris Pipe wood		concrete and bricks.
5		construction debris 2 by 4's plywood		Pipe brick and concrete
6		construction debris		
7		Gray silty clay		

Test Pit Cross Section and / or Plan View



REMARKS The test pit was 8 feet long by 5 feet wide by 7 feet deep.

PHOTO LOG

TEST PIT

PAGE 3 OF 3

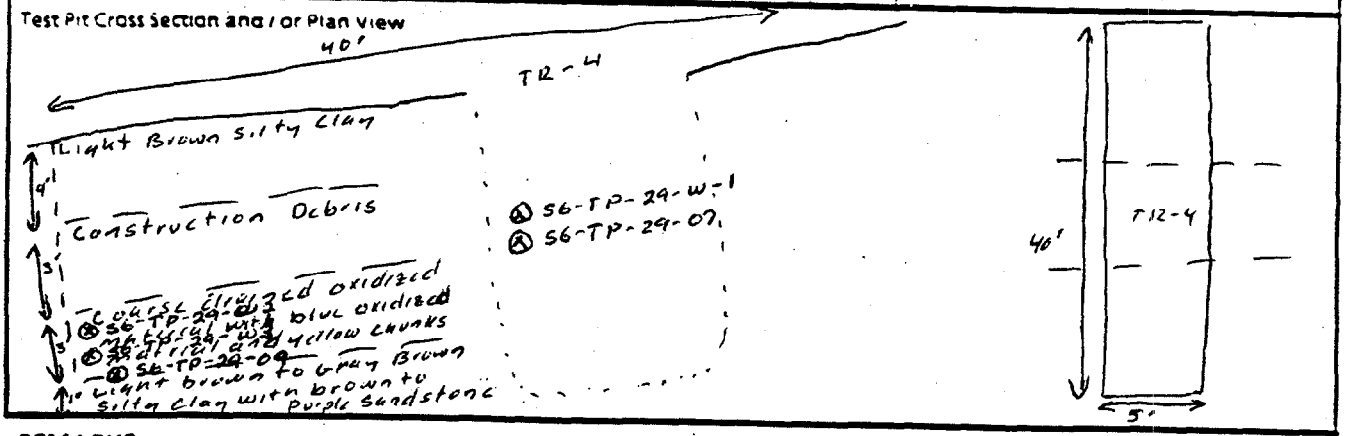
TEST PIT LOG

HALLIBURTON NUS

PROJECT: N.A.W.C. Warminster TEST PIT NO.: TP-29
PROJECT NO.: 6883-4010 CTO 252 DATE: 2/18/97
LOCATION: Site 6
FIELD GEOLOGIST: Chuck Mayer

DEPTH (Ft.)	LITHOLOGY CHANGE (Depth ft.)	MATERIAL DESCRIPTION (Soil Density / Consistency, Color)	USCS	REMARKS
1		Light Brown silty clay		
2		Light Brown silty clay		
3		Light Brown silty clay		
4		Light Brown silty clay		
5		construction debris lt brown silty clay		Rocks and concrete.
6		Construction debris		
7		Construction debris		
8		Coarse Grained oxidized material		Blue oxidated material Yellow chunks of material
9		Coarse Grained oxidized material		
10		Coarse Grained oxidized material		
11		Light brown to Gray Brown silty clay, with brown to purple sandstone fragments		

Test Pit Cross Section and / or Plan View



REMARKS Test pit was 40 feet long by 5 feet wide by 9 to 13 feet deep from east to west. One smashed drum was encountered at 6 feet in the center of the test pit.

PHOTO LOG

TEST PIT

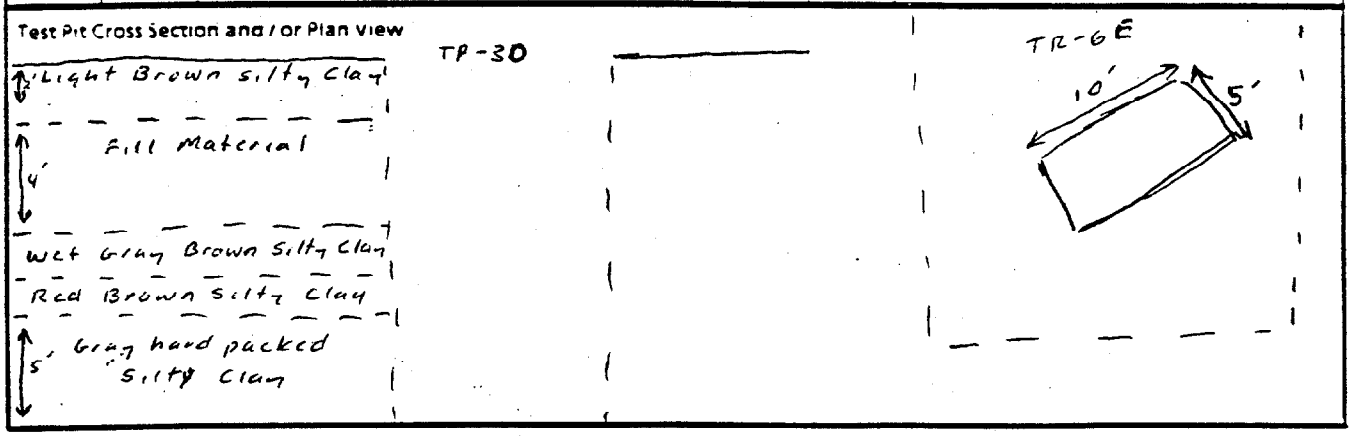
PAGE ____ OF

TEST PIT LOG **HALLIBURTON NUS**

PROJECT: N.A.W.C. Warminster TEST PIT NO.: TP-30
PROJECT NO.: 6883 4010 CTO 252 DATE: 2/18/97
LOCATION: Site 6
FIELD GEOLOGIST: Chuck Mayer

DEPTH (ft.)	LITHOLOGY CHANGE (Depth ft.)	MATERIAL DESCRIPTION (Soil Density / Consistency, Color)	USCS	REMARKS
1		Light Brown silty clay		
2		Light Brown silty clay		
3		Asphalt, metal, wire, telephone poles		
4		Concrete from parking lot Yellow lines		
5		Concrete from parking lot		
6		Concrete from Parking lot		
7		Wet Gray brown silty clay		Water was hit.
8		Red brown silty clay		
9		Gray hard packed silty clay with vegitation		
10		Gray hard packed silty clay with vegitation		
11		Gray hard packed silty clay		
12		Gray hard packed silty clay		
13		Gray hard packed silty clay		Terra Cotta pipe was encountered

Test Pit Cross Section and / or Plan View



REMARKS Bedrock was not encountered in this pit before water began to flow into the pit. No samples were collected from this Test Pit.

PHOTO LOG

TEST PIT

PAGE 1 OF 1

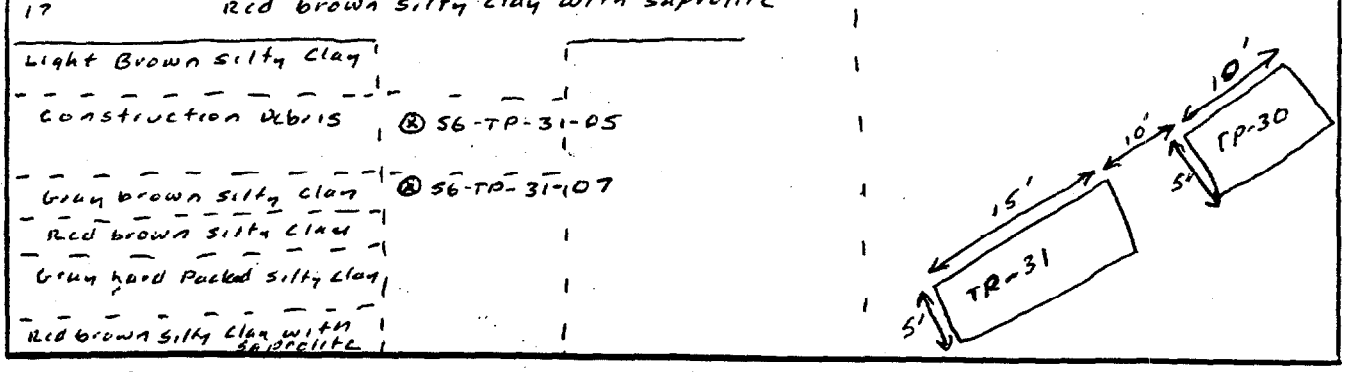
TEST PIT LOG

HALLIBURTON NUS

PROJECT: NAWC Warminster TEST PIT NO.: TP-31
PROJECT NO.: 6883-4010 CTO 252 DATE: 2/19/97
LOCATION: Site 6
FIELD GEOLOGIST: Chuck Meyer

DEPTH (ft.)	LITHOLOGY CHANGE (Depth, ft.)	MATERIAL DESCRIPTION (Soil Density / Consistency, Color)	USCS	REMARKS
1		Light Brown Silty Clay		
2		Light Brown Silty Clay		
3		Asphalt metal, wire, Telephone Poles		
4		Concrete from Parking lot Yellow lines		
5		Concrete from Parking lot		
6		Concrete from Parking lot		
7		Gray brown silty Clay		
8		Red brown Silty Clay		
9		Gray hard packed silty Clay		Vegitation Present
10		Gray hard packed silty Clay		
11		Gray hard packed silty Clay		
12		Gray hard Packed silty Clay		
13		Gray hard packed silty Clay		
14		Red brown silty Clay		Water Encountered
15		Red brown silty Clay with saprolite		
16		Red brown silty Clay with Saprolite		
17		Red brown silty Clay with saprolite		

Test Pit Cross Section and / or Plan View



REMARKS Construction debris was 4 feet Thick. There was water Encountered at 14 feet

PHOTO LOG

TEST PIT

PAGE 1 OF 1

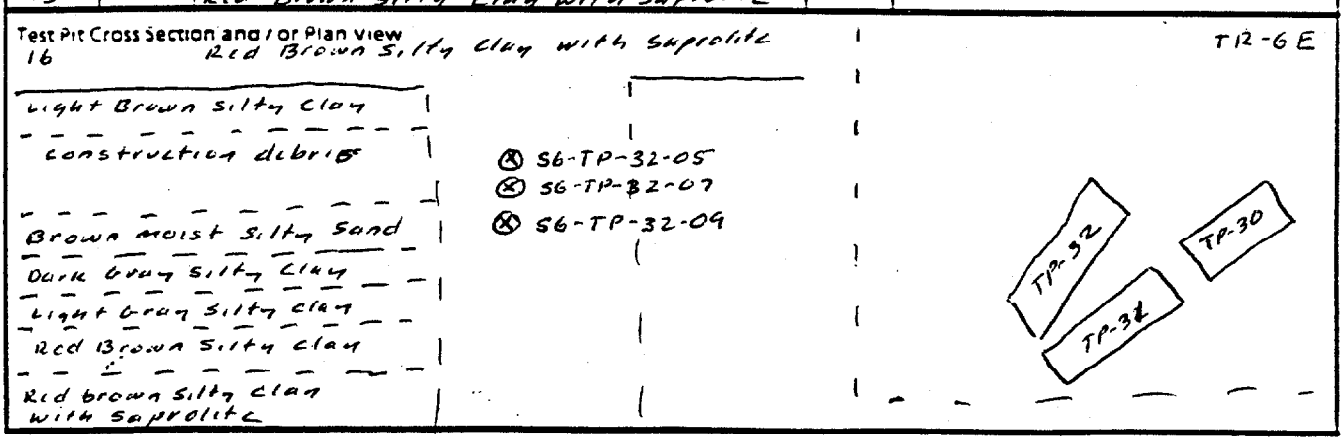
TEST PIT LOG

HALLIBURTON NUS

PROJECT: NAWC Warminster TEST PIT NO.: TP-32
PROJECT NO.: 6883-9010 DATE: 2/19/97
LOCATION: Site 6
FIELD GEOLOGIST: Chuck Meyer

DEPTH (ft.)	LITHOLOGY CHANGE (Depth,ft.)	MATERIAL DESCRIPTION (Soil Density / Consistency, Color)	USCS	REMARKS
1		Light Brown Silty Clay		
2		Light Brown Silty Clay		
3		Asphalt brick and Rock		
4		Concrete From Parking lot		
5		Concrete From Parking lot		
6		Concrete from Parking lot		
7		Concrete from Parking lot		
8		Concrete Rock		
9		Brown Silty Sand moist		
10		Dark Gray Clay		
11		Light Gray Clay		
12		Light Gray Clay		
13		Red Brown Silty Clay		
14		Red Brown Silty Clay		Water was Encountered
15		Red Brown Silty Clay with saprolite		
16		Red Brown Silty Clay with saprolite		

Test Pit Cross Section and / or Plan View



REMARKS

PHOTO LOG

TEST PIT

PAGE ____ OF

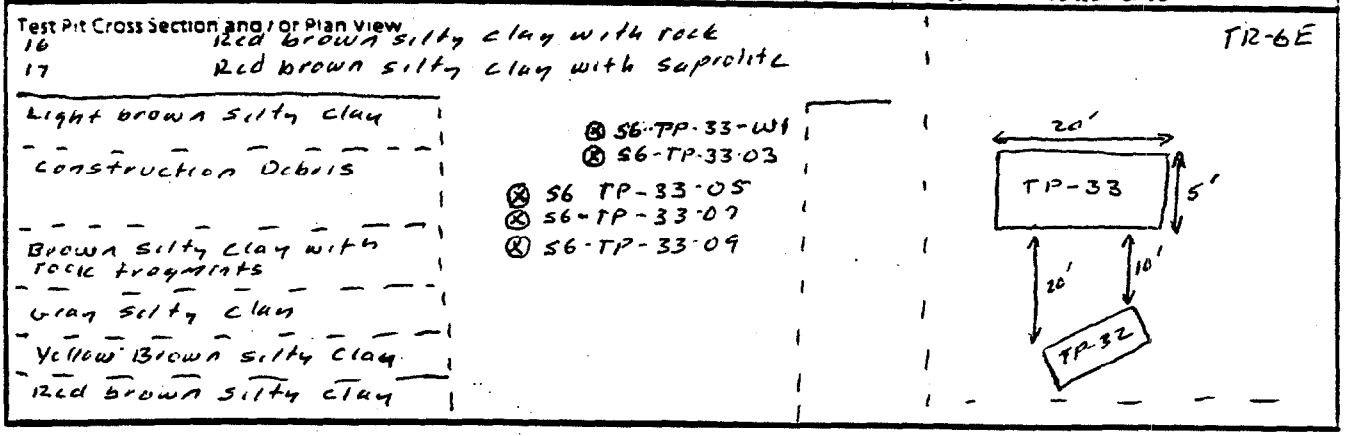
TEST PIT LOG

HALLIBURTON NUS

PROJECT: NAWC Warminster TEST PIT NO.: TP-33
PROJECT NO.: 6863-4010 CTO 252 DATE: 2/19/97
LOCATION: Site 6
FIELD GEOLOGIST: Chuck Meyer

DEPTH (ft.)	LITHOLOGY CHANGE (Depth, ft.)	MATERIAL DESCRIPTION (Soil Density / Consistency, Color)	USCS	REMARKS
1		Light Brown Silty Clay		
2		Light Brown Silty Clay		
3		Asphalt and Construction Debris		
4		Concrete asphalt		
5		Concrete Asphalt wood		
6		Construction Debris		
7		Construction Debris		
8		Construction Debris		
9		Brown silty clay with rock fragments		
10		Brown silty clay with rock fragments		
11		Gray Silty Clay		
12		Gray Silty Clay		
13		Yellow Brown Silty Clay		
14		Yellow Tan Silty Clay		
15		Red brown silty clay		Water was encountered
16		Red brown silty clay with rock		
17		Red brown silty clay with saprolite		

Test Pit Cross Section and / or Plan View



REMARKS The test pit measured 20 feet long by 5 feet wide by 17 feet deep.

PHOTO LOG

TEST PIT

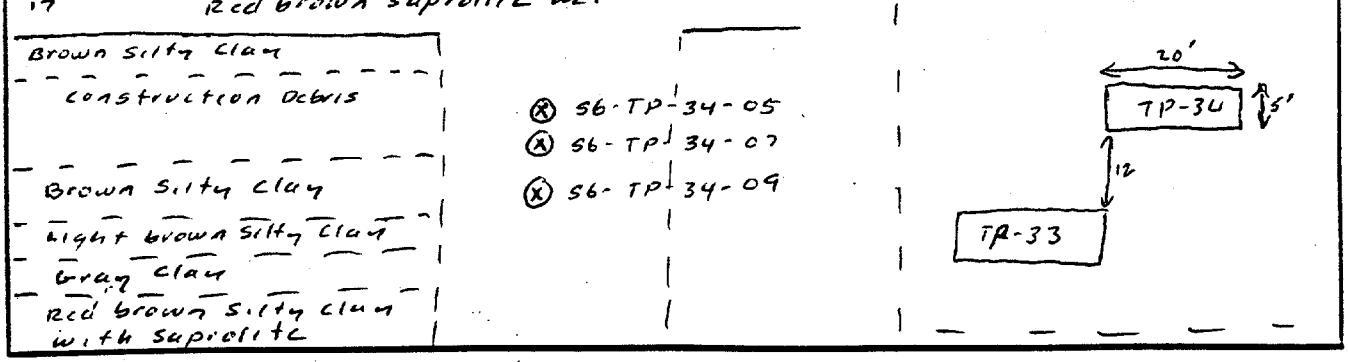
PAGE 1 OF 1

TEST PIT LOG **HALLIBURTON NUS**

PROJECT: NAWC Warminster TEST PIT NO.: TP-34
PROJECT NO.: 6883-4010 CTO 252 DATE: 2/20/97
LOCATION: Site 6
FIELD GEOLOGIST: Chuck Meyer

DEPTH (ft.)	LITHOLOGY CHANGE (Depth ft.)	MATERIAL DESCRIPTION (Soil Density / Consistency, Color)	USCS	REMARKS
1		Brown silty clay		
2		Brown silty clay		
3		Light Brown silty clay with Asphalt		
4		Light Brown silty clay with Asphalt + concrete		
5		Concrete and brick chunks		
6		Concrete brick and wood		
7		Concrete brick, pipe + asphalt		
8		Construction Debris		
9		Brown silty clay		
10		Brown silty clay		
11		Light brown silty clay		
12		Gray clay		
13		Light Gray Clay		
14		Light Gray clay.		
15		Red brown silty clay		Water Encountered
16		Red brown silty clay with saprolite		
17		Red brown saprolite wet		

Test Pit Cross Section and / or Plan View



REMARKS The test pit was 12 feet west of the northwestern corner of Test Pit 33. The test pit was 20 feet long by 5 feet wide by 12 feet deep.

PHOTO LOG

TEST PIT

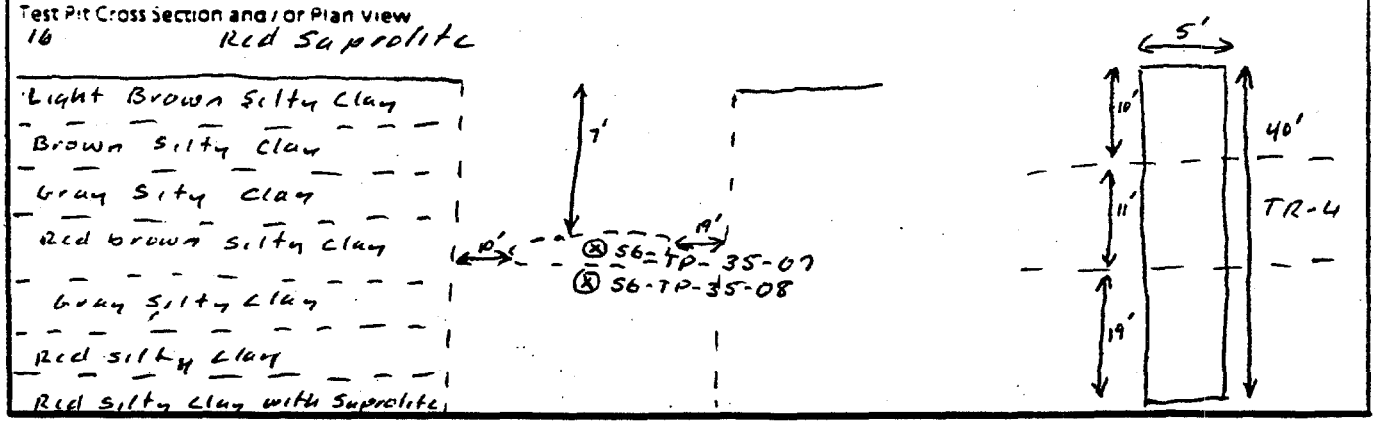
PAGE 1 OF 1

TEST PIT LOG **HALLIBURTON NUS**

PROJECT: NAWC Warminster TEST PIT NO.: TP - 35
PROJECT NO.: 6883-4010 DATE: 2/21/97
LOCATION: Site 6
FIELD GEOLOGIST: Chuck Meyer

DEPTH (ft.)	LITHOLOGY CHANGE (Depth,ft.)	MATERIAL DESCRIPTION (Soil Density / Consistency, Color)	USCS	REMARKS
1		Light Brown Silty Clay		
2		Light Brown Silty Clay		
3		Brown Silty clay		
4		Brown Silty Clay		
5		Brown Silty Clay		
6		Gray Silty Clay		Vegitation Present
7		Red brown Silty Clay		construction debris 10 feet east of the western end of the Pit
8		Red brown Silty Clay		Black viscous material with oxidation 7 feet from western end of Pit.
9		Dark Gray Silty Clay		
10		Light Gray Silty Clay		
11		Red Silty Clay		
12		Red Silty Clay		
13		Red Silty Clay with Saprolite		
14		Red Silty Clay with Saprolite		
15		Red Silty Clay with Saprolite		
16		Red Saprolite		

Test Pit Cross Section and / or Plan View



REMARKS A trench was noted in this test pit 7 feet from the surface 10 feet from the western side of the trench and 19 feet from the eastern end of the trench.

PHOTO LOG

TEST PIT TP-35

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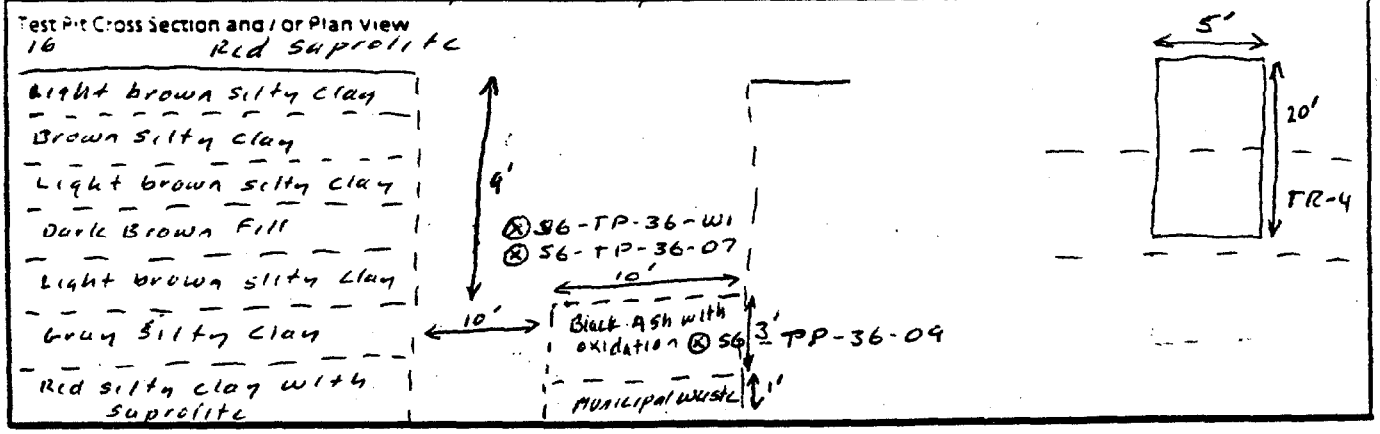
TEST PIT LOG **HALLIBURTON NUS**

PROJECT: NAWC Warminster TEST PIT NO.: TP-36
PROJECT NO.: 6883-4010 DATE: 2/21/97
LOCATION: Site 6
FIELD GEOLOGIST: Chuck Meyer

DEPTH (ft.)	LITHOLOGY CHANGE (Depth ft.)	MATERIAL DESCRIPTION (Soil Density / Consistency, Color)	USCS	REMARKS
1		Light Brown silty clay		
2		Brown silty clay		
3		Brown silty clay		
4		Gray silty clay		Vegitation present
5		Gray silty clay		
6		Light brown silty clay		Asphalt present
7		Dark brown Fill		Concrete, asphalt and brick
8		Light brown silty clay		
9		Dark gray silty clay		Black ash with oxidation 10 feet from western end of Pit
10		Dark gray silty clay		
11		Light gray silty clay		
12		Red silty clay		
13		Red silty clay		Municipal waste on bedrock at 13 feet 10 feet from end of Pit
14		Red silty clay with saprolite		
15		Red silty clay with saprolite		
16		Red saprolite		

Test Pit Cross Section and / or Plan View



REMARKS

PHOTO LOG

TEST PIT

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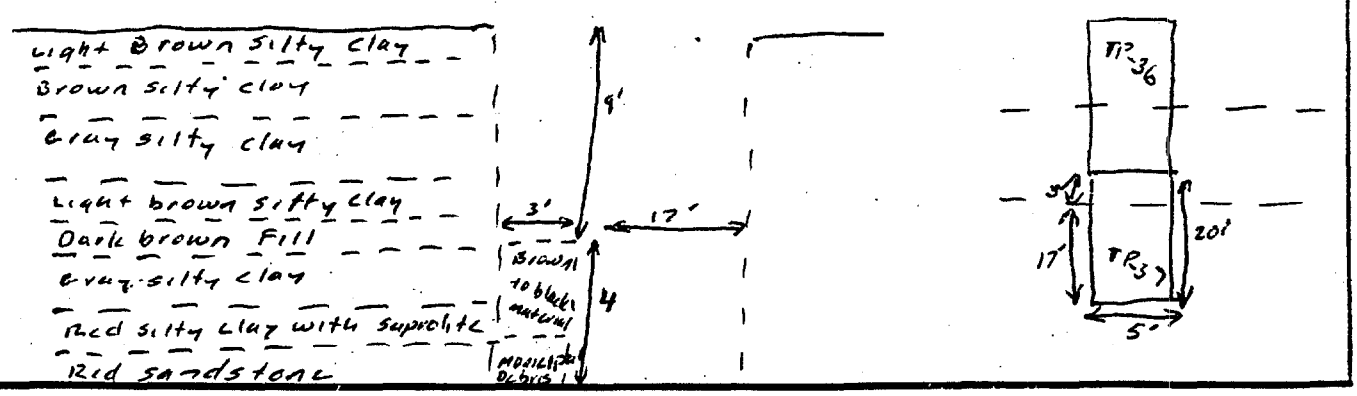
TEST PIT LOG

HALLIBURTON NUS

PROJECT: NAWC Warminster TEST PIT NO.: TP-37
PROJECT NO.: 6883-4010 DATE: 2/24/97
LOCATION: Site 6
FIELD GEOLOGIST: Chuck Meyer

DEPTH (ft.)	LITHOLOGY CHANGE (Depth,ft.)	MATERIAL DESCRIPTION (Soil Density / Consistency, Color)	USCS	REMARKS
1		Light brown silty Clay		
2		Brown silty clay		
3		Brown silty clay		
4		Gray silty clay		
5		Gray silty clay		
6		light brown silty clay		
7		Dark brown Fill		
8		Gray silty clay		
9		Gray silty clay		
10		Red silty clay with saprolite		
11		Red sandstone		

Test Pit Cross Section and / or Plan view



REMARKS Total test pit was 20 feet long by 13 feet at the western end and 11 feet at the eastern end by 5 feet wide.

PHOTO LOG

TEST PIT TP-37

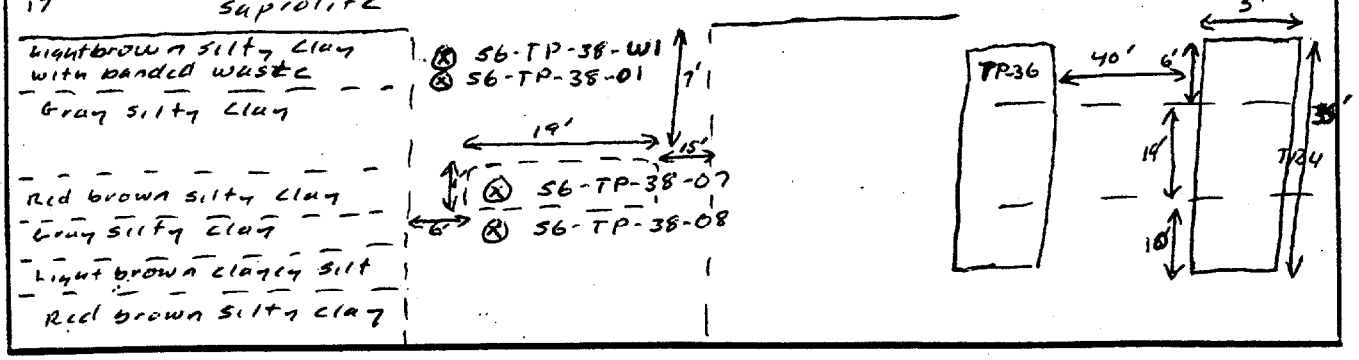
PAGE 1 OF 1

TEST PIT LOG **HALLIBURTON NUS**

PROJECT: NAWC Warminster TEST PIT NO.: TP-38
PROJECT NO.: 6853-4010 CTO 252 DATE: 2/24/97
LOCATION: Site 6
FIELD GEOLOGIST: Chuck Mayer

DEPTH (ft.)	LITHOLOGY CHANGE (Depth ft.)	MATERIAL DESCRIPTION (Soil Density / Consistency, Color)	USCS	REMARKS
1		Light brown silty clay		banded black ash glass brick and gravel
2		Gray silty clay		Vegitation present
3		Gray silty clay		
4		Gray silty clay		
5		Gray silty clay		
6		Gray silty clay		
7		Red brown silty clay with gravel		
8		Gray silty clay		
9		Light brown clayey silt		
10		Light brown clayey silt		
11		Light Brown clayey silt		
12		Light brown to orange silty clay		
13		Red brown silty clay		
14		Red brown silty clay		
15		Red brown silty clay with saprolite		
16		Red brown silty clay with saprolite		
17		Saprolite		

Test Pit Cross Section and / or Plan View



REMARKS

PHOTO LOG TEST PIT

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TEST PIT LOG

HALLIBURTON NUS

PROJECT: NAWC Warminster TEST PIT NO.: TP-39

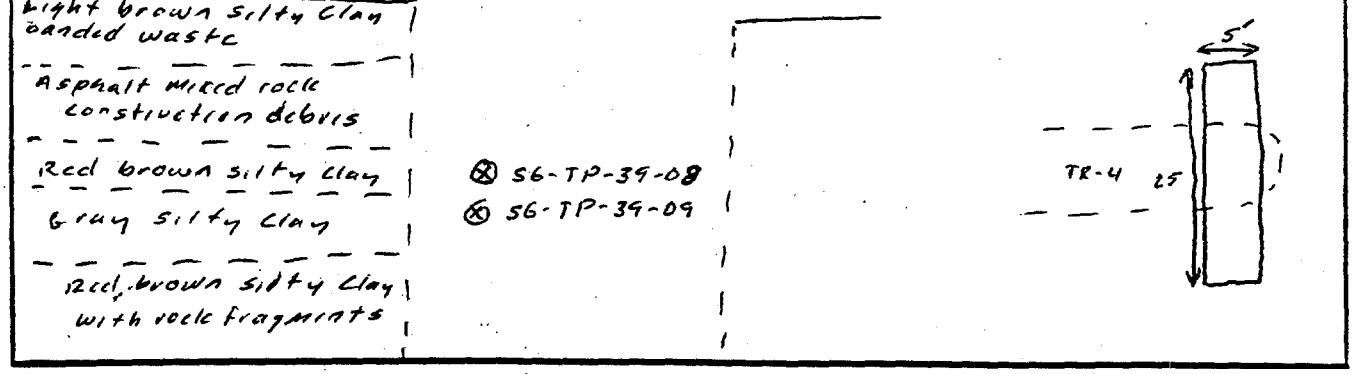
PROJECT NO.: 6883-4010 CTO252 DATE: 2/25/97

LOCATION: Site 6

FIELD GEOLOGIST: Chuck Meyer

DEPTH (ft.)	LITHOLOGY CHANGE (Depth, ft.)	MATERIAL DESCRIPTION (Soil Density / Consistency, Color)	USCS	REMARKS
1		Light brown silty clay		banded waste layer plastic ceramic ash material
2		Light brown silty clay		
3		Asphalt mixed rock + construction debris		
4		Asphalt mixed rock and construction debris		
5		Concrete construction debris		
6		Concrete construction debris		
7		Concrete construction debris		
8		Red brown silty clay with concrete and rocks.		
9		Light brown to gray silty clay		
10		Gray silty clay		
11		Gray silty clay		
12		Light gray silty clay		
13		Red brown silty clay with Rock Fragments		water was encountered
14		Red brown silty clay with Rock fragments		
15		Red brown saprolite		

Test Pit Cross Section and / or Plan View



REMARKS The total distance of the pit was 5 feet wide by 25 feet long and 15 feet deep.

PHOTO LOG

TEST PIT

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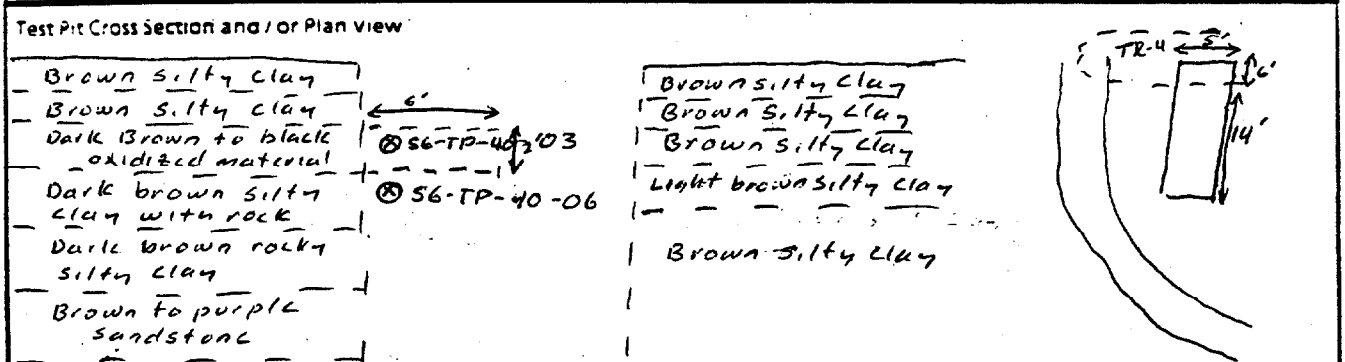
TEST PIT LOG **HALLIBURTON NUS**

PROJECT: NAWC Warminster TEST PIT NO.: TP-40
PROJECT NO.: 6863-4010 DATE: 2/25/97
LOCATION: Site 6
FIELD GEOLOGIST: Chuck Moyer

DEPTH (ft.)	LITHOLOGY CHANGE (Depth, ft.)	MATERIAL DESCRIPTION (Soil Density / Consistency, Color)	USCS	REMARKS
1		Brown Silty Clay		
2		Brown Silty Clay		
3		Dark brown to black oxidized material		
4		Brown to black oxidized material		The western 6 feet of the pit contained tree trunks parts and rocks
5		Brown to black oxidized material		The western 6 feet of the pit contained tree trunks rocks and the material
6		Dark brown silty clay with rock		
7		Dark brown rocky silty clay		
8		Brown to purple sandstone		

Test Pit Cross Section and / or Plan View



REMARKS Test Pit was 20 feet long 5 feet wide and 8 feet deep. Duplicate sample and MS/MSD were collected here. duplicate was S6-TP-40-10 at an assigned time of 1600.

PHOTO LOG TEST PIT

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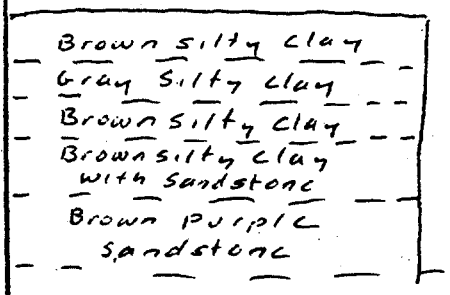
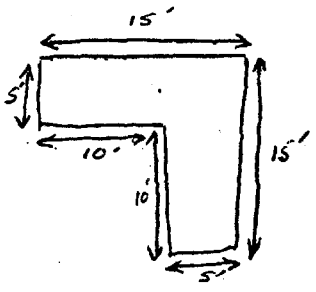
TEST PIT LOG **HALLIBURTON NUS**

PROJECT: NAWC Warminster TEST PIT NO.: TP-4 1
PROJECT NO.: 6883-4010 CTO 252 DATE: 2/26/97
LOCATION: Site 6
FIELD GEOLOGIST: Gavek Meyer

DEPTH (ft.)	LITHOLOGY CHANGE (Depth ft.)	MATERIAL DESCRIPTION (Soil Density / Consistency, Color)	USCS	REMARKS
		North South Axis		
1		Brown silty clay		Vegitation Present
2		Gray silty clay		
3		Brown silty clay		
4		Brown silty clay with sandstone		
5		Brown purple sandstone		
		East West Axis		
1		Brown silty clay		Vegitation Present
2		Gray silty clay		
3		Brown silty clay		
4		Brown silty clay with sandstone		
5		Brown purple sandstone		

Test Pit Cross Section and / or Plan View





REMARKS

PHOTO LOG TEST PIT

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