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Feasibility Study Report
Site 12 - Town Gut Landfill
Site 41 - Scrap Yard

Indian Head Division
Naval Surface Warfare Center
Indian Head, Maryland

VOLUME II - APPENDICES

Engineering Field Activity Chesapeake
Naval Facilities Engineering Command

Contract Number N62472-90-D-1298
Contract Task Order 0245

January 2001

APPENDIX A

PRE-FEASIBILITY STUDY WETLANDS DELINEATION REPORT

Wetland Delineation Report
for
Site 12 (Town Gut Landfill) and Site 42 (Olsen Road Landfill)

Naval Surface Warfare Center
Indian Head Division
Indian Head, Maryland

Engineering Field Activity Chesapeake
Naval Facilities Engineering Command

Contract Number N62472-90-D-1298
Contract Task Order 0245

January 2000

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WETLAND DELINEATION REPORT FOR SITE 12 (TOWN GUT LANDFILL) AND SITE 42 (OLSEN ROAD LANDFILL)

NAVAL SURFACE WARFARE CENTER
INDIAN HEAD DIVISION
INDIAN HEAD, MARYLAND

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT

Submitted to:
Engineering Field Activity Chesapeake
Environmental Branch Code 18
Naval Facilities Engineering Command
Washington Navy Yard, Building 212
Washington, D.C. 20374-2121

Submitted by:
Tetra Tech NUS, Inc.
600 Clark Avenue, Suite 3
King of Prussia, Pennsylvania 19406-1433

CONTRACT NUMBER N62472-90-D-1298
CONTRACT TASK ORDER 0245

JANUARY 2000

PREPARED BY:

GEORGE J. LATULIPPE, P.E.
PROJECT MANAGER
TETRA TECH NUS, INC.
PITTSBURGH, PENNSYLVANIA

APPROVED BY:

JOHN J. TREPANOWSKI, P.E.
PROGRAM MANAGER
TETRA TECH NUS, INC.
KING OF PRUSSIA, PENNSYLVANIA

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ACRONYMS

ARARs	Applicable, relevant, and appropriate regulations
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
DBH	diameter at breast height
EPA	United States Environmental Protection Agency
FAC	Facultative
FACU	Facultative Upland
FACW	Facultative Wetland
FWS	United States Fish and Wildlife Service
IHDIV-NSWC	Indian Head Division, Naval Surface Warfare Center
MDE	Maryland Department of the Environment
OBL	Obligate Wetland
SCS	United States Soil Conservation Service
TtNUS	Tetra Tech NUS, Inc.
UPL	Obligate Upland
USACE	U.S. Army Corps of Engineers

1.0 INTRODUCTION

Areas meeting the definition of wetlands used by the U.S. Environmental Protection Agency (EPA) and the U.S. Army Corps of Engineers (USACE), under Section 404 of the Clean Water Act (33 USC 1344), were delineated on those parts of Indian Head Division, Naval Surface Warfare Center (IHDIV-NSWC) designated as Site 12 (Town Gut Landfill) and Site 42 (Olson Road Landfill). The delineation also identified wetlands regulated by the state of Maryland under several natural resource protection acts.

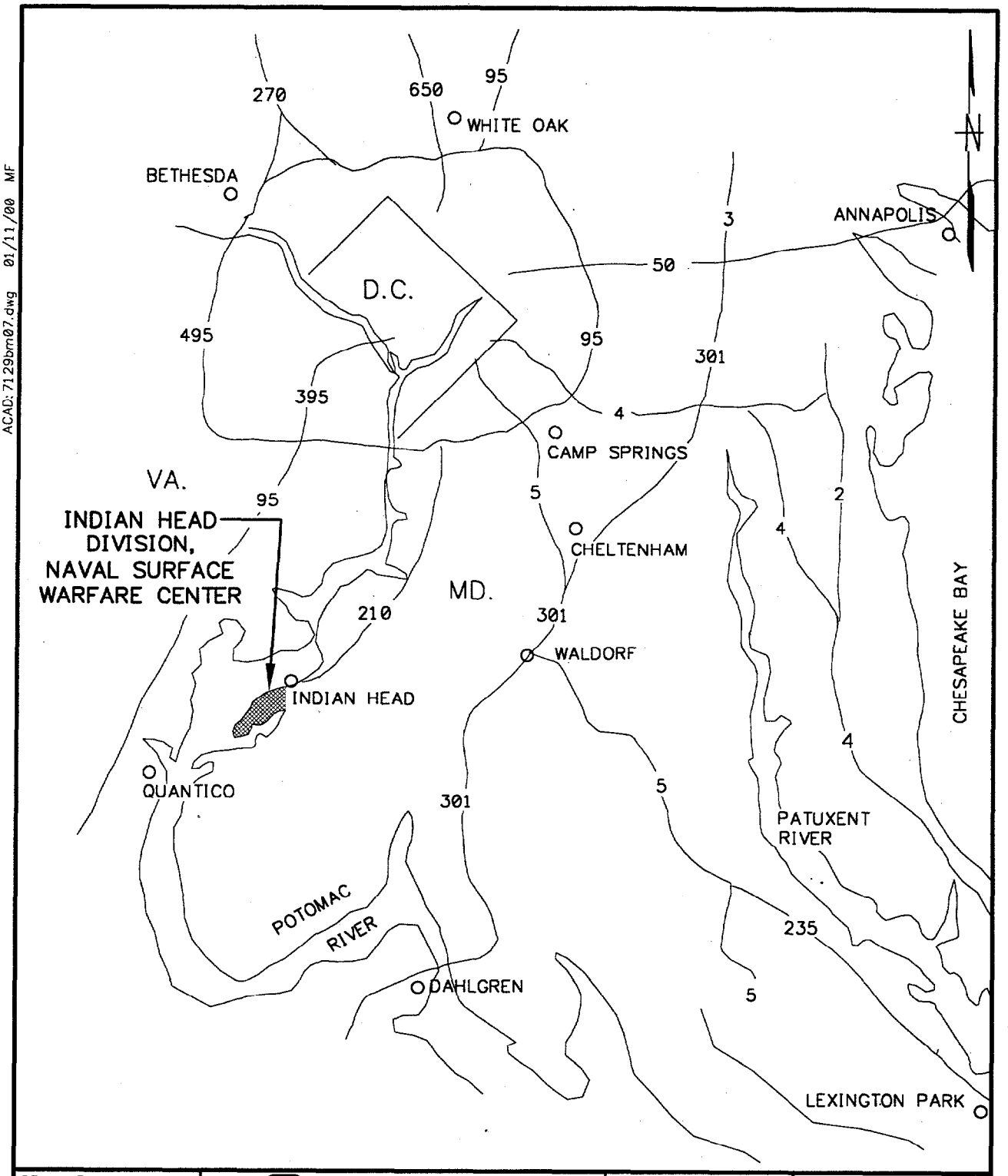
The USACE and EPA define wetlands as "those areas that are inundated or saturated at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas (40 CFR 230.3 and 33 CFR 328.3)." Maryland defines wetlands using the same definition but has enacted separate regulations for protecting tidal wetlands (the Maryland Tidal Wetlands Act) and nontidal wetlands (the Maryland Nontidal Wetlands Protection Act).

1.1 PURPOSE

The Navy is investigating Sites 12 and 42 under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA; 42 USC 9601 et seq.). Section 404 of the Clean Water Act and the Maryland wetland protection regulations constitute Applicable, Relevant, and Appropriate Regulations (ARARs) under CERCLA. Federal agencies such as the Navy are not required to formally apply for permits under ARARs when conducting activities in the context of CERCLA. But agencies are required to comply with the intent of ARARs by protecting environmental resources in a commensurate manner. Compliance with ARARs pertaining to wetland protection requires identifying, mapping, and describing the affected wetland areas. The following report summarizes an effort to map the wetlands on the sites and presents a descriptive baseline that can be used to develop a mitigation plan for restoring or replacing the wetlands, if necessitated by remediation activities.

1.2 SITE DESCRIPTION

The IHDIV-NSWC is located in northwestern Charles County, Maryland, approximately 25 miles southwest of Washington, DC (Figure 1-1). The main area of the installation occupies a peninsula termed Cornwallis Neck. The peninsula is bounded to the north and west by the Potomac River and to the south by Mattawoman Creek. Both the Potomac River and Mattawoman Creek are tidal. A separate area of the installation, the Annex on Stump Neck, is located across Mattawoman Creek from the main area. Sites 12 and 42 are both located within the main area. The active mission of IHDIV-NSWC includes research, development, testing, evaluation, and support services related to ordnance and explosives.



DRAWN BY TAD DATE 4/98	Tetra Tech NUS, Inc.	CONTRACT NO. 7129	OWNER NO. ———
CHECKED BY GJL DATE 02/08/00	VICINITY MAP IHDIV – NSWC, INDIAN HEAD, MARYLAND	APPROVED BY GJL	DATE 02/08/00
COST/SCHED-AREA		APPROVED BY	DATE
SCALE AS NOTED		DRAWING NO. FIGURE 1–1	REV. 0

FORM CADD NO. SOUTH_AV.DWG - REV 0 - 02/07/97

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1.2.1 Site 12

Site 12 comprises approximately 4 acres of undeveloped land in the south-central part of the main area (Figure 1-2). The site is bounded to the east, north, and southeast by Atkins Road. Atkins Road Extension crosses the middle of the site in a northwestward orientation, serving as a shortcut between segments of Atkins Road south and north of the site. This road extension divides Site 12 into western and eastern components.

Between 1968 and 1980, the site was used to dispose of landscaping waste, fill material, and rubble. Material generated outside the installation was also deposited at the site prior to 1972. Now abandoned, the landfill is estimated to contain approximately 80,000 cubic yards of material, or approximately 6,400 tons of mixed solid waste material comprising primarily landscaping wastes, tree stumps, and demolition debris. Some unauthorized dumping may have occurred at the landfill prior to closure. Unauthorized materials dumped at the site could have included paints, varnishes, and other chemical wastes (TtNUS, 1999)

The landfilled area is estimated to encompass approximately 1 acre, and the top of the fill is estimated to be approximately 10 to 15 feet over the original ground surface (TtNUS, 1999). The gently sloping surface currently supports perennial grasses and widely scattered deciduous tree saplings. Steeper slopes bordering the landfilled area support mature deciduous forest. The western edge of the site abuts a pond situated upstream of a dam constructed across a cove of Mattawoman Creek. A 72-inch pipe under the dam regulates the water level in the pond and allows excess water to flow out into tidal wetlands bordering Mattawoman Creek. Another 72-inch pipe provides continuity under Atkins Road Extension to another pond in the central part of the site. That pond bisects landfilled areas east of Atkins Road Extension into northern and southern components.

1.2.2 Site 42

Figure 1-2 shows the location of Site 42 on the facility. Site 42 includes approximately 2 acres formerly occupied by a landfill. An Assembly Building (Building 1866) was constructed on part of the abandoned landfill in 1992. An unnamed nontidal tributary to Mattawoman Creek flows southward along the western edge of the former landfill. The site was used for unauthorized disposal of solid wastes between 1982 and 1987 (TtNUS, 1999).

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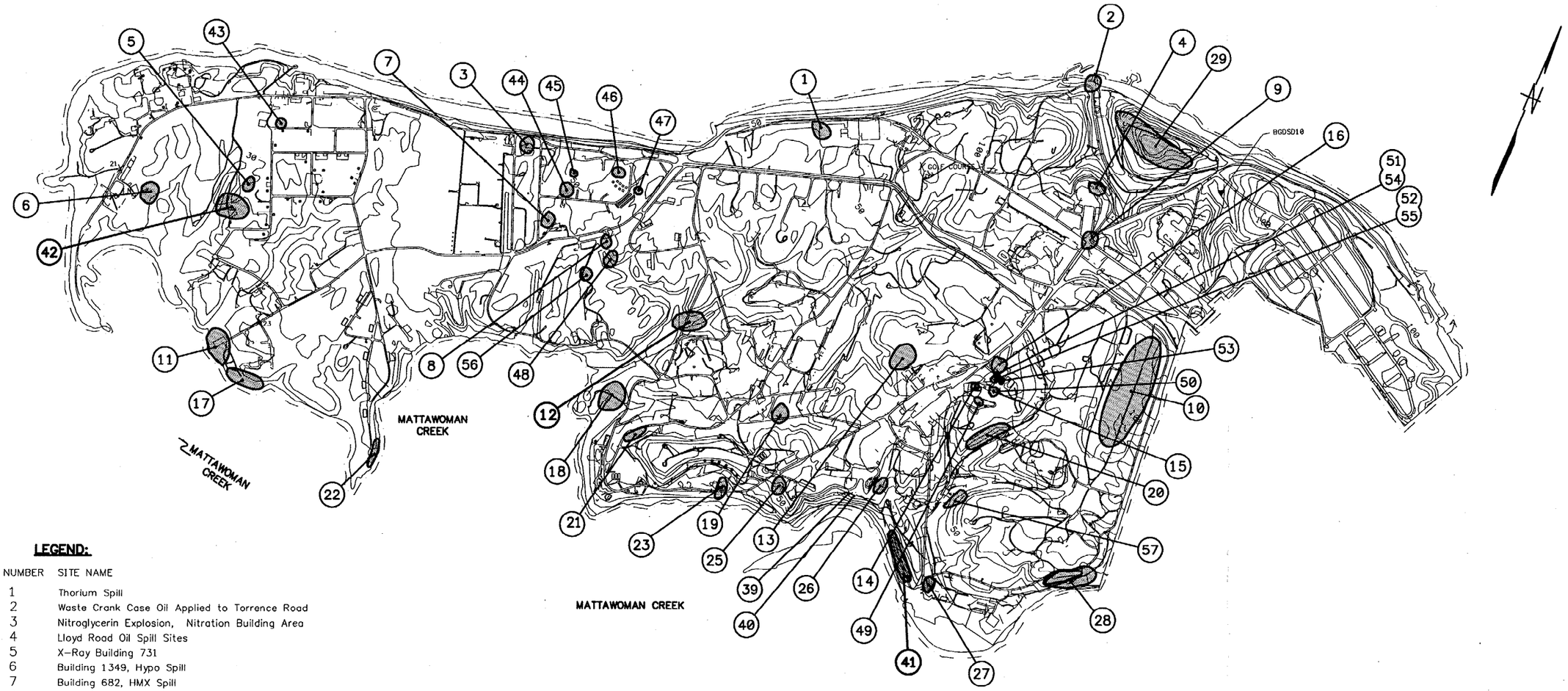

LEGEND:

SITE NUMBER	SITE NAME
1	Thorium Spill
2	Waste Crank Case Oil Applied to Torrence Road
3	Nitroglycerin Explosion, Nitration Building Area
4	Lloyd Road Oil Spill Sites
5	X-Ray Building 731
6	Building 1349, Hypo Spill
7	Building 682, HMX Spill
8	Building 766, Mercury Deposits
9	Patterson Avenue, Oil Spill
10	Single-base Propellant Grains Spill
11	Coffee Road Landfill
12	**Town Gut Landfill**
13	Paint Solvents Disposal Ground
14	Waste Acid Disposal Pit
15	Mercury Deposits in Manhole, Flourine Lab
16	Laboratory Chemical Disposal
17	Disposal Metal Parts Along Shoreline
18	Hog Island
19	Catch Basins at Chip Collection Houses
20	Single-base Powder Facilities
21	Bronson Road Landfill
22	NG Slums Burning Site
23	Hydraulic Oil Spill Discharges From Extrusion Plant
24	Abandoned Drain Lines
25	Hypo Discharge X-Ray Building No. 2
26	Thermal Destructor 2
27	Thermal Destructor 1
28	Original Burning Ground
29	The Valley
30-38	Stump Neck Annex (SEE FIGURE 3-2)
39	Organic Plant Outfall
40	Palladium Catalyst in Sediments
41	**Scrap Yard**
42	**Olson Road Landfill**
43	Toluene Disposal Site
44	Soak Out Area
45	Abandoned Drums
46	Cadmium Sandblast Grit
47	Mercuric Nitrate Disposal Area
48	Nitroglycerine Plant Disposal Area
49	Chemical Disposal Area
50	Building 103, Crawl Space
51	Building 101, Dry Wall
52	Building 102, Dry Wall
53	Mercury Contamination of the Sewage System
54	Building 101
55	Building 102
56	IW87 - Lead Contamination
57	TCE Building 292 Area

APPROXIMATE SITE LOCATION
INTERMITTENT STREAM
NAVAL RESERVE BOUNDARY
100 CONTOUR INTERVAL 10 FEET
FLOW DIRECTION

0 1600 3200
SCALE IN FEET

NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

DRAWN BY KW DATE 3/30/99
CHECKED BY GJL DATE 02/09/00
COST/SCHED-AREA
SCALE AS NOTED

Tetra Tech NUS, Inc.

SITE LOCATION MAP
INDIAN HEAD NSWC
INDIAN HEAD, MARYLAND

CONTRACT NO. 7129
OWNER NO.
APPROVED BY GJL DATE 02/09/00
APPROVED BY DATE
DRAWING NO. FIGURE 1-2
REV. 0

FORM CADD NO. SOUTH_BH.DGN - REV 0 - 02/11/97

00604 R012

Areas of the former landfill not occupied by Building 1866 and its parking lot currently support perennial grasses and widely scattered deciduous tree saplings. Two drainage ditches cross that part of the abandoned landfill north of Building 1866. Another drainage ditch is located close to the southern edge of the site and receives outflow from a drainage pipe (Outfall IW71). Areas west and south of the abandoned landfill support mature deciduous forest vegetation. Areas to the east and north are occupied by other facilities.

2.0 WETLAND DELINEATION METHODOLOGY

The wetland delineation followed the routine on-site methodology in the Corps of Engineers Wetlands Delineation Manual (1987 Manual) (Environmental Laboratory, 1987) and the USACE-issued memorandum on clarification and interpretation of that manual (USACE, 1992). Field data on vegetation, soils, and hydrology at points on representative transects perpendicular to each wetland were used to determine the exact position of each wetland boundary.

2.1 WETLAND DELINEATION BACKGROUND

Wetlands, as regulated under Section 404 of the Clean Water Act, are defined in 33 CFR 328 as "areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions."

For an area to be identified as a wetland according to the 1987 Manual, it must display positive evidence of each of three parameters:

- Hydrophytic vegetation
- Hydric soil
- Wetland hydrology

The 1987 Manual defines each parameter and lists specific field indicators that may be used to document evidence for each. Certain specific exceptions, under which wetlands may not necessarily show evidence of each parameter, are noted in the 1987 Manual. These exceptions pertain to disturbed areas and certain areas of exceptional complexity termed "problem areas."

2.2 WETLAND DELINEATION PROCEDURES

Each site was initially walked to determine those areas where wetlands could potentially be present. Representative transects were then established perpendicular to each area of potential wetlands. Vegetation, soil, and hydrology data were collected at each data point on the transects, as follows:

Vegetation: Each plant species observed within a 30-foot-diameter circular quadrant surrounding the center of each data point was recorded (a nested 5-foot-diameter quadrant was utilized to record herbaceous vegetation). Dominant species were determined, on the basis of estimated percent areal cover, for each of the following vegetative strata:

- Canopy - Trees over 5 inches in diameter at breast height (DBH)
- Saplings - Woody plants over 20 feet in height but under 5 inches DBH
- Shrubs - Woody plants under 20 feet in height
- Herbaceous Groundcover - Nonwoody plants and woody seedlings under 3 feet in height
- Woody Vines - Woody vines attached to the trunks of trees or saplings

The wetland indicator status for each dominant species was then recorded according to Reed (1988). Indicator statuses include the following:

- Obligate Wetland (OBL) - Species recognized as occurring in wetlands greater than 99 percent of the time.

- Facultative Wetland (FACW) - Species recognized as occurring in wetlands 67 to 99 percent of the time.

- Facultative (FAC) - Species equally likely to occur in wetlands or uplands (nonwetlands).

- Facultative Upland (FACU) - Species recognized as occurring in wetlands 1 to 33 percent of the time.

- Obligate Upland (UPL) - Species recognized as occurring in wetlands less than 1 percent of the time.

The 1987 Manual states that areas within which greater than 50 percent of the dominant plant species are OBL, FACW, and FAC display evidence of hydrophytic vegetation. Modifiers of "+" and "-" are added to the indicator statuses of plants considered to be slightly more or less prone to occur in wetlands than indicated by the indicator status alone. Species designated as "FAC-" are considered to count against rather than toward the 50-percent threshold. The 1987 Manual also lists several morphological adaptations of plants that are responses to wetland hydrology. Visual observation of one or more of these adaptations also constitutes evidence of hydrophytic vegetation, regardless of indicator status data.

Soil: Soil borings were hand augered to a minimum depth of 20 inches (or auger refusal) at each data point. The following data were recorded for each soil horizon (layer) encountered:

- Soil matrix color, using a Munsell Soil Color Chart. The matrix is the predominant color of a soil horizon. In most soils in the eastern United States, grayer matrix colors are generally indicative of extended periods of soil saturation, and brighter orange, yellow, or red matrix colors are generally indicative of infrequent saturation.

- Color, abundance, and distinctiveness of soil mottles, if present. Mottles are spots or streaks of a different color that occur within the matrix of a soil horizon. Bright orange, yellow, or red mottles contrasting with a gray matrix are generally indicative of extended periods of soil saturation.

- Texture, estimated subjectively in the field using definitions established by the U.S. Department of Agriculture (SCS, 1962).

- Presence of concretions or other irregularities.

The soil profile data were used to identify the soil series at each soil boring location. The soil profile data were compared against physical descriptions and characteristic soil profiles for specific soil series in the Soil Survey for Charles County, Maryland (SCS, 1974). If the soil series could be conclusively determined, the Hydric Soils List for Maryland (NRCS, 1999) was consulted to determine whether it was listed as hydric. Additionally, the profile properties were used to determine whether the soil displayed one or more of the field indicators of hydric soils listed in the 1987 Manual. Hydric soil field indicators recently adapted by the NRCS (NRCS, 1996) were also considered.

Hydrology: The depth of surface water, if present, was recorded at each data point. Otherwise, the depths to soil saturation and to free water in the soil borehole were recorded. If saturated soils were not encountered in a borehole, it was recorded as dry. The 1987 Manual lists several primary field indicators of wetland hydrology, including

- Visual observation of soil inundation (presence of surface water)
- Visual observation of soil saturation (free water within 10 inches of the surface)
- Presence of watermarks on trees or structures resulting from previous episodes of surface water
- Presence of drift lines caused by previous episodes of surface water
- Presence of sediment deposits resulting from earlier episodes of surface water
- Presence of surface drainage features indicative of episodes of surface water

The supplementary guidance also notes several secondary field indicators that can be used as evidence of seasonally saturated wetland hydrology when primary indicators are not present. At least two secondary field indicators must be documented as present for the wetland hydrology parameter to be met. Examples of secondary field indicators of wetland hydrology include, but are not limited to

- Passed FAC-Neutral Test (the number of dominant plant species with indicator statuses of OBL and FACW exceeds the number with FACU or UPL statuses).

- Presence of water-stained leaves on the soil surface.

- Presence of oxidized root channels surrounding living plant roots (narrow strips of orange or yellow soil adjoining roots in a gray-colored soil).

2.3 STAKING AND SURVEYING

Wetland boundaries on each site were marked in the field using wooden stakes. Each stake was labeled "WET" followed by the site number (12 or 42) and a sequential number. Each data point on the transects selected for recording field data was also staked, and the stakes were labeled "WET" followed by "DP" and the number assigned to the data point. The coordinates for each stake were subsequently determined through a conventional land survey and shown on topographic base maps for each site.

3.0 WETLAND DELINEATION RESULTS

Section 3.1 presents the results of the wetland delineation for Site 12. Section 3.2 presents the results of the wetland delineation for Site 42. Drawings depicting the wetland delineations are presented in Figure 3-1 for Site 12 and Figure 3-2 for Site 42. Data sheets presenting field data on vegetation, soil, and hydrology for representative data points on transects perpendicular to the delineated wetland boundaries are presented for Site 12 in Appendix A and for Site 42 in Appendix B.

3.1 SITE 12

Wetlands on formerly landfilled areas at Site 12 are limited to narrow zones of herbaceous vegetation on saturated soils at the shorelines of the ponds created by the dam south of the site (Figure 3-1). The vegetation in these narrow fringes of shoreline wetlands comprises a dense, nearly pure stand of smartweed (*Polygonum punctatum*). The zone of saturated wetlands fringing the ponds is generally between 5 and 15 feet wide at the edge of the pond west of Atkins Road Extension and between 10 and 50 feet wide at the edge of the pond east of that roadway. The additional width bordering the eastern pond is likely the result of recent beaver activity, which has partially restricted a culvert carry flow westward under the roadway. There are no wetlands on the surface of the abandoned landfill, except where the landfill immediately abuts the ponds. All the wetlands on Site 12 are nontidal.

Under the wetland classification system developed by the US Fish and Wildlife Service (FWS) (Cowardin et al., 1979), nearly all the wetlands on Site 12 would be best classified as palustrine emergent, dominated by persistent herbaceous vegetation. A small area of wetlands bordering a segment of shoreline near the eastern edge of Site 12, east of the landfill, would be classified as palustrine forested, dominated by broad-leaved deciduous trees.

The standing impounded water in the ponds supports dense, localized patches of the nonpersistent emergent plant, duck potato (*Sagittaria latifolia*). Nonpersistent emergent vegetation does not remain standing throughout a normal year. Wetlands dominated by nonpersistent vegetation may at many times appear to be open waters lacking vegetation. The ponds, which are nontidal, may thus be classified as palustrine emergent wetlands dominated by nonpersistent vegetation. Because of the small size of the ponds, they would not typically be classified as lacustrine under the FWS system.

3.1.1 <u>Pond West of Atkins Road Extension</u>

The zone of saturated wetlands fringing the shoreline of the pond west of Atkins Road Extension is delineated by Stakes "WET 12-1" through "WET 12-31." The transition between upland areas on the

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FIGURE 3-1

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SPEC. —

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CODE I.D. NO. 80091

DEPARTMENT OF THE NAVY — CHESAPEAKE DIVISION — NAVAL FACILITIES ENGINEERING COMMAND — WASHINGTON, D.C.

IHDIV-NSWC INDIAN HEAD — INDIAN HEAD, MD

WETLAND DELINEATION MAP
SITE 12 - TOWN GUT LANDFILL
IHDIV-NSWC, INDIAN HEAD, MARYLAND

SEAL AREA

Tetra Tech NUS, Inc.
FOSTER PLAZA VII
661 ANDERSEN DRIVE
PITTSBURGH, PA 15220

DES. | CHK.
DRAWN BY: J. BELLONE — TITLE — DATE 1/6/00
PROGRAM MANAGER — DATE 01/03/01
APPROVED — DATE
EFD FOR COMMAND NAVFAC

08A	403
04	404
E.I.C.	405
401	408
402	04B

REVIEWED BY ROICC — DATE

SYMBOL	DESCRIPTION	DATE	APPROVED

REVISIONS

NOTE:
WET42-1 to WET42-5 are not shown because they are out of area of investigation.

NO.	DATE	REVISIONS	BY	CHKD	APPD

REFERENCES	NO.	RELEASED FOR	BY	DATE

DRAWN BY	DATE
J. BELLONE	11/23/99
CHECKED BY	DATE
P. DOUB	12/17/99
COST/SCHEDULE-AREA	
SCALE	
AS NOTED	

Tetra Tech NUS, Inc.

WETLAND DELINEATION MAP
SITE 42 - OLSEN ROAD LANDFILL
IHDIV-NSWC, INDIAN HEAD, MARYLAND

CONTRACT NO.	OWNER NO.
7129	—
APPROVED BY	DATE
	01/03/01
APPROVED BY	DATE
—	—
DRAWING NO.	REV.
FIGURE 3-2	0

landfill and the wetlands is illustrated with Transect 1 (Appendix A), comprising three data points (1, 2, and 3) on a line perpendicular to the wetland boundary at Stake "WET 12-26."

Vegetation: Vegetation outside the delineated wetland boundary comprises a nearly pure turf of tall fescue (*Festuca arundinacea*), and vegetation inside the boundary comprises a dense stand of smartweed. Several saplings of black locust (*Robinia psuedoacacia*) are widely scattered over parts of the landfill. Saplings within the delineated wetland boundary are dead or dying. Black locust is generally intolerant of extended periods of soil saturation, and the dying saplings suggest that water levels in the pond may have recently risen.

Soils: Soils outside the delineated wetland boundary appear to be fill soils associated with the landfill. Surface soils do not change dramatically at the wetland boundary, but the matrix color does become somewhat grayer with more pronounced mottling. Distinctive changes in soil color due to saturated (anaerobic) conditions are not necessarily expected in fill soils. It was not evident from the transects where the fill soils stopped. It is expected that the fill soils associated with the landfill end somewhere under the ponded water. The Soil Survey of Charles County, Maryland maps the ponds and much of the landfill as tidal marsh soils (SCS, 1974). This mapping does not reflect current conditions. The soil survey reports observations made prior to 1970, before much of the landfill was established and before the nearby dam was constructed.

Hydrology: At the time of the delineation, soils inside the delineated wetland boundary were saturated at the surface. Soils outside the boundary were not saturated close to the surface. An abrupt topographic rise of 6 to 12 inches generally coincides with the transition from smartweed to tall fescue. The hydrology of the wetlands is likely a function of water levels in the pond, but it is possible that some surface water may also be seeping out from the fill soils on the landfill.

Other Observations: Small flocks of Canada geese (*Branta canadensis*) were observed on the adjoining pond on several occasions during the delineation. Certain trees close to the shoreline displayed chewed bark, indicative of recent activity by beaver (*Castor canadensis*).

Functions and Values: The wetland vegetation fringing the pond helps to stabilize the shoreline and prevent erosion of the soil covering the landfill. It may also help protect water quality in the pond by slowing the velocity of, and filtering, surface runoff coming off the landfill. The emergent vegetation may help improve the value of the ponds as habitat for fish and wildlife by contributing nutrients and organisms at the bottom of the food chain. The wetland fringe improves the aesthetic appearance of the ponds, making the site appear more natural than if the turf immediately abutted open water.

3.1.2 Pond East of Atkins Road Extension

The zone of saturated wetlands fringing the shoreline of the pond east of Atkins Road Extension is delineated by Stakes "WET 12A-1" through "WET 12A-43." On the south shore of the pond, the transition between uplands on the landfill and the wetlands is illustrated by Transect 2 (Appendix A), comprising three data points (4, 5, and 6) on a line perpendicular to the wetland boundary at Stake "WET 12A-5." On the north shore of the pond, the transition between uplands on the landfill and the wetlands is illustrated by Transect 4 (Appendix A), comprising four data points (11, 12, 13, and 14) on a line perpendicular to the wetland boundary at Stake "WET 12A-35."

The easternmost part of the site, just inside the bend in Atkins Road, includes an area of deciduous forest and pond shoreline whose surface soils have not been disturbed by landfill activity. Stakes delineating the wetland boundary in this part of the site number between "WET 12A-10" and "WET 12A-30." The transition from uplands to wetlands in this part of the site is illustrated by Transect 3 (Appendix A), comprising four data points (7, 8, 9, and 10) on a line perpendicular to the wetland boundary at Stake "WET 12A-28."

Vegetation: Vegetation on the landfilled areas east of Atkins Road Extension is similar to that on the landfilled areas west of the road. Vegetation outside the delineated wetland boundary comprises a nearly pure turf of tall fescue, and vegetation inside the boundary comprises a dense, nearly pure stand of smartweed. As is true west of the road, several saplings of black locust are widely scattered over areas of the landfill, and those within the delineated wetland boundary are dead or dying. Those outside the boundary appear to be normal. This may reflect a recent rise in the water level within this series of interconnected ponds.

Uplands in the easternmost part of the site, which was not previously occupied by the landfill, are relatively steep slopes that support mature deciduous forests dominated by species such as chestnut oak (*Quercus prinus*), white oak (*Quercus alba*), and tulip poplar (*Liriodendron tulipifera*). Many of the trees are over 18 inches in diameter at breast height (DBH, defined as trunk diameter 4.5 feet off the ground). Occasional saplings and seedlings of canopy trees and of Virginia pine (*Pinus virginiana*) are present under the canopy. Forest cover such as this is common on the steep slopes bordering the coves and inlets of Mattawoman Creek on IHDIV-NSWC.

Wetlands fringing the pond in the easternmost wooded area of the site are generally shaded and include trees and saplings typical of the bottomland hardwood forests typically associated with stream valleys in Charles County. The trees and saplings that were observed include red maple (*Acer rubrum*) and sweet gum (*Liquidambar styraciflua*).

Soils: Soils throughout Transects 2 and 4 appear to be fill soils associated with the landfill. Surface soil properties do not generally appear to change dramatically at the wetland boundary, but the soil matrix color does become somewhat grayer with more pronounced mottling at the boundary. Distinctive changes in soil coloration in response to conditions of saturation (anaerobic conditions) are not necessarily expected in fill soils. The Soil Survey of Charles County, Maryland maps the ponds and much of the landfill as tidal marsh soils (SCS, 1974). This mapping does not reflect current conditions. The soil survey reports observations made prior to 1970, before much of the landfill was constructed and before the nearby dam was constructed.

It is noted that changes in soil coloration on Transect 4 are substantially more distinct than those on Transects 1 and 2. The soil pits along that transect may have intercepted the tidal marsh soils reported to have originally been present on the site.

Hydrology: At the time of the delineation (September 30, 1999), areas inside the delineated wetland boundary on the former landfill were saturated at the surface. Areas outside the boundary were not saturated close to the surface. An abrupt topographic rise of 6 to 12 inches generally coincides with the transition from dense smartweed to dense tall fescue. The hydrology of the wetlands fringing the ponds is likely a function of the water level in the pond, although it is also possible that some surface water may be seeping out from the fill soil (the landfill) to the pond.

The hydrology of the wetlands in the easternmost (undisturbed) part of the site is also likely a function of water levels in the ponds. But at least one sizable seep was also observed (at Stake "WET 12A-26") where groundwater was flowing out from the toe of a slope.

Other Observations: Many trees and saplings close to the pond have experienced bark loss due to beaver activity, and many saplings have been felled. Tracks of whitetail deer (*Odocoileus virginianus*) were observed in saturated soil near Stake "WET 12A-25." A bald eagle (*Haliaeetus leucocephalus*) was observed flying over the site during the delineation.

Functions and Values: The wetland vegetation fringing the pond helps to stabilize the shoreline and prevent erosion of the soil covering the landfill. It may also help protect water quality in the pond by slowing the velocity of and filtering surface runoff coming off the landfill. The emergent vegetation may help improve the value of the ponds as habitat for fish and wildlife by contributing nutrients and organisms at the bottom of the food chain. The wetland fringe improves the aesthetic appearance of the ponds, making the site appear more natural than if the turf immediately abutted the open water.

3.2 SITE 42

Wetlands on Site 42 include narrow lowlands bordering the perennial stream west of the landfill, a swale carrying seepage from the edge of the Building 1866 parking lot to the stream, and the bottoms of several drainage ditches (Figure 3-2). An elevated berm associated with a steam pipe crosses the stream just downstream from Building 1866 and creates a shallow, marshy impoundment. This impoundment is a wetland dominated by dense herbaceous vegetation.

All the wetlands are nontidal. The stream channel would be classified as riverine, upper perennial by the FWS (Cowardin et al., 1979). The wetlands bordering the stream would be best classified as palustrine forested, broad-leaved deciduous. These wetlands generally support only herbaceous vegetation, but they are narrow and shaded by overhanging limbs from the adjoining uplands. The wetlands in the impoundment, in the drainage ditches, and in the swale would be best classified as PEM1.

3.2.1 Western Stream and Associated Wetlands

Stakes "WET 42-1" through "WET 42-28" mark the upland boundary of wetlands associated with the west side of the stream (opposite from the landfill). Stakes "WET 42-29" through "WET 42-39," Stakes "WET 42-65" through "WET 42-71," and Stakes "WET 42-85" through "WET 42-106" mark the upland boundary of wetlands associated with the east side of the stream (the same side as the landfill). The gaps in the stake numbers on the eastern side correspond to the drainage ditches and swale. The transition from uplands to wetlands bordering the stream is illustrated by Transects 1 and 2 (Appendix B), comprising data points on lines perpendicular to the wetland boundary at Stake "WET 42-6" and Stake "WET 42-32."

Vegetation: The stream channel itself generally lacks vegetation. Wetlands adjacent to the stream channel are generally characterized by dense smartweed with frequent false nettle (*Boemeria cylindrica*). The wetlands are narrow and shaded by deciduous trees growing on the adjoining uplands. The marshy impoundment is wider, not shaded, and includes patches of other emergent plant species such as common cattail (*Typha latifolia*) and tearthumb (*Polygonum sagittatum*).

Soils: The sediment in the stream channel is generally soft and unconsolidated. Surface soils in the wetlands bordering the streams are generally fine sandy loams or silt loams distinguished from adjoining upland soils by grayer colors and more distinctive mottling. The Soil Survey of Charles County, Maryland maps the soils in both the wetlands and uplands surrounding the stream in the moderately well drained Keyport series (SCS, 1974). Field observations suggest that undisturbed upland soils on the site are Keyport soils but that the wetland soils are better classified in the poorly drained Elkton series. Surface soils on the abandoned landfill are fill soils.

Hydrology: The stream originates as two intermittent headwaters just north of the site. Water in the channel flows southward. Water depth in the channel was generally under 6 inches at the time of the delineation. The stream enters a tidal cove of Mattawoman Creek several hundred feet south of the site. The wetlands bordering the stream were saturated at the surface at the time of the delineation.

Functions and Values: The small pools in the stream and the emergent vegetation in the wetlands help reduce the velocity of runoff entering the stream from uplands. Wetlands associated with headwater streams such as this are commonly recognized as playing a role in reducing flood levels. But the proximity of the stream to tidal waters (Mattawoman Creek) minimizes the importance of potential flooding. However, the deterrence of flow could help reduce the entry of oil and grease and other water-borne constituents from surrounding military operations into Mattawoman Creek. The stream channel and associated wetlands provide good habitat for small minnows and amphibians typically inhabiting small streams. The stream is too shallow to provide habitat for sportfish, but smaller organisms inhabiting the stream could migrate downstream into Mattawoman Creek to support the food chain there. The aesthetic value of the stream is considerable but is limited to only a small number of workers having business specifically at Building 1866.

3.2.2 Seepage Near Southwestern Corner of Landfill

A gentle swale originates near the southwestern corner of the parking lot for Building 1866 and proceeds downhill (southwestward) to the shallow impoundment bordering the stream. At the time of the delineation, water was observed to be seeping out of the soil near the top of the swale and flowing downhill toward the stream. There was no distinct channel. The water flowed through dense herbaceous vegetation. Interestingly, the water was observed to be unnaturally warm, over 90°F. The origin of the water and the reasons for the high temperatures are not clear.

The transition from uplands to wetlands in the swale is illustrated by Transect 3 (Appendix B), comprising data points on a line perpendicular to the wetland boundary at Stake "WET 42-74." Herbaceous vegetation within the swale is typical of marshes dominated by persistent emergent vegetation. However, some scattered upland trees and a patch of Allegheny blackberry (*Rubus allegheniensis*) within the swale are dead or dying. Particularly noteworthy is a large, dead tulip poplar tree (*Liriodendron tulipifera*) near the top of the swale. Surface soils throughout the swale and adjoining uplands are fill soils overlying the former landfill. Although fill soils are not necessarily expected to display color differences in response to saturation, soils within the swale were observed to be grayer than those of the adjoining uplands. Soils in the lower parts of the swale were very soft, much like quicksand.

As is true for the wetlands in the drainage ditch, the functions and values of the wetlands in the swale appear to be limited. The vegetation in the swale probably helps to reduce the velocity of the water as it

flows downhill through the swale toward the stream. This property is especially important considering the unusual high temperature of the water. Such water temperatures can be injurious to plants and microfauna in sediment and can hasten depletion of dissolved oxygen. The value of the swale as wildlife habitat appears to be minimal, but the dead tulip poplar could serve as a snag, offering a valuable roosting site for birds.

3.2.3 Drainage Ditches

Two drainage ditches cross the surface of the landfill north of Building 1866. Both are straight, with steep embankments. The ditches both originate in developed facilities north of Building 1866, merge near the northwestern corner of the building, and then flow into the stream. The sides of the ditches are marked with Stakes "WET 42-39" through "WET 42-65."

The bottoms of the ditches contained up to an inch of slowly running water and supported a dense stand of emergent vegetation at the time of the delineation. The vegetation comprises dense patches of herbaceous species such as common cattail, soft rush (*Juncus effusus*), and woolgrass (*Scirpus cyperinus*). That vegetation contrasts sharply with the tall fescue on the embankments and over the rest of the landfill. Soils under the ditches, as with the rest of the former landfill, are fill soils. The emergent vegetation in the ditches likely helps to slow runoff entering from adjoining uplands, including several parking lots and buildings used in explosives work, thereby potentially reducing water-borne constituents entering the streams. Otherwise, the functions and values of wetlands in such man-made ditches are very limited.

A third drainage ditch originates near the entrance to Building 1866's parking lot and runs westward (downhill) along the eastern side of the site and enters the impoundment associated with the stream. The sides of this ditch are marked by Stakes "WET 42-85" to "WET 42-96." The ditch receives discharges from a drainage pipe outfall (IW71) (TtNUS, 1999). It also appears to receive surface runoff from a roadway and from the parking lot for Building 1866. The sides of the ditch are very steep and over 10 feet in height at places. There is little or no vegetation in the bottom of the ditch, which is shaded by trees on the adjoining uplands. As for the other drainage ditches, the functions and values of wetlands in this ditch are highly limited.

4.0 SUMMARY

The following section briefly summarizes the findings of the wetland delineation and discusses how the delineated wetlands are addressed in ARARs identified for CERCLA compliance activities on the IHDIV-NSWC site.

4.1 AREAS ADDRESSED BY SECTION 404 CLEAN WATER ACT

All areas within the delineated wetland boundaries on both sites are regulated under Section 404 of the Clean Water Act. Section 404 regulates the discharge of dredged or fill material into "waters of the United States," a term that includes wetlands connected to navigable waterways subject to use in interstate commerce. The regulatory status of isolated wetlands lacking surface connections to navigable waterways remains uncertain. But each wetland delineated on each site is connected by streams or other surface connections to Mattawoman Creek, which is navigable. Most activities that involve soil disturbance, such as grading or the placement of fill, are regulated under Section 404. Activities that drain wetlands without filling or grading are not regulated, and vegetation disturbance is not regulated.

Outside the context of CERCLA, applicants proposing activities regulated under Section 404 must submit an application for a permit to the USACE (Baltimore District in Maryland). USACE reviews applications using technical criteria outlined in the "404(b)(1) Guidelines" before issuing or denying applications. Compliance with the intent of Section 404 during the remediation process would involve minimizing encroachment into any delineated wetlands or other waterways. If disturbance of surface soils in such areas is unavoidable, suitable mitigation would involve restoring the affected areas, if possible, or enhancing, restoring, or creating wetlands in another location in the same watershed.

4.2 AREAS ADDRESSED BY MARYLAND NONTIDAL WETLANDS PROTECTION ACT

All wetlands on both sites are above the head of tide for Mattawoman Creek and thus are nontidal. Theoretically, the impounded waters in the ponds on Site 12 are not actual wetlands, but the saturated soils fringing the ponds support persistent vegetation and clearly are nontidal wetlands. The act also regulates upland areas within 25 feet of nontidal wetlands (i.e. a nontidal wetland buffer). Unlike Section 404, the Maryland Nontidal Wetlands Protection Act regulates almost any activity that disturbs nontidal wetlands or the buffer, including clearing vegetation or draining.

Outside the context of CERCLA, applicants proposing activities that disturb nontidal wetlands or the buffer must submit an application for a permit to the Maryland Department of the Environment (MDE). To expedite the application process, MDE has developed a Joint Application Permit that can be submitted as

a single package to MDE, which then distributes the application to USACE. Compliance with the intent of the act would be similar to compliance with the intent of Section 404.

4.3 AREAS ADDRESSED BY OTHER MARYLAND REGULATIONS PERTAINING TO WETLANDS

Maryland Tidal Wetlands Act: Both sites lie more than 500 feet upgradient from the head of tides associated with Mattawoman Creek. Thus, neither site contains wetlands regulated under the Maryland Tidal Wetlands Act. The ponds on Site 12 are mapped as "tidal marsh" in the Soil Survey for Charles County (SCS, 1974). It appears as if the head of tides associated with Mattawoman Creek extended into Site 12 before a dam was constructed south of the site. That dam currently blocks the upstream (northward) movement of tides and permanently impounds the area formerly identified as tidal marsh, rendering it nontidal.

Maryland Chesapeake Bay Critical Areas Act: Most of Site 12 and the southern part of Site 42 lie within 1,000 feet of tidal areas associated with Mattawoman Creek and thus fall into what the State of Maryland defines as the Chesapeake Bay Critical Area. The act requires local jurisdictions to implement regulations for reviewing development activities, including land clearing and grading, in areas within 1,000 feet of tidal waters or wetlands associated with the Chesapeake Bay or its tributaries. Charles County, like most local jurisdictions, requires proponents of activities in the Critical Area to demonstrate efforts to minimize disturbance to tidal and nontidal wetlands, streams, forest cover, steep slopes (greater than 15 percent), highly erodable soils (Erodability Factor greater than 0.35), and other sensitive natural areas (Charles County Planning Commission, 1994).

The county reviews applications for grading permits, building permits, subdivisions, site plans, rezoning, special use permits, and special exceptions for compliance with its criteria for protecting the Critical Area. Compliance with the intent of the Act during the remediation process would involve minimizing disturbance of the sensitive areas noted above and implementing best management practices to reduce the potential for sedimentation of the ponds, streams, and wetlands.

Compliance with the intent of the act would also involve minimizing disturbance of areas outside the landfill proper at each site. The landfills themselves do not support forest cover. However, adjoining slopes in the eastern part of Site 12 and west and south of Site 42 are forested and exceed 15 percent in places. Additionally, intact upland soils adjoining both landfills are mapped in the Sassafras series (at Site 12) and the Keyport series (at Site 42) (SCS, 1974). Both soil series have Erodability Factors exceeding 0.35 (MWCOG, 1991).

Maryland Forest Conservation Act: The Maryland Forest Conservation Act requires local jurisdictions, including Charles County, to implement regulations protecting forest resources from land development activities. Compliance is integrated into the permit review process for grading permits and subdivision approvals. The compliance process is typically two steps: Applicants first map and characterize forest resources on the affected property (a forest stand delineation) and then prepare a forest conservation plan outlining efforts to minimize disturbance to forest resources and, if necessary, restore forest cover as a mitigation measure.

The act specifically exempts the Chesapeake Bay Critical Area and thus applies only to those areas greater than 1,000 feet from mean high tide. The two acts are somewhat complementary, the Forest Conservation Act extending many of the forest conservation practices prescribed under the Chesapeake Bat Critical Areas Act to lands more distant from the bay.

Forest is defined, for purposes of the act, as areas dominated by woody plants that are at least 10,000 square feet in area and include at least 100 trees per acre, of which at least half must exceed 2 inches in trunk diameter (DNR, 1997). There are no areas meeting this definition on the landfill proper at either site. The slope immediately west of the stream on Site 42 and the forested slopes and wetlands in the eastern part of Site 12 do meet the definition. Additionally, these forested slopes and wetlands meet the criteria for priority areas for forest retention under the act (DNR, 1997).

Compliance with the intent of the act would involve minimizing encroachment into forested wetlands or uplands at the edge of the landfills. It would also involve restoring tree seedlings to any unavoidably cleared forested area or to a nearby area of comparable size.

5.0 LIST OF PREPARERS

J. Peyton Doub, PWS
WDCP93MD0510029B
Tetra Tech NUS, Inc., Gaithersburg, Maryland
MS, Botany, University of California, Davis, California. 1984
BS, Plant Sciences, Cornell University, Ithaca, New York. 1982
Delineator, Report Author

Ralph P. Barr
Tetra Tech NUS, Inc., Gaithersburg, Maryland
BA, Biology, Slippery Rock University, Slippery Rock, Pennsylvania. 1972
Technical Reviewer

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APPENDIX A

WETLAND DELINEATION FIELD DATA SHEETS

SITE 12

SITE 12
WETLAND DELINEATION TRANSECT 1
DATA POINT 1
DATA POINT 2
DATA POINT 3

DATA POINT 1
10 FEET WEST OF STAKE "WET 12-26"

SITE 12 (TOWN GUT LANDFILL)
INDIAN HEAD DIVISION – NAVAL SURFACE WARFARE CENTER
WETLAND DELINEATION DATA FORM, PAGE 1

Project/Site:	IHDIV-NSWC SITE 12	Date:	SEPTEMBER 30, 1999
Applicant:	US NAVY	County:	CHARLES
Investigator:	J. PEYTON DOUB, PWS	State:	MARYLAND

Do Normal Circumstances exist on the site?:	X	No	Community ID:	OLD FIELD
Is the site significantly disturbed (Atypical Situation)?:	X	No	Transect ID:	1
Is the area a potential Problem Area?:	Yes	X	Plot ID:	1
(If needed, explain on reverse)				

VEGETATION

Dominant Plant Species	Stratum	Indicator	Other Plant Species	Stratum	Indicator
FESTUCA ARUNDINACEA	H	FACU	POLYGONUM PUNCTATUM	H	OBL
			JUNCUS EFFUSUS	H	FACW+

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 0

Remarks: DENSE TURF OF TALL FESCUE. NO INDICATORS OF HYDROPHYTIC VEGETATION.

HYDROLOGY

Recorded Data (Described in Remarks):
- ____ Stream, Lake, or Tide Gauge
- ____ Aerial Photographs
- ____ Other
- X No Recorded Data Available

Field Observations:

Depth of Surface Water:	NONE	(in.)
Depth to Free Water in Pit:	NONE	(in.)
Depth in Saturated Soil:	NONE	(in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ____ Inundated
- ____ Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- ____ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ____ Oxidized Root Channels in Upper 12 inches
- ____ Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks: NO INDICATORS OF WETLAND HYDROLOGY.

DATA POINT 1
10 FEET WEST OF STAKE "WET 12-26"

SITE 12 (TOWN GUT LANDFILL)
INDIAN HEAD DIVISION – NAVAL SURFACE WARFARE CENTER
WETLAND DELINEATION DATA FORM, PAGE 2

SOIL

Map Unit Name (Series and Phase):	TIDAL MARSH	Drainage Class:	VERY POOR
Taxonomy (subgroup):	N/A	Field Observations Confirmed Mapped Type?	Yes [redacted]

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture Concretions, Structure, etc,
0-2	N/A	7.5YR 4/3	7.5YR 5/6	FAINT, IRREGULAR	SANDY CLAY LOAM
2-20+	N/A	7.5YR 5/3	7.5YR 5/6	APPROX. 50:50	SANDY CLAY WITH GRAVEL

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soil
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: NO INDICATORS OF HYDRIC SOIL. APPEARS TO BE FILL SOIL PLACED ON THE SURFACE OF THE ABANDONED LANDFILL.

WETLAND DETERMINATION

	(Circle)		(Circle)
Hydrophytic Vegetation Present?	Yes [redacted]	Is this Sampling Point Within a Wetland?	Yes [redacted]
Wetland Hydrology Present?	Yes [redacted]		
Hydric Soils Present?	Yes [redacted]		

Remarks: UPGRADIENT END OF TRANSECT IN OBVIOUS UPLAND.

Classification: UPLAND (U)

DATA POINT 2
AT STAKE "WET 12-26"

SITE 12 (TOWN GUT LANDFILL)
INDIAN HEAD DIVISION – NAVAL SURFACE WARFARE CENTER
WETLAND DELINEATION DATA FORM, PAGE 1

Project/Site:	IHDIV-NSWC SITE 12	Date:	SEPTEMBER 30, 1999
Applicant:	US NAVY	County:	CHARLES
Investigator:	J. PEYTON DOUB, PWS	State:	MARYLAND

Do Normal Circumstances exist on the site?:		No	Community ID:	TRANSITION
Is the site significantly disturbed (Atypical Situation)?:		No	Transect ID:	1
Is the area a potential Problem Area?:	Yes		Plot ID:	2
(If needed, explain on reverse)				

VEGETATION

Dominant Plant Species	Stratum	Indicator	Other Plant Species	Stratum	Indicator
POLYGONUM PUNCTATUM	H	OBL			
FESTUCA ARUNDINACEA	H	FACU			

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 50

Remarks: PLOT LOCATED AT ABRUPT TRANSITION FROM HYDROPHYTIC TO UPLAND VEGETATION. FACU VEGETATION DOMINANT ONLY ON UPLAND SIDE OF PLOT; OBL VEGETATION DOMINANT ONLY ON WETLAND SIDE OF PLOT.

HYDROLOGY

Recorded Data (Described in Remarks):
- ____ Stream, Lake, or Tide Gauge
- ____ Aerial Photographs
- ____ Other
- X No Recorded Data Available

Field Observations:

Depth of Surface Water:	NONE	(in.)
Depth to Free Water in Pit:	6	(in.)
Depth in Saturated Soil:	3	(in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ____ Inundated
- X Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- ____ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- X Oxidized Root Channels in Upper 12 inches
- ____ Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks: AT EDGE OF AREA WITH INDICATORS OF WETLAND HYDROLOGY

DATA POINT 2
AT STAKE "WET 12-26"

SITE 12 (TOWN GUT LANDFILL)
INDIAN HEAD DIVISION – NAVAL SURFACE WARFARE CENTER
WETLAND DELINEATION DATA FORM, PAGE 2

SOIL

Map Unit Name (Series and Phase):	TIDAL MARSH	Drainage Class:	VERY POOR
Taxonomy (subgroup):	N/A	Field Observations Confirmed Mapped Type?	Yes [redacted]

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture Concretions, Structure, etc,
0-3	N/A	7.5YR 4/3	7.5YR 5/6	APPROX. 50:50	SANDY CLAY LOAM
3-12	N/A	7.5YR 5/2	7.5YR 5/6	STREAKS, <20%	SANDY CLAY LOAM
12-20+	N/A	7.5YR 5/1	7.5YR 5/6	STREAKS, <20%	SANDY CLAY WITH GRAVEL

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soil
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: AT EDGE OF AREA WITH FIELD INDICATORS OF HYDRIC SOIL.

WETLAND DETERMINATION

	(Circle)		(Circle)
Hydrophytic Vegetation Present?	Yes [redacted]	Is this Sampling Point Within a Wetland?	Yes [redacted]
Wetland Hydrology Present?	[redacted] No		
Hydric Soils Present?	Yes [redacted]		

Remarks: AT ABRUPT TRANSITION FROM WETLAND TO UPLAND.

Classification: TRANSITION UPLAND (U) TO PALUSTRINE EMERGENT WETLAND (PEM)

DATA POINT 3
10 FEET EAST OF STAKE "WET 12-26"

SITE 12 (TOWN GUT LANDFILL)
INDIAN HEAD DIVISION – NAVAL SURFACE WARFARE CENTER
WETLAND DELINEATION DATA FORM, PAGE 1

Project/Site:	IHDIV-NSWC SITE 12	Date:	SEPTEMBER 30, 1999
Applicant:	US NAVY	County:	CHARLES
Investigator:	J. PEYTON DOUB, PWS	State:	MARYLAND

Do Normal Circumstances exist on the site?:	No	Community ID:	MARSH FRINGE
Is the site significantly disturbed (Atypical Situation)?:	No	Transect ID:	1
Is the area a potential Problem Area?:	Yes	Plot ID:	3
(If needed, explain on reverse)			

VEGETATION

Dominant Plant Species	Stratum	Indicator	Other Plant Species	Stratum	Indicator
POLYGONUM PUNCTATUM	H	OBL			
ECHINOCHLOA CRUS-GALLI	H	FACU			
ECHINOCHLOA WALTERI	H	FACW+			

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 67

Remarks: PLOT LOCATED WITHIN FRINGE OF EMERGENT WETLAND VEGETATION ALONG SHORE OF PERMANENTLY INUNDATED POND.

HYDROLOGY

Recorded Data (Described in Remarks):
- ____ Stream, Lake, or Tide Gauge
- ____ Aerial Photographs
- ____ Other
- X No Recorded Data Available

Field Observations:

Depth of Surface Water:	Surface	(in.)
Depth to Free Water in Pit:	Surface	(in.)
Depth in Saturated Soil:	Surface	(in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ____ Inundated
- X Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- ____ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- X Oxidized Root Channels in Upper 12 inches
- ____ Water-Stained Leaves
- ____ Local Soil Survey Data
- X FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks: SATURATED FRINGE AT EDGE OF PERMANENTLY INUNDATED POND

DATA POINT 3
10 FEET EAST OF STAKE "WET 12-26"

SITE 12 (TOWN GUT LANDFILL)
INDIAN HEAD DIVISION – NAVAL SURFACE WARFARE CENTER
WETLAND DELINEATION DATA FORM, PAGE 2

SOIL

Map Unit Name (Series and Phase):	TIDAL MARSH	Drainage Class:	VERY POOR
Taxonomy (subgroup):	N/A	Field Observations Confirmed Mapped Type?	Yes [redacted]

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture Concretions, Structure, etc,
0-10	N/A	7.5YR 5/2	7.5YR 5/6	STREAKS, <20%	SANDY CLAY LOAM
10-20+	N/A	7.5YR 5/1	7.5YR 5/6	STREAKS, <20%	SANDY CLAY WITH GRAVEL

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- X Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soil
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: LOW CHROMA COLORS (DEPLETED MATRIX) ARE A FIELD INDICATOR OF HYDRIC SOILS

WETLAND DETERMINATION

	(Circle)			(Circle)
Hydrophytic Vegetation Present?	[redacted]	No	Is this Sampling Point Within a Wetland?	[redacted] No
Wetland Hydrology Present?		No		
Hydric Soils Present?		No		

Remarks: FRINGE OF PALUSTRINE ENERGENT WETLAND ALONG SHORE OF PERMANENTLY INUNDATED POND

Classification: PALUSTRINE EMERGENT WETLAND (PEM)

SITE 12
WETLAND DELINEATION TRANSECT 2
DATA POINT 4
DATA POINT 5
DATA POINT 6

DATA POINT 4
10 FEET SOUTH OF STAKE "WET 12A-5"

SITE 12 (TOWN GUT LANDFILL)
INDIAN HEAD DIVISION – NAVAL SURFACE WARFARE CENTER
WETLAND DELINEATION DATA FORM, PAGE 1

Project/Site:	IHDIV-NSWC SITE 12	Date:	SEPTEMBER 30, 1999
Applicant:	US NAVY	County:	CHARLES
Investigator:	J. PEYTON DOUB, PWS	State:	MARYLAND

Do Normal Circumstances exist on the site?:		No	Community ID:	OLD FIELD
Is the site significantly disturbed (Atypical Situation)?:		No	Transect ID:	2
Is the area a potential Problem Area?:	Yes		Plot ID:	4
(If needed, explain on reverse)				

VEGETATION

Dominant Plant Species	Stratum	Indicator	Other Plant Species	Stratum	Indicator
FESTUCA ARUNDINACEA	H	FACU	LONICERA JAPONICA	H	FAC-

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 0

Remarks: DENSE TURF OF TALL FESCUE. NO INDICATORS OF HYDROPHYTIC VEGETATION.

HYDROLOGY

Recorded Data (Described in Remarks):
- ____ Stream, Lake, or Tide Gauge
- ____ Aerial Photographs
- ____ Other
- X No Recorded Data Available

Field Observations:

Depth of Surface Water:	NONE	(in.)
Depth to Free Water in Pit:	NONE	(in.)
Depth in Saturated Soil:	15	(in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ____ Inundated
- ____ Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- ____ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ____ Oxidized Root Channels in Upper 12 inches
- ____ Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks: NO INDICATORS OF WETLAND HYDROLOGY.

DATA POINT 4
10 FEET SOUTH OF STAKE "WET 12A-5"

SITE 12 (TOWN GUT LANDFILL)
INDIAN HEAD DIVISION – NAVAL SURFACE WARFARE CENTER
WETLAND DELINEATION DATA FORM, PAGE 2

SOIL

Map Unit Name (Series and Phase):	TIDAL MARSH	Drainage Class:	VERY POOR
Taxonomy (subgroup):	N/A	Field Observations Confirmed Mapped Type?	Yes [redacted]

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture Concretions, Structure, etc,
0-2	N/A	7.5YR 4/2	NONE	N/A	SANDY CLAY LOAM
2-6	N/A	7.5YR 4/2	7.5YR 5/6	APPROX. 50:50	SANDY CLAY LOAM
6-15	N/A	7.5YR 5/6	NONE	N/A	SANDY CLAY LOAM

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soil
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: NO INDICATORS OF HYDRIC SOIL. APPEARS TO BE FILL SOIL PLACED ON THE SURFACE OF THE ABANDONED LANDFILL. AUGER REFUSAL AT APPROXIMATELY 15 INCHES.

WETLAND DETERMINATION

	(Circle)		(Circle)
Hydrophytic Vegetation Present?	Yes [redacted]	Is this Sampling Point Within a Wetland?	Yes [redacted]
Wetland Hydrology Present?	Yes [redacted]		
Hydric Soils Present?	Yes [redacted]		

Remarks: UPGRADIENT END OF TRANSECT IN OBVIOUS UPLAND.

Classification: UPLAND (U)

DATA POINT 5
AT STAKE "WET 12A-5"

SITE 12 (TOWN GUT LANDFILL)
INDIAN HEAD DIVISION – NAVAL SURFACE WARFARE CENTER
WETLAND DELINEATION DATA FORM, PAGE 1

Project/Site:	IHDIV-NSWC SITE 12	Date:	SEPTEMBER 30, 1999
Applicant:	US NAVY	County:	CHARLES
Investigator:	J. PEYTON DOUB, PWS	State:	MARYLAND

Do Normal Circumstances exist on the site?:		No	Community ID:	TRANSITION
Is the site significantly disturbed (Atypical Situation)?:		No	Transect ID:	2
Is the area a potential Problem Area?:	Yes		Plot ID:	5
(If needed, explain on reverse)				

VEGETATION

Dominant Plant Species	Stratum	Indicator	Other Plant Species	Stratum	Indicator
FESTUCA ARUNDINACEA	H	FACU	JUNCUS EFFUSIS	H	FACW+
POLYGONUM PUNCTATUM	H	OBL			
LONICERA JAPONICA	H	FAC-			

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 33

Remarks: PLOT LOCATED AT ABRUPT TRANSITION FROM HYDROPHYTIC TO UPLAND VEGETATION. FACU VEGETATION DOMINANT ONLY ON UPLAND SIDE OF PLOT; OBL VEGETATION DOMINANT ONLY ON WETLAND SIDE OF PLOT.

HYDROLOGY

Recorded Data (Described in Remarks):
- ____ Stream, Lake, or Tide Gauge
- ____ Aerial Photographs
- ____ Other
- X No Recorded Data Available

Field Observations:

Depth of Surface Water:	NONE	(in.)
Depth to Free Water in Pit:	12	(in.)
Depth in Saturated Soil:	10	(in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ____ Inundated
- X Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- ____ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ____ Oxidized Root Channels in Upper 12 inches
- ____ Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks: AT EDGE OF AREA WITH INDICATORS OF WETLAND HYDROLOGY

DATA POINT 5
AT STAKE "WET 12A-5"

SITE 12 (TOWN GUT LANDFILL)
INDIAN HEAD DIVISION – NAVAL SURFACE WARFARE CENTER
WETLAND DELINEATION DATA FORM, PAGE 2

SOIL

Map Unit Name (Series and Phase):	TIDAL MARSH	Drainage Class:	VERY POOR
Taxonomy (subgroup):	N/A	Field Observations Confirmed Mapped Type?	Yes [redacted]

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture Concretions, Structure, etc,
0-2	N/A	7.5YR 4/3	NONE	N/A	SANDY CLAY LOAM
2-6	N/A	7.5YR 4/3	7.5YR 5/6	APPROX. 50:50	SANDY CLAY LOAM
6-12	N/A	7.5YR 5/6	NONE	N/A	SANDY CLAY LOAM
12-20+	N/A	7.5YR 5/1	7.5YR 5/6	STREAKS, <20%	SANDY CLAY LOAM

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soil
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: AT EDGE OF AREA WITH FIELD INDICATORS OF HYDRIC SOIL.

WETLAND DETERMINATION

	(Circle)			(Circle)
Hydrophytic Vegetation Present?	Yes	[redacted]	Is this Sampling Point Within a Wetland?	Yes [redacted]
Wetland Hydrology Present?	[redacted]	No		
Hydric Soils Present?	Yes	[redacted]		

Remarks: AT ABRUPT TRANSITION FROM WETLAND TO UPLAND.

Classification: TRANSITION UPLAND (U) TO PALUSTRINE EMERGENT WETLAND (PEM)

DATA POINT 6
10 FEET NORTH OF STAKE "WET 12A-5"

SITE 12 (TOWN GUT LANDFILL)
INDIAN HEAD DIVISION – NAVAL SURFACE WARFARE CENTER
WETLAND DELINEATION DATA FORM, PAGE 1

Project/Site:	IHDIV-NSWC SITE 12	Date:	SEPTEMBER 30, 1999
Applicant:	US NAVY	County:	CHARLES
Investigator:	J. PEYTON DOUB, PWS	State:	MARYLAND

Do Normal Circumstances exist on the site?:		No	Community ID:	TRANSITION
Is the site significantly disturbed (Atypical Situation)?:		No	Transect ID:	2
Is the area a potential Problem Area?:	Yes		Plot ID:	6
(If needed, explain on reverse)				

VEGETATION

Dominant Plant Species	Stratum	Indicator	Other Plant Species	Stratum	Indicator
POLYGONUM PUNCTATUM	H	OBL	JUNCUS EFFUSIS	H	FACW+
			LONICERA JAPONICA	H	FAC-

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 100

Remarks: PLOT LOCATED WITHIN FRINGE OF EMERGENT WETLAND VEGETATION ALONG SHORE OF PERMANENTLY INUNDATED POND. TWO DEAD BLACK LOCUST (*ROBINIA PSUEDOACACIA*) (FACU-) SAPLINGS WITHIN PLOT.

HYDROLOGY

Recorded Data (Described in Remarks):
- ____ Stream, Lake, or Tide Gauge
- ____ Aerial Photographs
- ____ Other
- X No Recorded Data Available

Field Observations:

Depth of Surface Water:	NONE	(in.)
Depth to Free Water in Pit:	4	(in.)
Depth in Saturated Soil:	SURFACE	(in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ____ Inundated
- X Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- ____ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- X Oxidized Root Channels in Upper 12 inches
- ____ Water-Stained Leaves
- ____ Local Soil Survey Data
- X FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks: SATURATED FRINGE AT EDGE OF PERMANENTLY INUNDATED POND

DATA POINT 6
10 FEET NORTH OF STAKE "WET 12A-5"

SITE 12 (TOWN GUT LANDFILL)
INDIAN HEAD DIVISION – NAVAL SURFACE WARFARE CENTER
WETLAND DELINEATION DATA FORM, PAGE 2

SOIL

Map Unit Name (Series and Phase):	TIDAL MARSH	Drainage Class:	VERY POOR
Taxonomy (subgroup):	N/A	Field Observations Confirmed Mapped Type?	Yes [redacted]

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture Concretions, Structure, etc,
0-12	N/A	7.5YR 5/2	7.5YR 5/6	APPROX 50:50	SANDY CLAY LOAM
12-20+	N/A	7.5YR 5/1	7.5YR 5/6	STREAKS, <20%	SANDY CLAY

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- X Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soil
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: DEAD UPLAND TREES IN THIS FRINGE AREA SUGGEST THAT HYDROLOGICAL CONDITIONS HAVE BECOME WETTER IN RECENT YEARS. SOIL COLORS MAY NOT YET REFLECT CURRENT HYDROLOGICAL CONDITIONS.

WETLAND DETERMINATION

	(Circle)		(Circle)
Hydrophytic Vegetation Present?	[redacted] No	Is this Sampling Point Within a Wetland?	[redacted] No
Wetland Hydrology Present?	No		
Hydric Soils Present?	No		

Remarks: FRINGE OF PALUSTRINE ENERGENT WETLAND ALONG SHORE OF PERMANENTLY INUNDATED POND

Classification: PALUSTRINE EMERGENT WETLAND (PEM)

SITE 12
WETLAND DELINEATION TRANSECT 3
DATA POINT 7
DATA POINT 8
DATA POINT 9
DATA POINT10

DATA POINT 7
15 FEET NORTH OF STAKE "WET 12A-28"

SITE 12 (TOWN GUT LANDFILL)
INDIAN HEAD DIVISION – NAVAL SURFACE WARFARE CENTER
WETLAND DELINEATION DATA FORM, PAGE 1

Project/Site:	IHDIV-NSWC SITE 12	Date:	SEPTEMBER 30, 1999
Applicant:	US NAVY	County:	CHARLES
Investigator:	J. PEYTON DOUB, PWS	State:	MARYLAND

Do Normal Circumstances exist on the site?:		No	Community ID:	MIXED OAK FOREST
Is the site significantly disturbed (Atypical Situation)?:	Yes		Transect ID:	3
Is the area a potential Problem Area?:	Yes		Plot ID:	7
(If needed, explain on reverse)				

VEGETATION

Dominant Plant Species	Stratum	Indicator	Other Plant Species	Stratum	Indicator
QUERCUS PRINUS	C	UPL	ACER RUBRUM	SA	FAC
QUERCUS RUBRA	C	FACU-	QUERCUS ALBA	SA	FACU-
ACER RUBRUM	C	FAC			
QUERCUS ALBA	C	FACU-			
LIQUIDAMBAR STYRACIFLUA	C	FAC			
PINUS VIRGINIANA	SA	NONE			
LIQUIDAMBAR STYRACIFLUA	SH	FAC			

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 50

Remarks: NO INDICATORS OF HYDROPHYTIC VEGETATION. VIRGINIA PINE ALMOST NEVER OCCURS IN WETLANDS AND MAY BE THOUGHT OF AS "UPL". THE VIRGINIA PINES NEAR THIS PLOT ARE MOSTLY DEAD SAPLINGS THAT APPEAR TO HAVE BEEN SUPPRESSED BY THE CANOPY.

HYDROLOGY

Recorded Data (Described in Remarks):
- ____ Stream, Lake, or Tide Gauge
- ____ Aerial Photographs
- ____ Other
- X No Recorded Data Available

Field Observations:

Depth of Surface Water:	NONE	(in.)
Depth to Free Water in Pit:	NONE	(in.)
Depth in Saturated Soil:	NONE	(in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ____ Inundated
- ____ Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- ____ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ____ Oxidized Root Channels in Upper 12 inches
- ____ Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks: NO INDICATORS OF WETLAND HYDROLOGY.

DATA POINT 7
15 FEET NORTH OF STAKE "WET 12A-28"

SITE 12 (TOWN GUT LANDFILL)
INDIAN HEAD DIVISION – NAVAL SURFACE WARFARE CENTER
WETLAND DELINEATION DATA FORM, PAGE 2

SOIL

Map Unit Name (Series and Phase):	SANDY LAND, STEEP	Drainage Class:	NOT SPECIFIED
Taxonomy (subgroup):	N/A	Field Observations Confirmed Mapped Type?	[redacted] No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture Concretions, Structure, etc,
0-1	A	10YR 4/2	NONE	N/A	LOAM
1-12	B	10YR 6/6	NONE	N/A	SANDY CLAY LOAM
12-20+	B	10YR 5/4	NONE	N/A	SANDY LOAM

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soil
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: NO INDICATORS OF HYDRIC SOIL.

WETLAND DETERMINATION

	(Circle)			(Circle)
Hydrophytic Vegetation Present?	Yes	[redacted]	Is this Sampling Point Within a Wetland?	Yes [redacted]
Wetland Hydrology Present?	Yes			
Hydric Soils Present?	Yes			

Remarks: UPGRADIENT END OF TRANSECT IN OBVIOUS UPLAND.

Classification: UPLAND (U)

DATA POINT 8
5 FEET NORTH OF STAKE "WET 12A-28"

SITE 12 (TOWN GUT LANDFILL)
INDIAN HEAD DIVISION – NAVAL SURFACE WARFARE CENTER
WETLAND DELINEATION DATA FORM, PAGE 1

Project/Site:	IHDIV-NSWC SITE 12	Date:	SEPTEMBER 30, 1999
Applicant:	US NAVY	County:	CHARLES
Investigator:	J. PEYTON DOUB, PWS	State:	MARYLAND
Do Normal Circumstances exist on the site?:	Yes [redacted] No	Community ID:	BTMLD HW FOREST
Is the site significantly disturbed (Atypical Situation)?:	Yes [redacted]	Transect ID:	3
Is the area a potential Problem Area?: (If needed, explain on reverse)	Yes [redacted]	Plot ID:	8

VEGETATION

Dominant Plant Species	Stratum	Indicator	Other Plant Species	Stratum	Indicator
ACER RUBRUM	C	FAC	LIQUIDAMBAR STYRACIFLUA	SH	FAC
QUERCUS RUBRA	C	FACU-	CAREX PENSYLVANICA (?)	H	NONE
ACER RUBRUM	SA	FAC			
LIQUIDAMBAR STYRACIFLUA	SH	FAC			

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 75

Remarks: DRY EDGE OF BOTTOMLAND HARDWOOD FOREST. DOMINATED BY FAC SPECIES WITH NO FACW OR OBL SPECIES.

HYDROLOGY

Recorded Data (Described in Remarks):
- ____ Stream, Lake, or Tide Gauge
- ____ Aerial Photographs
- ____ Other
- X No Recorded Data Available

Field Observations:

Depth of Surface Water:	NONE	(in.)
Depth to Free Water in Pit:	NONE	(in.)
Depth in Saturated Soil:	NONE	(in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ____ Inundated
- ____ Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- ____ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ____ Oxidized Root Channels in Upper 12 inches
- ____ Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks: NO INDICATORS OF WETLAND HYDROLOGY.

DATA POINT 8
5 FEET NORTH OF STAKE "WET 12A-28"

SITE 12 (TOWN GUT LANDFILL)
INDIAN HEAD DIVISION – NAVAL SURFACE WARFARE CENTER
WETLAND DELINEATION DATA FORM, PAGE 2

SOIL

Map Unit Name (Series and Phase):	TIDAL MARSH	Drainage Class:	VERY POOR
Taxonomy (subgroup):	N/A	Field Observations Confirmed Mapped Type?	Yes [redacted]

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture Concretions, Structure, etc,
0-2	A	10YR 4/2	NONE	N/A	LOAM
2-15	B	10YR 6/6	10YR 6/1	APPROX. 80:20	CLAY
15-20+	B	10YR 6/6	10YR 6/1	APPROX. 50:50	SANDY CLAY LOAM

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soil
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: NO INDICATORS OF HYDRIC SOIL.

WETLAND DETERMINATION

	(Circle)			(Circle)
Hydrophytic Vegetation Present?	[redacted]	No	Is this Sampling Point Within a Wetland?	Yes [redacted]
Wetland Hydrology Present?	Yes	[redacted]		
Hydric Soils Present?	Yes	[redacted]		

Remarks: AREA IS DOMINATED BY FAC PLANT SPECIES AND TECHNICALLY MEETS THE DELINEATION CRITERIA FOR HYDROPHYTIC VEGETATION. HOWEVER, DOMINANCE BY FAC SPECIES WITHOUT ANY OBL OR FACW SPECIES DOES NOT TRULY INDICATE HYDROPHYTIC VEGETATION.

Classification: UPLAND (U)

DATA POINT 9
AT STAKE "WET 12A-28"

SITE 12 (TOWN GUT LANDFILL)
INDIAN HEAD DIVISION – NAVAL SURFACE WARFARE CENTER
WETLAND DELINEATION DATA FORM, PAGE 1

Project/Site:	IHDIV-NSWC SITE 12	Date:	SEPTEMBER 30, 1999
Applicant:	US NAVY	County:	CHARLES
Investigator:	J. PEYTON DOUB, PWS	State:	MARYLAND

Do Normal Circumstances exist on the site?:		No	Community ID:	BTMLD HW FOREST
Is the site significantly disturbed (Atypical Situation)?:	Yes		Transect ID:	3
Is the area a potential Problem Area?:	Yes		Plot ID:	9
(If needed, explain on reverse)				

VEGETATION

Dominant Plant Species	Stratum	Indicator	Other Plant Species	Stratum	Indicator
ACER RUBRUM	C	FAC	QUERCUS RUBRA	C	FACU-
ACER RUBRUM	SA	FAC	JUNCUS EFFUSIS	H	FACW+
LIQUIDAMBAR STYRACIFLUA	SH	FAC	LONICERA JAPONICA	H	FAC-
CAREX PENSYLVANICA (?)	H	NONE			

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 100

Remarks: PLOT LOCATED AT ABRUPT TRANSITION FROM HYDROPHYTIC TO UPLAND VEGETATION. FACU VEGETATION DOMINANT ONLY ON UPLAND SIDE OF PLOT; OBL VEGETATION DOMINANT ONLY ON WETLAND SIDE OF PLOT.

HYDROLOGY

Recorded Data (Described in Remarks):
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other
- X No Recorded Data Available

Field Observations:

Depth of Surface Water:	NONE	(in.)
Depth to Free Water in Pit:	10	(in.)
Depth in Saturated Soil:	6	(in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ___ Inundated
- X Saturated in Upper 12 inches
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ___ Oxidized Root Channels in Upper 12 inches
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- ___ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks: AT EDGE OF AREA WITH INDICATORS OF WETLAND HYDROLOGY

DATA POINT 9
AT STAKE "WET 12A-28"

SITE 12 (TOWN GUT LANDFILL)
INDIAN HEAD DIVISION – NAVAL SURFACE WARFARE CENTER
WETLAND DELINEATION DATA FORM, PAGE 2

SOIL

Map Unit Name (Series and Phase):	TIDAL MARSH	Drainage Class:	VERY POOR
Taxonomy (subgroup):	N/A	Field Observations Confirmed Mapped Type?	Yes [redacted]

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture Concretions, Structure, etc,
0-2	A	10YR 4/1	NONE	N/A	LOAM
2-12	B	10YR 6/1	10YR 6/6	APPROX. 70:30	SANDY CLAY
12-20	B	1G 7/N	10YR 5/6	STREAKS, <10%	SANDY CLAY

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- X Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soil
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: AT EDGE OF AREA WITH FIELD INDICATORS OF HYDRIC SOIL.

WETLAND DETERMINATION

	(Circle)			(Circle)
Hydrophytic Vegetation Present?	[redacted]	No	Is this Sampling Point Within a Wetland?	[redacted] No
Wetland Hydrology Present?		No		
Hydric Soils Present?		No		

Remarks: AT ABRUPT TRANSITION FROM WETLAND TO UPLAND.

Classification: TRANSITION UPLAND (U) TO PALUSTRINE FORESTED WETLAND (PFO)

DATA POINT 10
5 FEET SOUTH OF STAKE "WET 12A-28"

SITE 12 (TOWN GUT LANDFILL)
INDIAN HEAD DIVISION – NAVAL SURFACE WARFARE CENTER
WETLAND DELINEATION DATA FORM, PAGE 1

Project/Site:	IHDIV-NSWC SITE 12	Date:	SEPTEMBER 30, 1999
Applicant:	US NAVY	County:	CHARLES
Investigator:	J. PEYTON DOUB, PWS	State:	MARYLAND

Do Normal Circumstances exist on the site?:		No	Community ID:	BTMLD HW FOREST
Is the site significantly disturbed (Atypical Situation)?:	Yes		Transect ID:	3
Is the area a potential Problem Area?:	Yes		Plot ID:	10
(If needed, explain on reverse)				

VEGETATION

Dominant Plant Species	Stratum	Indicator	Other Plant Species	Stratum	Indicator
ACER RUBRUM	C	FAC	JUNCUS EFFUSIS	H	FACW+
POLYGONUM PUNCTATUM	H	OBL	ELYMUS VIRGINICUS (?)	H	FACW-

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 100

Remarks: PLOT LOCATED WITHIN FRINGE OF EMERGENT WETLAND VEGETATION ALONG SHORE OF PERMANENTLY INUNDATED POND. SEVERAL DEAD BLACK LOCUST (*ROBINIA PSUEDOACACIA*) (FACU-) SAPLINGS WITHIN PLOT. SMARTWEEDS (*POLYGONUM PUNCTATUM*) FORM A DENSE FRINGE AT EDGE OF POND, BUT WETLAND BOUNDARY IS SEVERAL FEET FURTHER LANDWARD.

HYDROLOGY

Recorded Data (Described in Remarks):
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other
- X No Recorded Data Available

Field Observations:

Depth of Surface Water:	NONE	(in.)
Depth to Free Water in Pit:	8	(in.)
Depth in Saturated Soil:	4	(in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ___ Inundated
- X Saturated in Upper 12 inches
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- X Oxidized Root Channels in Upper 12 inches
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- X FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks: SATURATED FRINGE AT EDGE OF PERMANENTLY INUNDATED POND

DATA POINT 10
5 FEET NORTH OF STAKE "WET 12A-28"

SITE 12 (TOWN GUT LANDFILL)
INDIAN HEAD DIVISION – NAVAL SURFACE WARFARE CENTER
WETLAND DELINEATION DATA FORM, PAGE 2

SOIL

Map Unit Name (Series and Phase):	TIDAL MARSH	Drainage Class:	VERY POOR
Taxonomy (subgroup):	N/A	Field Observations Confirmed Mapped Type?	Yes [redacted]

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture Concretions, Structure, etc,
0-12	B	10YR 6/1	10YR 6/6	STREAKS, <20%	SANDY CLAY
12-20+	B	1G 6/N	10YR 5/6	STREAKS, <10%	CLAY

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- X Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soil
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: SOIL COLORS ARE INDICATIVE OF HYDRIC SOILS

WETLAND DETERMINATION

	(Circle)		(Circle)
Hydrophytic Vegetation Present?	[redacted]	Is this Sampling Point Within a Wetland?	[redacted] No
Wetland Hydrology Present?	No		
Hydric Soils Present?	No		

Remarks: FRINGE OF PALUSTRINE ENERGENT WETLAND ALONG SHORE OF PERMANENTLY INUNDATED POND

Classification: PALUSTRINE FORESTED WETLAND (PFO)

SITE 12
WETLAND DELINEATION TRANSECT 4
DATA POINT 11
DATA POINT 12
DATA POINT 13
DATA POINT 14

DATA POINT 11
20 FEET NORTHEAST OF STAKE "WET 12A-35"

SITE 12 (TOWN GUT LANDFILL)
INDIAN HEAD DIVISION – NAVAL SURFACE WARFARE CENTER
WETLAND DELINEATION DATA FORM, PAGE 1

Project/Site:	IHDIV-NSWC SITE 12	Date:	SEPTEMBER 30, 1999
Applicant:	US NAVY	County:	CHARLES
Investigator:	J. PEYTON DOUB, PWS	State:	MARYLAND

Do Normal Circumstances exist on the site?:	[redacted]	No	Community ID:	OLD FIELD
Is the site significantly disturbed (Atypical Situation)?:	[redacted]	No	Transect ID:	4
Is the area a potential Problem Area?:	Yes	[redacted]	Plot ID:	11
(If needed, explain on reverse)				

VEGETATION

Dominant Plant Species	Stratum	Indicator	Other Plant Species	Stratum	Indicator
FESTUCA ARUNDINACEA	H	FACU	LESPEDEZA CUNEATA	H	NI
			GLECOMA HEDERACEA	H	FACU
			SOLANUM CAROLINENSE	H	UPL

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 0

Remarks: DENSE TURF OF TALL FESCUE. NO INDICATORS OF HYDROPHYTIC VEGETATION.

HYDROLOGY

Recorded Data (Described in Remarks):
- ____ Stream, Lake, or Tide Gauge
- ____ Aerial Photographs
- ____ Other
- X No Recorded Data Available

Field Observations:

Depth of Surface Water:	NONE	(in.)
Depth to Free Water in Pit:	NONE	(in.)
Depth in Saturated Soil:	NONE	(in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ____ Inundated
- ____ Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- ____ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ____ Oxidized Root Channels in Upper 12 inches
- ____ Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks: NO INDICATORS OF WETLAND HYDROLOGY.

DATA POINT 11
20 FEET NORTHEAST OF STAKE "WET 12A-35"

SITE 12 (TOWN GUT LANDFILL)
INDIAN HEAD DIVISION – NAVAL SURFACE WARFARE CENTER
WETLAND DELINEATION DATA FORM, PAGE 2

SOIL

Map Unit Name (Series and Phase):	TIDAL MARSH	Drainage Class:	NOT SPECIFIED
Taxonomy (subgroup):	N/A	Field Observations Confirmed Mapped Type?	Yes [redacted]

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture Concretions, Structure, etc,
0-6	N/A	10YR 5/2	10YR 5/6	FAINT STREAKS	SANDY CLAY LOAM
6-20+	N/A	10YR 5/6	10YR 5/2	APPROX. 75:25	SANDY CLAY LOAM

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soil
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: NO INDICATORS OF HYDRIC SOIL.

WETLAND DETERMINATION

	(Circle)		(Circle)
Hydrophytic Vegetation Present?	Yes [redacted]	Is this Sampling Point Within a Wetland?	Yes [redacted]
Wetland Hydrology Present?	Yes [redacted]		
Hydric Soils Present?	Yes [redacted]		

Remarks: UPGRADIENT END OF TRANSECT IN OBVIOUS UPLAND.

Classification: UPLAND (U)

DATA POINT 12
10 FEET NORTHEAST OF STAKE "WET 12A-35"

SITE 12 (TOWN GUT LANDFILL)
INDIAN HEAD DIVISION – NAVAL SURFACE WARFARE CENTER
WETLAND DELINEATION DATA FORM, PAGE 1

Project/Site:	IHDIV-NSWC SITE 12	Date:	SEPTEMBER 30, 1999
Applicant:	US NAVY	County:	CHARLES
Investigator:	J. PEYTON DOUB, PWS	State:	MARYLAND

Do Normal Circumstances exist on the site?:	No	Community ID:	OLD FIELD
Is the site significantly disturbed (Atypical Situation)?:	No	Transect ID:	4
Is the area a potential Problem Area?:	Yes	Plot ID:	12
(If needed, explain on reverse)			

VEGETATION

Dominant Plant Species	Stratum	Indicator	Other Plant Species	Stratum	Indicator
FESTUCA ARUNDINACEA	H	FACU	LESPEDEZA CUNEATA	H	NI
			GLECOMA HEDERACEA	H	FACU
			SOLANUM CAROLINENSE	H	UPL

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 0

Remarks: DENSE TURF OF TALL FESCUE. NO INDICATORS OF HYDROPHYTIC VEGETATION.

HYDROLOGY

Recorded Data (Described in Remarks):
- ____ Stream, Lake, or Tide Gauge
- ____ Aerial Photographs
- ____ Other
- X No Recorded Data Available

Field Observations:

Depth of Surface Water:	NONE	(in.)
Depth to Free Water in Pit:	12	(in.)
Depth in Saturated Soil:	9	(in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ____ Inundated
- X Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- ____ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ____ Oxidized Root Channels in Upper 12 inches
- ____ Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks: GRADUAL TRANSITION FROM DISTINCTLY WETLAND TO DISTINCTLY UPLAND HYDROLOGY

DATA POINT 12
10 FEET NORTHEAST OF STAKE "WET 12A-35"

SITE 12 (TOWN GUT LANDFILL)
INDIAN HEAD DIVISION – NAVAL SURFACE WARFARE CENTER
WETLAND DELINEATION DATA FORM, PAGE 2

SOIL

Map Unit Name (Series and Phase):	TIDAL MARSH	Drainage Class:	VERY POOR
Taxonomy (subgroup):	N/A	Field Observations Confirmed Mapped Type?	Yes [redacted]

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture Concretions, Structure, etc,
0-3	N/A	10YR 5/2	10YR 5/6	FAINT STREAKS	SANDY CLAY LOAM
3-15	N/A	10YR 5/2	10YR 5/6	STREAKS (<10%)	SANDY CLAY LOAM
15-20+	N/A	7.5YR 4/1	NONE	N/A	COURSE SANDT
					CLAY LOAM

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soil
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: SOILS BELOW 15 INCH DEPTH MAY BE ORIGINAL SOILS UNDER LANDFILL

WETLAND DETERMINATION

	(Circle)			(Circle)
Hydrophytic Vegetation Present?	Yes	[redacted]	Is this Sampling Point Within a Wetland?	Yes [redacted]
Wetland Hydrology Present?	[redacted]	No		
Hydric Soils Present?	[redacted]	No		

Remarks: TRANSITIONAL AREA BUT STILL CLEARLY UPGRADIENT OF WETLAND BOUNDARY

Classification: UPLAND (U)

DATA POINT 13
AT STAKE "WET 12A-35"

SITE 12 (TOWN GUT LANDFILL)
INDIAN HEAD DIVISION – NAVAL SURFACE WARFARE CENTER
WETLAND DELINEATION DATA FORM, PAGE 1

Project/Site:	IHDIV-NSWC SITE 12	Date:	SEPTEMBER 30, 1999
Applicant:	US NAVY	County:	CHARLES
Investigator:	J. PEYTON DOUB, PWS	State:	MARYLAND

Do Normal Circumstances exist on the site?:		No	Community ID:	TRANSITION
Is the site significantly disturbed (Atypical Situation)?:		No	Transect ID:	4
Is the area a potential Problem Area?:	Yes		Plot ID:	13
(If needed, explain on reverse)				

VEGETATION

Dominant Plant Species	Stratum	Indicator	Other Plant Species	Stratum	Indicator
FESTUCA ARUNDINACEA	H	FACU	GLECOMA HEDERACEA	H	FACU
POLYGONUM PUNCTATUM	H	OBL	SOLANUM CAROLINENSE	H	UPL

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 50

Remarks: PLOT LOCATED AT ABRUPT TRANSITION FROM HYDROPHYTIC TO UPLAND VEGETATION. FACU VEGETATION DOMINANT ONLY ON UPLAND SIDE OF PLOT; OBL VEGETATION DOMINANT ONLY ON WETLAND SIDE OF PLOT.

HYDROLOGY

Recorded Data (Described in Remarks):
- ____ Stream, Lake, or Tide Gauge
- ____ Aerial Photographs
- ____ Other
- X No Recorded Data Available

Field Observations:

Depth of Surface Water:	NONE	(in.)
Depth to Free Water in Pit:	15	(in.)
Depth in Saturated Soil:	6	(in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ____ Inundated
- X Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- ____ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ____ Oxidized Root Channels in Upper 12 inches
- ____ Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks: AT EDGE OF AREA WITH INDICATORS OF WETLAND HYDROLOGY

DATA POINT 13
AT STAKE "WET 12A-35"

SITE 12 (TOWN GUT LANDFILL)
INDIAN HEAD DIVISION – NAVAL SURFACE WARFARE CENTER
WETLAND DELINEATION DATA FORM, PAGE 2

SOIL

Map Unit Name (Series and Phase):	TIDAL MARSH	Drainage Class:	VERY POOR
Taxonomy (subgroup):	N/A	Field Observations Confirmed Mapped Type?	Yes [redacted]

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture Concretions, Structure, etc,
0-15	N/A	10YR 5/1	10YR 5/6	STREAKS, <10%	SANDY CLAY LOAM
15-20+	N/A	1G 4/N	NONE	N/A	SANDY CLAY

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- X Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soil
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: AT EDGE OF AREA WITH FIELD INDICATORS OF HYDRIC SOIL.

WETLAND DETERMINATION

	(Circle)			(Circle)
Hydrophytic Vegetation Present?	Yes	[redacted]	Is this Sampling Point Within a Wetland?	Yes [redacted]
Wetland Hydrology Present?	[redacted]	No		
Hydric Soils Present?	[redacted]	No		

Remarks: AT TRANSITION FROM WETLAND TO UPLAND.

Classification: TRANSITION UPLAND (U) TO PALUSTRINE EMERGENT WETLAND (PEM)

DATA POINT 14
10 FEET SOUTHWEST OF STAKE "WET 12A-35"

SITE 12 (TOWN GUT LANDFILL)
INDIAN HEAD DIVISION – NAVAL SURFACE WARFARE CENTER
WETLAND DELINEATION DATA FORM, PAGE 1

Project/Site:	IHDIV-NSWC SITE 12	Date:	SEPTEMBER 30, 1999
Applicant:	US NAVY	County:	CHARLES
Investigator:	J. PEYTON DOUB, PWS	State:	MARYLAND

Do Normal Circumstances exist on the site?:		No	Community ID:	FRINGE MARSH
Is the site significantly disturbed (Atypical Situation)?:		No	Transect ID:	4
Is the area a potential Problem Area?:	Yes		Plot ID:	14
(If needed, explain on reverse)				

VEGETATION

Dominant Plant Species	Stratum	Indicator	Other Plant Species	Stratum	Indicator
POLYGONUM PUNCTATUM	H	OBL			

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 100

Remarks: PLOT LOCATED WITHIN FRINGE OF EMERGENT WETLAND VEGETATION ALONG SHORE OF PERMANENTLY INUNDATED POND. DENSE PURE COVER BY SMARTWEED (*POLYGONUM PUNCTATUM*).

HYDROLOGY

Recorded Data (Described in Remarks):
- ____ Stream, Lake, or Tide Gauge
- ____ Aerial Photographs
- ____ Other
- X No Recorded Data Available

Field Observations:

Depth of Surface Water:	NONE	(in.)
Depth to Free Water in Pit:	12	(in.)
Depth in Saturated Soil:	SURFACE	(in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ____ Inundated
- X Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- ____ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- X Oxidized Root Channels in Upper 12 inches
- ____ Water-Stained Leaves
- ____ Local Soil Survey Data
- X FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks: SATURATED FRINGE AT EDGE OF PERMANENTLY INUNDATED POND

DATA POINT 14
10 FEET SOUTHWEST OF STAKE "WET 12A-35"

SITE 12 (TOWN GUT LANDFILL)
INDIAN HEAD DIVISION – NAVAL SURFACE WARFARE CENTER
WETLAND DELINEATION DATA FORM, PAGE 2

SOIL

Map Unit Name (Series and Phase):	TIDAL MARSH	Drainage Class:	VERY POOR
Taxonomy (subgroup):	N/A	Field Observations Confirmed Mapped Type?	Yes [redacted]

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture Concretions, Structure, etc,
0-15	N/A	10YR 5/1	10YR 5/6	STREAKS, <10%	SANDY CLAY LOAM
15-20+	N/A	1G 4/N	NONE	N/A	SANDY CLAY

Hydric Soil Indicators:

___	Histosol	___	Concretions
___	Histic Epipedon	___	High Organic Content in Surface Layer in Sandy Soil
___	Sulfidic Odor	___	Organic Streaking in Sandy Soils
___	Aquic Moisture Regime	___	Listed on Local Hydric Soils List
___	Reducing Conditions	___	Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors	___	Other (Explain in Remarks)

Remarks: SOIL COLORS ARE INDICATIVE OF HYDRIC SOILS. SOILS BELOW 15 INCH DEPTH MAY BE ORIGINAL SOILS UNDER THE LANDFILL.

WETLAND DETERMINATION

	(Circle)			(Circle)
Hydrophytic Vegetation Present?	[redacted]	No	Is this Sampling Point Within a Wetland?	[redacted] No
Wetland Hydrology Present?		No		
Hydric Soils Present?		No		

Remarks: FRINGE OF PALUSTRINE ENERGENT WETLAND ALONG SHORE OF PERMANENTLY INUNDATED POND

Classification: PALUSTRINE EMERGENT WETLAND (PEM)

APPENDIX B

WETLAND DELINEATION FIELD DATA SHEETS

SITE 42

SITE 42
WETLAND DELINEATION TRANSECT 1
DATA POINT 1
DATA POINT 2
DATA POINT 3

DATA POINT 1
10 FEET WEST OF STAKE "WET 42-6"

SITE 42 (OLSON ROAD LANDFILL)
INDIAN HEAD DIVISION – NAVAL SURFACE WARFARE CENTER
WETLAND DELINEATION DATA FORM, PAGE 1

Project/Site:	IHDIV-NSWC SITE 42	Date:	SEPTEMBER 29, 1999
Applicant:	US NAVY	County:	CHARLES
Investigator:	J. PEYTON DOUB, PWS	State:	MARYLAND

Do Normal Circumstances exist on the site?:	[redacted]	No	Community ID:	BTMLD HW FOREST
Is the site significantly disturbed (Atypical Situation)?:	[redacted]	No	Transect ID:	1
Is the area a potential Problem Area?:	Yes	[redacted]	Plot ID:	1
(If needed, explain on reverse)				

VEGETATION

Dominant Plant Species	Stratum	Indicator	Other Plant Species	Stratum	Indicator
LIQUIDAMBAR STYRACIFLUA	C	FAC			
ROBINIA PSEUDOACACIA	C	FACU-			
PLATANUS OCCIDENTALIS	C	FACW-			
LIQUIDAMBAR STYRACIFLUA	SA	FAC			
LIQUIDAMBAR STYRACIFLUA	SH	FAC			
POLYGONUM PUNCTATUM	H	OBL			

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 83

Remarks: HYDROPHYTIC VEGETATION.

HYDROLOGY

Recorded Data (Described in Remarks):
- ____ Stream, Lake, or Tide Gauge
- ____ Aerial Photographs
- ____ Other
- X No Recorded Data Available

Field Observations:

Depth of Surface Water:	NONE	(in.)
Depth to Free Water in Pit:	NONE	(in.)
Depth in Saturated Soil:	NONE	(in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ____ Inundated
- ____ Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- ____ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ____ Oxidized Root Channels in Upper 12 inches
- ____ Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks: NO INDICATORS OF WETLAND HYDROLOGY.

DATA POINT 1
10 FEET WEST OF STAKE "WET 42-6"

SITE 42 (OLSON ROAD LANDFILL)
INDIAN HEAD DIVISION – NAVAL SURFACE WARFARE CENTER
WETLAND DELINEATION DATA FORM, PAGE 2

SOIL

Map Unit Name (Series and Phase):	KEYPORT SILT LOAM	Drainage Class:	MODERATELY WELL
Taxonomy (subgroup):	5-12% SLOPES	Field Observations Confirmed Mapped Type?	Yes [redacted]

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture Concretions, Structure, etc,
0-15	N/A	10YR 6/6	NONE	N/A	SANDY CLAY LOAM
15-20+	N/A	10YR 7/4	10YR 7/8	PATCHES, <10%	CLAY LOAM

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soil
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: NO INDICATORS OF HYDRIC SOIL. THIS SOIL APPEARS TO BE FILL SOIL PLACED IN THE STREAM VALLEY AS PART OF THE STEAM PIPE CROSSING TO THE NORTH.

WETLAND DETERMINATION

	(Circle)			(Circle)	
Hydrophytic Vegetation Present?	[redacted]	No	Is this Sampling Point Within a Wetland?	Yes	[redacted]
Wetland Hydrology Present?	Yes	[redacted]			
Hydric Soils Present?	Yes	[redacted]			

Remarks: UPGRADIENT END OF TRANSECT IN OBVIOUS UPLAND. HYDROPHYTIC HERBACEOUS VEGETATION APPEARS TO BE AN UPLAND EXTENSION OF A PATCH OF VEGETATION LOCATED MOSTLY IN THE ADJOINING WETLANDS. WOODY VEGETATION IS MOSTLY FAC.

Classification: UPLAND (U)

DATA POINT 2
AT STAKE "WET 42-6"

SITE 42 (OLSON ROAD LANDFILL)
INDIAN HEAD DIVISION – NAVAL SURFACE WARFARE CENTER
WETLAND DELINEATION DATA FORM, PAGE 1

Project/Site:	IHDIV-NSWC SITE 42	Date:	SEPTEMBER 29, 1999
Applicant:	US NAVY	County:	CHARLES
Investigator:	J. PEYTON DOUB, PWS	State:	MARYLAND

Do Normal Circumstances exist on the site?:		No	Community ID:	BTMLD HW FOREST
Is the site significantly disturbed (Atypical Situation)?:		No	Transect ID:	1
Is the area a potential Problem Area?:	Yes		Plot ID:	2
(If needed, explain on reverse)				

VEGETATION

Dominant Plant Species	Stratum	Indicator	Other Plant Species	Stratum	Indicator
LIQUIDAMBAR STYRACIFLUA	C	FAC			
ROBINIA PSEUDOACACIA	C	FACU-			
PLATANUS OCCIDENTALIS	C	FACW-			
LIQUIDAMBAR STYRACIFLUA	SA	FAC			
LIQUIDAMBAR STYRACIFLUA	SH	FAC			
POLYGONUM PUNCTATUM	H	OBL			
BOEMERIA CYLINDRICA	H	FACW+			

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 86

Remarks: PLOT AT EDGE OF AREA WITHIN WHICH FALSE NETTLE (*BOEMERIA CYLINDRICA*) OCCURS. THE UPWARD EXTENT OF HYDRIC SOILS AND VISIBLE WETLAND HYDROLOGY APPEARS TO CORRESPOND TO THE UPWARD EXTENT OF FALSE NETTLE.

HYDROLOGY

Recorded Data (Described in Remarks):
- ____ Stream, Lake, or Tide Gauge
- ____ Aerial Photographs
- ____ Other
- X No Recorded Data Available

Field Observations:

Depth of Surface Water:	NONE	(in.)
Depth to Free Water in Pit:	NONE	(in.)
Depth in Saturated Soil:	NONE	(in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ____ Inundated
- ____ Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- ____ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- X Oxidized Root Channels in Upper 12 inches
- ____ Water-Stained Leaves
- ____ Local Soil Survey Data
- X FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks: AT EDGE OF AREA WITH INDICATORS OF WETLAND HYDROLOGY

DATA POINT 2
AT STAKE "WET 42-6"

SITE 42 (OLSON ROAD LANDFILL)
INDIAN HEAD DIVISION – NAVAL SURFACE WARFARE CENTER
WETLAND DELINEATION DATA FORM, PAGE 2

SOIL

Map Unit Name (Series and Phase):	KEYPORT SILT LOAM	Drainage Class:	MODERATELY WELL
Taxonomy (subgroup):	5-12% SLOPES	Field Observations Confirmed Mapped Type?	Yes [redacted]

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture Concretions, Structure, etc,
0-12	N/A	10YR 6/4	10YR 6/6	STREAKS (<10%)	SANDY CLAY LOAM
12-18	N/A	10YR 7/1	10YR 7/6	STREAKS (<10%)	SANDY CLAY LOAM
18-20+	N/A	10YR 7/1	10YR 7/6	STREAKS (<10%)	SANDY LOAM

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soil
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: AT EDGE OF AREA WITH FIELD INDICATORS OF HYDRIC SOIL.

WETLAND DETERMINATION

	(Circle)			(Circle)	
Hydrophytic Vegetation Present?	[redacted]	No	*Is this Sampling Point Within a Wetland?*	Yes	[redacted]
Wetland Hydrology Present?	Yes	[redacted]			
Hydric Soils Present?	Yes	[redacted]			

Remarks: AT ABRUPT TRANSITION FROM WETLAND TO UPLAND.

Classification: TRANSITION UPLAND (U) TO PALUSTRINE FORESTED WETLAND (PFO)

DATA POINT 3
10 FEET EAST OF STAKE "WET 42-6"

SITE 42 (OLSON ROAD LANDFILL)
INDIAN HEAD DIVISION – NAVAL SURFACE WARFARE CENTER
WETLAND DELINEATION DATA FORM, PAGE 1

Project/Site:	IHDIV-NSWC SITE 42	Date:	SEPTEMBER 29, 1999
Applicant:	US NAVY	County:	CHARLES
Investigator:	J. PEYTON DOUB, PWS	State:	MARYLAND

Do Normal Circumstances exist on the site?:		No	Community ID:	BTMLD HW FOREST
Is the site significantly disturbed (Atypical Situation)?:		No	Transect ID:	1
Is the area a potential Problem Area?:	Yes		Plot ID:	3
(If needed, explain on reverse)				

VEGETATION

Dominant Plant Species	Stratum	Indicator	Other Plant Species	Stratum	Indicator
LIQUIDAMBAR STYRACIFLUA	C	FAC			
ROBINIA PSEUDOACACIA	C	FACU-			
LIQUIDAMBAR STYRACIFLUA	SA	FAC			
LIQUIDAMBAR STYRACIFLUA	SH	FAC			
LINDERA BENZOIN	SH	FACW-			
POLYGONUM PUNCTATUM	H	OBL			
BOEMERIA CYLINDRICA	H	FACW+			

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 86

Remarks: HYDROPHYTIC VEGETATION. MOST OF THIS VEGETATION COMPRISES A NARROW STRIP OF HERBS AND SHRUBS OVERSHADED BY TREES GROWING ON ADJOINING UPLANDS.

HYDROLOGY

Recorded Data (Described in Remarks):
- ____ Stream, Lake, or Tide Gauge
- ____ Aerial Photographs
- ____ Other
- X No Recorded Data Available

Field Observations:

Depth of Surface Water:	NONE	(in.)
Depth to Free Water in Pit:	NONE	(in.)
Depth in Saturated Soil:	12	(in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ____ Inundated
- X Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- ____ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- X Oxidized Root Channels in Upper 12 inches
- ____ Water-Stained Leaves
- ____ Local Soil Survey Data
- X FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks: EVIDENCE OF WETLAND HYDROLOGY WEAK. RUNNING WATER IN ADJOINING STREAM MAY BE PROGRESSIVELY CUTTING A DEEPER CHANNEL INTO ADJOINING ALLUVIAL SOILS, LEAVING ADJOINING WETLANDS PROGRESSIVELY DRIER.

DATA POINT 3
10 FEET EAST OF STAKE "WET 42-6"

SITE 42 (OLSON ROAD LANDFILL)
INDIAN HEAD DIVISION – NAVAL SURFACE WARFARE CENTER
WETLAND DELINEATION DATA FORM, PAGE 2

SOIL

Map Unit Name (Series and Phase):	KEYPORT SILT LOAM	Drainage Class:	MODERATELY WELL
Taxonomy (subgroup):	5-12% SLOPES	Field Observations Confirmed Mapped Type?	Yes [redacted]

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture Concretions, Structure, etc,
0-2	N/A	10YR 6/4	10YR 6/6	STREAKS, <10%	SANDY CLAY LOAM
2-18	N/A	10YR 6/2	10YR 6/8	STREAKS, <20%	SANDY CLAY LOAM
18-20+	N/A	10YR 7/1	10YR 7/6	STREAKS, <20%	FINE SANDY LOAM

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- X Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soil
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: LOW CHROMA COLORS (DEPLETED MATRIX) ARE A FIELD INDICATOR OF HYDRIC SOILS

WETLAND DETERMINATION

	(Circle)			(Circle)
Hydrophytic Vegetation Present?	[redacted]	No	Is this Sampling Point Within a Wetland?	[redacted] No
Wetland Hydrology Present?		No		
Hydric Soils Present?		No		

Remarks: NARROW STRIP OF WETLANDS BORDERING PERENNIAL HEADWATER STREAM CHANNEL.

Classification: PALUSTRINE FORESTED WETLAND (PFO)

SITE 42
WETLAND DELINEATION TRANSECT 2
DATA POINT 4
DATA POINT 5
DATA POINT 6
DATA POINT 7

DATA POINT 4
20 FEET NORTHEAST OF STAKE "WET 42-32"

SITE 42 (OLSON ROAD LANDFILL)
INDIAN HEAD DIVISION – NAVAL SURFACE WARFARE CENTER
WETLAND DELINEATION DATA FORM, PAGE 1

Project/Site:	IHDIV-NSWC SITE 42	Date:	SEPTEMBER 29, 1999
Applicant:	US NAVY	County:	CHARLES
Investigator:	J. PEYTON DOUB, PWS	State:	MARYLAND

Do Normal Circumstances exist on the site?:		No	Community ID:	OLD FIELD
Is the site significantly disturbed (Atypical Situation)?:		No	Transect ID:	2
Is the area a potential Problem Area?:	Yes		Plot ID:	4
(If needed, explain on reverse)				

VEGETATION

Dominant Plant Species	Stratum	Indicator	Other Plant Species	Stratum	Indicator
FESTUCA ARUNDINACEA	H	FACU	LIQUIDAMBAR STYRACIFLUA	SA	FAC
			LIQUIDAMBAR STYRACIFLUA	SH	FAC
			SOLANUM CAROLINENSE	H	UPL
			HELIANTHUS TUBEROSUS (?)	H	FAC
			ATHYRIUM FELIX-FEMINA	H	FAC

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 0

Remarks: OLD FIELD VEGETATION ON WELL DRAINED AREA. THIS IS A DENSE TURF OF TALL FESCUE (*FESTUCA ARUNDINACEA*).

HYDROLOGY

Recorded Data (Described in Remarks):
- ____ Stream, Lake, or Tide Gauge
- ____ Aerial Photographs
- ____ Other
- X No Recorded Data Available

Field Observations:

Depth of Surface Water:	NONE	(in.)
Depth to Free Water in Pit:	NONE	(in.)
Depth in Saturated Soil:	NONE	(in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ____ Inundated
- ____ Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- ____ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ____ Oxidized Root Channels in Upper 12 inches
- ____ Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks: NO EVIDENCE OF WETLAND HYDROLOGY.

DATA POINT 4
20 FEET NORTHEAST OF STAKE "WET 42-32"

SITE 42 (OLSON ROAD LANDFILL)
INDIAN HEAD DIVISION – NAVAL SURFACE WARFARE CENTER
WETLAND DELINEATION DATA FORM, PAGE 2

SOIL

Map Unit Name (Series and Phase):	KEYPORT SILT LOAM	Drainage Class:	MODERATELY WELL
Taxonomy (subgroup):	2-5% SLOPES	Field Observations Confirmed Mapped Type?	[redacted] No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture Concretions, Structure, etc,
0-1	A	10YR 4/3	NONE	N/A	FINE SANDY LOAM
1-12	E	10YR 5/4	NONE	N/A	FINE SANDY LOAM
12-18	B	10YR 6/6	NONE	N/A	FINE SANDY LOAM
18-20+	B	10YR 7/6	NONE	N/A	SANDY CLAY

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soil
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: NO INDICATORS OF HYDRIC SOIL. ALTHOUGH IN CLEARED AREA ASSOCIATED WITH LANDFILL, SOILS APPEAR TO GENERALLY RESEMBLE THE ORIGINAL KEYPORT SERIES MAPPED FOR THIS LOCATION IN THE COUNTY SOIL SURVEY.

WETLAND DETERMINATION

	(Circle)			(Circle)
Hydrophytic Vegetation Present?	Yes	[redacted]	Is this Sampling Point Within a Wetland?	Yes [redacted]
Wetland Hydrology Present?	Yes			
Hydric Soils Present?	Yes			

Remarks: UPGRADIENT END OF TRANSECT IN OBVIOUS UPLAND.

Classification: UPLAND (U)

DATA POINT 5
10 FEET NORTHEAST OF STAKE "WET 42-32"

SITE 42 (OLSON ROAD LANDFILL)
INDIAN HEAD DIVISION – NAVAL SURFACE WARFARE CENTER
WETLAND DELINEATION DATA FORM, PAGE 1

Project/Site:	IHDIV-NSWC SITE 42	Date:	SEPTEMBER 29, 1999
Applicant:	US NAVY	County:	CHARLES
Investigator:	J. PEYTON DOUB, PWS	State:	MARYLAND

Do Normal Circumstances exist on the site?:		No	Community ID:	DECIDUOUS FOREST
Is the site significantly disturbed (Atypical Situation)?:	Yes		Transect ID:	2
Is the area a potential Problem Area?:	Yes		Plot ID:	5
(If needed, explain on reverse)				

VEGETATION

Dominant Plant Species	Stratum	Indicator	Other Plant Species	Stratum	Indicator
LIRIODENDRON TULIPIFERA	C	FACU	LONICERA JAPONICA	H	FAC-
FAGUS GRANDIDENTATA	C	FACU	SETARIA SP.	H	VAR
LIQUIDAMBAR STYRACIFLUA	C	FAC	COMMELINA COMMUNIS	H	FAC-
PRUNUS SEROTINA	SA	FACU			
LIQUIDAMBAR STYRACIFLUA	SA	FAC			
LIQUIDAMBAR STYRACIFLUA	SH	FAC			
POLYSTICHUM ACROSTICH.	H	FACU-			

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 43

Remarks: NO EVIDENCE OF HYDROPHYTIC VEGETATION. THIS IS A SMALL REMNANT PATCH OF MATURE DECIDUOUS FOREST THAT WAS NOT CLEARED IN CONNECTION WITH THE LANDFILL OR SURROUNDING CONSTRUCTION ACTIVITIES.

HYDROLOGY

Recorded Data (Described in Remarks):
- ____ Stream, Lake, or Tide Gauge
- ____ Aerial Photographs
- ____ Other
- X No Recorded Data Available

Field Observations:

Depth of Surface Water:	NONE	(in.)
Depth to Free Water in Pit:	NONE	(in.)
Depth in Saturated Soil:	NONE	(in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ____ Inundated
- ____ Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- ____ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ____ Oxidized Root Channels in Upper 12 inches
- ____ Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks: NO EVIDENCE OF WETLAND HYDROLOGY.

DATA POINT 5
10 FEET NORTHEAST OF STAKE "WET 42-32"

SITE 42 (OLSON ROAD LANDFILL)
INDIAN HEAD DIVISION – NAVAL SURFACE WARFARE CENTER
WETLAND DELINEATION DATA FORM, PAGE 2

SOIL

Map Unit Name (Series and Phase):	KEYPORT SILT LOAM	Drainage Class:	MODERATELY WELL
Taxonomy (subgroup):	2-5% SLOPES	Field Observations Confirmed Mapped Type?	[redacted] No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture Concretions, Structure, etc,
0-1	A	10YR 4/3	NONE	N/A	FINE SANDY LOAM
1-6	B	10YR 6/6	NONE	N/A	FINE SANDY LOAM
6-8	?	10YR 4/2	NONE	N/A	FINE SANDY LOAM
8-20+	B	10YR 5/4	NONE	N/A	FINE SANDY LOAM
					FEW MN CONCRET.

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soil
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: DEEP OCCURRENCE OF MN CONCRETIONS IS NOT SUFFICIENT EVIDENCE TO DETERMINE THAT SOIL IS HYDRIC. PROFILE DATA SUGGESTS SOME DISTURBANCE OF THIS SOIL, BUT VERY OLD TREES SUGGEST THAT ANY DISTURBANCE WOULD HAVE DATED FROM MORE THAN A CENTURY AGO.

WETLAND DETERMINATION

	(Circle)			(Circle)
Hydrophytic Vegetation Present?	Yes	[redacted]	Is this Sampling Point Within a Wetland?	Yes [redacted]
Wetland Hydrology Present?	Yes			
Hydric Soils Present?	Yes			

Remarks: UPLAND SLOPE BORDERING STREAM CHANNEL.

Classification: UPLAND (U)

DATA POINT 6
AT STAKE "WET 42-32"

SITE 42 (OLSON ROAD LANDFILL)
INDIAN HEAD DIVISION – NAVAL SURFACE WARFARE CENTER
WETLAND DELINEATION DATA FORM, PAGE 1

Project/Site:	IHDIV-NSWC SITE 42	Date:	SEPTEMBER 29, 1999
Applicant:	US NAVY	County:	CHARLES
Investigator:	J. PEYTON DOUB, PWS	State:	MARYLAND

Do Normal Circumstances exist on the site?:		No	Community ID:	TRANSITION
Is the site significantly disturbed (Atypical Situation)?:	Yes		Transect ID:	2
Is the area a potential Problem Area?:	Yes		Plot ID:	6
(If needed, explain on reverse)				

VEGETATION

Dominant Plant Species	Stratum	Indicator	Other Plant Species	Stratum	Indicator
LIRIODENDRON TULIPIFERA	C	FACU	LONICERA JAPONICA	H	FAC-
FAGUS GRANDIDENTATA	C	FACU	SETARIA SP.	H	VAR
LIQUIDAMBAR STYRACIFLUA	C	FAC	COMMELINA COMMUNIS	H	FAC-
LIQUIDAMBAR STYRACIFLUA	SH	FAC	CAREX STRICTA	H	OBL
POLYSTICHUM ACROSTICH.	H	FACU-	JUNCUS EFFUSUS	H	FACW+
POLYGONUM PUNCTATUM	H	OBL			
BOEMERIA CYLINDRICA	H	FACW+			

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 57

Remarks: AT SHARP TRANSITION FROM UPLAND TO WETLAND VEGETATION

HYDROLOGY

Recorded Data (Described in Remarks):
- ____ Stream, Lake, or Tide Gauge
- ____ Aerial Photographs
- ____ Other
- X No Recorded Data Available

Field Observations:

Depth of Surface Water:	NONE	(in.)
Depth to Free Water in Pit:	16	(in.)
Depth in Saturated Soil:	12	(in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ____ Inundated
- X Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- ____ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ____ Oxidized Root Channels in Upper 12 inches
- ____ Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks: AT EDGE OF AREA WITH INDICATORS OF WETLAND HYDROLOGY

DATA POINT 6
AT STAKE "WET 42-32"

SITE 42 (OLSON ROAD LANDFILL)
INDIAN HEAD DIVISION – NAVAL SURFACE WARFARE CENTER
WETLAND DELINEATION DATA FORM, PAGE 2

SOIL

Map Unit Name (Series and Phase):	KEYPORT SILT LOAM	Drainage Class:	MODERATELY WELL
Taxonomy (subgroup):	2-5% SLOPES	Field Observations Confirmed Mapped Type?	Yes [redacted]

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture Concretions, Structure, etc,
0-2	A	10YR 4/2	NONE	N/A	FINE SANDY LOAM
2-12	E	10YR 5/4	NONE	N/A	FINE SANDY LOAM
12-20+	B	10YR 5/1	10YR 5/6	STREAKS, <10%	FINE SANDY LOAM

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soil
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: AT EDGE OF AREA WITH FIELD INDICATORS OF HYDRIC SOIL.

WETLAND DETERMINATION

	(Circle)			(Circle)
Hydrophytic Vegetation Present?	[redacted]	No	Is this Sampling Point Within a Wetland?	Yes [redacted]
Wetland Hydrology Present?	[redacted]	No		
Hydric Soils Present?	Yes	[redacted]		

Remarks: AT ABRUPT TRANSITION FROM WETLAND TO UPLAND.

Classification: TRANSITION UPLAND (U) TO PALUSTRINE EMERGENT WETLAND (PEM)

DATA POINT 7
10 FEET SOUTHWEST OF STAKE "WET 42-32"

SITE 42 (OLSON ROAD LANDFILL)
INDIAN HEAD DIVISION – NAVAL SURFACE WARFARE CENTER
WETLAND DELINEATION DATA FORM, PAGE 1

Project/Site:	IHDIV-NSWC SITE 42	Date:	SEPTEMBER 29, 1999
Applicant:	US NAVY	County:	CHARLES
Investigator:	J. PEYTON DOUB, PWS	State:	MARYLAND

Do Normal Circumstances exist on the site?:		No	Community ID:	SHADED MARSH
Is the site significantly disturbed (Atypical Situation)?:	Yes		Transect ID:	2
Is the area a potential Problem Area?:	Yes		Plot ID:	7
(If needed, explain on reverse)				

VEGETATION

Dominant Plant Species	Stratum	Indicator	Other Plant Species	Stratum	Indicator
POLYGONUM PUNCTATUM	H	OBL	CAREX STRICTA	H	OBL
BOEMERIA CYLINDRICA	H	FACW+	JUNCUS EFFUSUS	H	FACW+

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 100

Remarks: HYDROPHYTIC VEGETATION. AREA SHADED BY OVERHANGING LIMBS OF TREES ON UPLANDS, BUT THESE TREES NOT USED IN DETERMINATION WHETHER VEGETATION IS HYDROPHYTIC.

HYDROLOGY

Recorded Data (Described in Remarks):
- ____ Stream, Lake, or Tide Gauge
- ____ Aerial Photographs
- ____ Other
- X No Recorded Data Available

Field Observations:

Depth of Surface Water:	NONE	(in.)
Depth to Free Water in Pit:	SURFACE	(in.)
Depth in Saturated Soil:	SURFACE	(in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ____ Inundated
- X Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- ____ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ____ Oxidized Root Channels in Upper 12 inches
- ____ Water-Stained Leaves
- ____ Local Soil Survey Data
- X FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks: SATURATED WETLANDS BORDERING STREAM CHANNEL.

DATA POINT 7
10 FEET SOUTHWEST OF STAKE "WET 42-32"

SITE 42 (OLSON ROAD LANDFILL)
INDIAN HEAD DIVISION – NAVAL SURFACE WARFARE CENTER
WETLAND DELINEATION DATA FORM, PAGE 2

SOIL

Map Unit Name (Series and Phase):	KEYPORT SILT LOAM	Drainage Class:	MODERATELY WELL
Taxonomy (subgroup):	2-5% SLOPES	Field Observations Confirmed Mapped Type?	Yes [redacted]

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture Concretions, Structure, etc,
0-20+	B	10YR 5/1	10YR 3/1	STREAKS, <10%	FINE SANDY LOAM

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- X Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- X Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soil
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: LOW CHROMA COLORS (DEPLETED MATRIX) ARE A FIELD INDICATOR OF HYDRIC SOILS. SO IS SULFIDIC ODOR.

WETLAND DETERMINATION

	(Circle)			(Circle)
Hydrophytic Vegetation Present?	[redacted]	No	Is this Sampling Point Within a Wetland?	[redacted] No
Wetland Hydrology Present?		No		
Hydric Soils Present?		No		

Remarks: NARROW ZONE OF WETLANDS BORDERING STREAM CHANNEL.

Classification: PALUSTRINE EMERGENT WETLAND (PEM)

SITE 42
WETLAND DELINEATION TRANSECT 3
DATA POINT 8
DATA POINT 9
DATA POINT 10

DATA POINT 8
10 FEET NORTHWEST OF STAKE "WET 42-74"

SITE 42 (OLSON ROAD LANDFILL)
INDIAN HEAD DIVISION – NAVAL SURFACE WARFARE CENTER
WETLAND DELINEATION DATA FORM, PAGE 1

Project/Site:	IHDIV-NSWC SITE 42	Date:	SEPTEMBER 29, 1999
Applicant:	US NAVY	County:	CHARLES
Investigator:	J. PEYTON DOUB, PWS	State:	MARYLAND

Do Normal Circumstances exist on the site?:	[redacted]	No	Community ID:	OLD FIELD
Is the site significantly disturbed (Atypical Situation)?:	[redacted]	No	Transect ID:	3
Is the area a potential Problem Area?:	Yes	[redacted]	Plot ID:	8
(If needed, explain on reverse)				

VEGETATION

Dominant Plant Species	Stratum	Indicator	Other Plant Species	Stratum	Indicator
LIQUIDAMBAR STYRACIFLUA	SA	FAC	HELIANTHUS TUBEROSUS (?)	H	FAC
LIQUIDAMBAR STYRACIFLUA	SH	FAC	GLECOMA HEDERACEA	H	FACU
POLYGONUM SP.	H	VAR			
RUBUS ALLEGHENIENSIS	H	FACU-			

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 67

Remarks: FAC-DOMINATED VEGETATION JUST UPGRADIENT OF WETLAND BOUNDARY.

HYDROLOGY

Recorded Data (Described in Remarks):
- ____ Stream, Lake, or Tide Gauge
- ____ Aerial Photographs
- ____ Other
- X No Recorded Data Available

Field Observations:

Depth of Surface Water:	NONE	(in.)
Depth to Free Water in Pit:	18	(in.)
Depth in Saturated Soil:	12	(in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ____ Inundated
- X Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- ____ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ____ Oxidized Root Channels in Upper 12 inches
- ____ Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks: VERY MARGINAL EVIDENCE OF WETLAND HYDROLOGY.

DATA POINT 8
10 FEET NORTHWEST OF STAKE "WET 42-74"

SITE 42 (OLSON ROAD LANDFILL)
INDIAN HEAD DIVISION – NAVAL SURFACE WARFARE CENTER
WETLAND DELINEATION DATA FORM, PAGE 2

SOIL

Map Unit Name (Series and Phase):	KEYPORT SILT LOAM	Drainage Class:	MODERATELY WELL
Taxonomy (subgroup):	5-12% SLOPES	Field Observations Confirmed Mapped Type?	Yes [redacted]

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture Concretions, Structure, etc,
0-10	N/A	10YR 4/3	NONE	N/A	GRAVELLY LOAM
10-20+	N/A	10YR 4/1	NONE	N/A	GRAVELLY LOAM

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soil
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: NO INDICATORS OF HYDRIC SOIL. THIS APPEARS TO BE FILL ASSOCIATED WITH THE LANDFILL.

WETLAND DETERMINATION

	(Circle)			(Circle)	
Hydrophytic Vegetation Present?	[redacted]	No	Is this Sampling Point Within a Wetland?	Yes	[redacted]
Wetland Hydrology Present?	Yes	[redacted]			
Hydric Soils Present?	Yes	[redacted]			

Remarks: UPGRADIENT END OF TRANSECT IN OBVIOUS UPLAND.

Classification: UPLAND (U)

DATA POINT 9
AT STAKE "WET 42-74"

SITE 42 (OLSON ROAD LANDFILL)
INDIAN HEAD DIVISION – NAVAL SURFACE WARFARE CENTER
WETLAND DELINEATION DATA FORM, PAGE 1

Project/Site:	IHDIV-NSWC SITE 42	Date:	SEPTEMBER 29, 1999
Applicant:	US NAVY	County:	CHARLES
Investigator:	J. PEYTON DOUB, PWS	State:	MARYLAND

Do Normal Circumstances exist on the site?:		No	Community ID:	TRANSITION
Is the site significantly disturbed (Atypical Situation)?:		No	Transect ID:	3
Is the area a potential Problem Area?:	Yes		Plot ID:	9
(If needed, explain on reverse)				

VEGETATION

Dominant Plant Species	Stratum	Indicator	Other Plant Species	Stratum	Indicator
RUBUS ALLEGHENIENSIS	H	FACU-	CALYSTEGIA SEPIUM (?)	H	FAC-
GLECOMA HEDERACEA	H	FACU	HELIANTHUS TUBEROSUS (?)	H	FAC
POLYGONUM SP.	H	VAR			
SOLANUM CAROLINENSE	H	UPL			

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 0

Remarks: PLOT SUPPORTS VEGETATION GENERALLY TYPICAL OF OLD FIELDS BUT MANY OF THE SPECIES, INCLUDING THE ALLEGHENY BLACKBERRY (*RUBUS ALLEGHENIENSIS*) AND GROUND IVY (*GLECOMA HEDERACEA*), APPEAR TO BE SEVERLY DECLINING DUE TO EXPOSURE TO SATURATED SOILS. THUS, THIS VEGETATION CAN BE CONSIDERED TO BE "HYDROPHYTIC".

HYDROLOGY

Recorded Data (Described in Remarks):
- ____ Stream, Lake, or Tide Gauge
- ____ Aerial Photographs
- ____ Other
- X No Recorded Data Available

Field Observations:

Depth of Surface Water:	NONE	(in.)
Depth to Free Water in Pit:	12	(in.)
Depth in Saturated Soil:	8	(in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ____ Inundated
- X Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- ____ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ____ Oxidized Root Channels in Upper 12 inches
- ____ Water-Stained Leaves
- ____ Local Soil Survey Data
- X FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks: AT EDGE OF AREA WITH INDICATORS OF WETLAND HYDROLOGY

DATA POINT 9
AT STAKE "WET 42-74"

SITE 42 (OLSON ROAD LANDFILL)
INDIAN HEAD DIVISION – NAVAL SURFACE WARFARE CENTER
WETLAND DELINEATION DATA FORM, PAGE 2

SOIL

Map Unit Name (Series and Phase):	KEYPORT SILT LOAM	Drainage Class:	MODERATELY WELL
Taxonomy (subgroup):	5-12% SLOPES	Field Observations Confirmed Mapped Type?	Yes

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture Concretions, Structure, etc,
0-8	N/A	10YR 4/3	NONE	N/A	GRAVELLY LOAM
8-20+	N/A	10YR 4/1	NONE	N/A	GRAVELLY LOAM

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- ___ Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soil
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: AT EDGE OF AREA WITH FIELD INDICATORS OF HYDRIC SOIL. THIS APPEARS TO BE FILL ASSOCIATED WITH THE LANDFILL.

WETLAND DETERMINATION

	(Circle)			(Circle)
Hydrophytic Vegetation Present?		No	Is this Sampling Point Within a Wetland?	Yes
Wetland Hydrology Present?		No		
Hydric Soils Present?	Yes			

Remarks: AT ABRUPT TRANSITION FROM WETLAND TO UPLAND.

Classification: TRANSITION UPLAND (U) TO PALUSTRINE EMERGENT WETLAND (PEM)

DATA POINT 10
10 FEET SOUTHEAST OF STAKE "WET 42-74"

SITE 42 (OLSON ROAD LANDFILL)
INDIAN HEAD DIVISION – NAVAL SURFACE WARFARE CENTER
WETLAND DELINEATION DATA FORM, PAGE 1

Project/Site:	IHDIV-NSWC SITE 42	Date:	SEPTEMBER 29, 1999
Applicant:	US NAVY	County:	CHARLES
Investigator:	J. PEYTON DOUB, PWS	State:	MARYLAND

Do Normal Circumstances exist on the site?:	No	Community ID:	HERBACEOUS MARSH
Is the site significantly disturbed (Atypical Situation)?:	No	Transect ID:	3
Is the area a potential Problem Area?:	Yes	Plot ID:	10
(If needed, explain on reverse)			

VEGETATION

Dominant Plant Species	Stratum	Indicator	Other Plant Species	Stratum	Indicator
POLYGONUM PUNCTATUM	H	OBL			
JUNCUS EFFUSUS	H	FACW+			
GLECOMA HEDERACEA	H	FACU			
RUBUS ALLEGHENIENSIS	H	FACU-			
SCIRPUS PUNGENS	H	FACW+			

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 60

Remarks: HYDROPHYTIC VEGETATION. UPLAND PLANTS IN THIS AREA, INCLUDING ALLEGHENY BLACKBERRY (*RUBUS ALLEGHENIENSIS*) AND GROUND IVY (*GLECOMA HEDERACEA*), ARE DYING OR DEAD. APPARENTLY DUE TO SOIL SATURATION.

HYDROLOGY

Recorded Data (Described in Remarks):
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other
- X No Recorded Data Available

Field Observations:

Depth of Surface Water:	0-0.5	(in.)
Depth to Free Water in Pit:	SURFACE	(in.)
Depth in Saturated Soil:	SURFACE	(in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ___ Inundated
- X Saturated in Upper 12 inches
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ___ Oxidized Root Channels in Upper 12 inches
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- X FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks: SHALLOW RUNNING WATER IN THIS SWALE APPEARS TO SEEP FROM UNDER THE PARKING LOT FOR BUILDING 1866. THE WATER WAS UNNATURALLY WARM AT THE TIME OF THE DELINEATION.

DATA POINT 10
10 FEET SOUTHEAST OF STAKE "WET 42-74"

SITE 42 (OLSON ROAD LANDFILL)
INDIAN HEAD DIVISION – NAVAL SURFACE WARFARE CENTER
WETLAND DELINEATION DATA FORM, PAGE 2

SOIL

Map Unit Name (Series and Phase):	KEYPORT SILT LOAM	Drainage Class:	MODERATELY WELL
Taxonomy (subgroup):	5-12% SLOPES	Field Observations Confirmed Mapped Type?	Yes [redacted]

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture Concretions, Structure, etc,
0-20+	N/A	10YR 4/1	NONE	N/A	GRAVELLY LOAM

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- X Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soil
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in Remarks)

Remarks: LOW CHROMA COLORS (DEPLETED MATRIX) ARE A FIELD INDICATOR OF HYDRIC SOILS. THIS APPEARS TO BE FILL ASSOCIATED WITH THE LANDFILL.

WETLAND DETERMINATION

	(Circle)			(Circle)	
Hydrophytic Vegetation Present?	[redacted]	No	Is this Sampling Point Within a Wetland?	[redacted]	No
Wetland Hydrology Present?		No			
Hydric Soils Present?		No			

Remarks: WETLANDS IN SWALE WHERE SURFACE WATER APPEARS TO ORIGINATE AS SEEPAGE FROM UNDER THE PARKING LOT FOR BUILDING 1866..

Classification: PALUSTRINE EMERGENT WETLAND (PFO)

APPENDIX B

PRE-FEASIBILITY STUDY ANALYTICAL DATA

APPENDIX B
SUMMARY OF ANALYTICAL RESULTS FOR 1999 SOIL SAMPLES
INDIAN HEAD - CTO-245
SITE 41

SAMPLE I.D.:	S41SS0010006	S41SS0010006-D	S41SS0020006	S41SS0030006	S41SS0030106	S41SS0040006	S41SS0040106	S41SS0050006
LOCATION:	S41SS001	S41SS001	S41SS002	S41SS003	S41SS003	S41SS004	S41SS004	S41SS005
SAMPLE DATE:	9/29/1999	9/29/1999	9/29/1999	9/29/1999	9/29/1999	9/29/1999	9/29/1999	9/29/1999
DEPTH (FEET):	0' - 0.5'	0' - 0.5'	0' - 0.5'	0' - 0.5'	1 - 1.5'	0' - 0.5'	1 - 1.5'	0' - 0.5'
DUPLICATE OF:	S41SS0010006-D	S41SS0010006						
PESTICIDES/PCBs (µg/kg)								
4,4'-DDD	4.0 UJ	7.6 UJ	39 UJ	3.7 UJ	3.9 UJ	3.8 UJ	15 UJ	44 UJ
4,4'-DDE	4.0 UJ	7.6 UJ	39 UJ	3.7 UJ	3.9 UJ	3.8 UJ	15 UJ	44 UJ
4,4'-DDT	6.4 R	8.4 J	21 J	3.7 UJ	3.9 UJ	2.7 R	14 R	44 UJ
ALDRIN	1.2 R	3.9 UJ	110 J	1.9 UJ	2.0 UJ	2.0 UJ	9.6 R	79 J
ALPHA-BHC	2.0 UJ	3.9 UJ	20 UJ	1.9 UJ	2.0 UJ	2.0 UJ	7.5 UJ	22 UJ
ALPHA-CHLORDANE	2.0 UJ	3.9 UJ	32 J	1.9 UJ	2.0 UJ	2.0 UJ	7.5 UJ	29 J
AROCLOR-1016	40 UJ	76 UJ	390 UJ	37 UJ	39 UJ	38 UJ	150 UJ	440 UJ
AROCLOR-1221	80 UJ	150 UJ	780 UJ	75 UJ	79 UJ	78 UJ	300 UJ	880 UJ
AROCLOR-1232	40 UJ	76 UJ	390 UJ	37 UJ	39 UJ	38 UJ	150 UJ	440 UJ
AROCLOR-1242	40 UJ	76 UJ	390 UJ	37 UJ	39 UJ	38 UJ	150 UJ	440 UJ
AROCLOR-1248	40 UJ	76 UJ	3800 J	37 UJ	39 UJ	38 UJ	150 UJ	3100 J
AROCLOR-1254	40 UJ	76 UJ	390 UJ	37 UJ	39 UJ	38 UJ	150 UJ	440 UJ
AROCLOR-1260	40 UJ	76 UJ	450 J	31 J	39 UJ	38 UJ	150 UJ	6000 J
BETA-BHC	2.0 UJ	3.9 UJ	20 UJ	1.9 UJ	2.0 UJ	2.0 UJ	7.5 UJ	22 UJ
DELTA-BHC	2.0 UJ	3.9 UJ	20 UJ	1.9 UJ	2.0 UJ	2.0 UJ	7.5 UJ	22 UJ
DIELDRIN	4.0 UJ	7.6 UJ	39 UJ	3.7 UJ	3.9 UJ	3.8 UJ	15 UJ	44 UJ
ENDOSULFAN I	2.0 UJ	3.9 UJ	20 UJ	1.9 UJ	2.0 UJ	2.0 UJ	7.5 UJ	22 UJ
ENDOSULFAN II	4.0 UJ	7.6 UJ	39 UJ	3.7 UJ	3.9 UJ	3.8 UJ	15 UJ	160 J
ENDOSULFAN SULFATE	4.0 UJ	7.6 UJ	39 UJ	3.7 UJ	3.9 UJ	3.8 UJ	15 UJ	28 R
ENDRIN	4.0 UJ	7.6 UJ	39 UJ	3.7 UJ	3.9 UJ	3.8 UJ	15 UJ	91 R
ENDRIN ALDEHYDE	4.0 UJ	7.6 UJ	39 UJ	3.7 UJ	3.9 UJ	3.8 UJ	15 UJ	250 J
ENDRIN KETONE	4.0 UJ	7.6 UJ	39 UJ	3.7 UJ	2.6 J	3.8 UJ	14 R	23 R
GAMMA-BHC (LINDANE)	2.0 UJ	3.9 UJ	20 UJ	1.9 UJ	2.0 UJ	2.0 UJ	7.5 UJ	22 UJ
GAMMA-CHLORDANE	2.0 UJ	3.9 UJ	20 UJ	1.9 UJ	2.0 UJ	2.0 UJ	7.5 UJ	22 UJ
HEPTACHLOR	2.0 UJ	3.9 UJ	20 UJ	1.9 UJ	2.0 UJ	2.0 UJ	7.5 UJ	22 UJ
HEPTACHLOR EPOXIDE	2.0 UJ	3.9 UJ	20 UJ	1.9 UJ	2.0 UJ	2.0 UJ	7.5 UJ	22 UJ
METHOXYCHLOR	20 UJ	39 UJ	200 UJ	19 UJ	10 J	20 UJ	72 J	220 UJ
TOXAPHENE	200 UJ	390 UJ	2000 UJ	190 UJ	200 UJ	200 UJ	750 UJ	2200 UJ

APPENDIX B
SUMMARY OF ANALYTICAL RESULTS FOR 1999 SOIL SAMPLES
INDIAN HEAD - CTO-245
SITE 41

SAMPLE I.D.:	S41SS0010006	S41SS0010006-D	S41SS0020006	S41SS0030006	S41SS0030106	S41SS0040006	S41SS0040106	S41SS0050006
LOCATION:	S41SS001	S41SS001	S41SS002	S41SS003	S41SS003	S41SS004	S41SS004	S41SS005
SAMPLE DATE:	9/29/1999	9/29/1999	9/29/1999	9/29/1999	9/29/1999	9/29/1999	9/29/1999	9/29/1999
DEPTH (FEET):	0' - 0.5'	0' - 0.5'	0' - 0.5'	0' - 0.5'	1 - 1.5'	0' - 0.5'	1 - 1.5'	0' - 0.5'
DUPLICATE OF:	S41SS0010006-D	S41SS0010006						
INORGANICS (mg/kg)								
ALUMINUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ANTIMONY	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ARSENIC	16.8	16.9	23.9	3.8	74.0	10.4	20.7	38.8
BARIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
BERYLLIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CADMIUM	0.10	0.05 U	30.9	0.09	0.30	0.05 U	0.05 U	7.2
CALCIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CHROMIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
COBALT	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
COPPER	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CYANIDE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
IRON	6630	6410	16200	9830	6070	7310	6390	113000
LEAD	11.8	7.8	267	9.2	17.4	5.5	7.6	106
MAGNESIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MANGANESE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MERCURY	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
NICKEL	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
POTASSIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SELENIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SILVER	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SODIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
THALLIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
VANADIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ZINC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

APPENDIX B
SUMMARY OF ANALYTICAL RESULTS FOR 1999 SOIL SAMPLES
INDIAN HEAD - CTO-245
SITE 41

SAMPLE I.D.:	S41SS0060006	S41SS0060106	S41SS0070006	S41SS0070106	S41SS0080006	S41SS0080006-D	S41SS0090006	S41SS0090106
LOCATION:	S41SS006	S41SS006	S41SS007	S41SS007	S41SS008	S41SS008	S41SS009	S41SS009
SAMPLE DATE:	9/29/1999	9/29/1999	9/29/1999	9/29/1999	9/29/1999	9/29/1999	9/29/1999	9/29/1999
DEPTH (FEET):	0' - 0.5'	1 - 1.5'	0' - 0.5'	1 - 1.5'	0' - 0.5'	0' - 0.5'	0' - 0.5'	1 - 1.5'
DUPLICATE OF:					S41SS0080006-D	S41SS0080006		
PESTICIDES/PCBs (µg/kg)								
4,4'-DDD	4.0 UJ	3.6 UJ	3.6 UJ	19 UJ	12 R	31 R	17 UJ	11 UJ
4,4'-DDE	4.0 UJ	3.6 UJ	3.6 UJ	19 UJ	16 UJ	19 UJ	17 UJ	11 UJ
4,4'-DDT	4.0 UJ	8.0 J	8.3 R	18 R	16 UJ	190 UJ	17 UJ	11 UJ
ALDRIN	2.1 UJ	1.8 UJ	1.8 UJ	14 R	15 R	10 UJ	8.5 UJ	3.5 R
ALPHA-BHC	2.1 UJ	1.8 UJ	1.8 UJ	10 UJ	8.4 UJ	10 UJ	8.5 UJ	5.7 UJ
ALPHA-CHLORDANE	2.1 UJ	1.8 UJ	1.8 UJ	10 UJ	19 J	38 J	8.5 UJ	5.7 UJ
AROCLOR-1016	40 UJ	36 UJ	36 UJ	190 UJ	160 UJ	190 UJ	170 UJ	110 UJ
AROCLOR-1221	82 UJ	72 UJ	72 UJ	390 UJ	330 UJ	390 UJ	340 UJ	220 UJ
AROCLOR-1232	40 UJ	36 UJ	36 UJ	190 UJ	160 UJ	190 UJ	170 UJ	110 UJ
AROCLOR-1242	40 UJ	36 UJ	36 UJ	190 UJ	160 UJ	190 UJ	170 UJ	110 UJ
AROCLOR-1248	40 UJ	36 UJ	36 UJ	190 UJ	630 J	190 UJ	170 UJ	110 UJ
AROCLOR-1254	40 J	36 UJ	36 UJ	190 UJ	160 UJ	190 UJ	170 UJ	110 UJ
AROCLOR-1260	40 UJ	36 UJ	36 UJ	190 UJ	15000 J	32000 J	690 J	260 J
BETA-BHC	2.1 UJ	1.8 UJ	1.8 UJ	10 UJ	8.4 UJ	10 UJ	8.5 UJ	5.7 UJ
DELTA-BHC	2.1 UJ	1.8 UJ	1.8 UJ	10 UJ	8.4 UJ	10 UJ	8.5 UJ	5.7 UJ
DIELDRIN	4.0 UJ	3.6 UJ	3.6 UJ	19 UJ	68 J	150 J	17 UJ	11 UJ
ENDOSULFAN I	2.1 UJ	1.8 UJ	1.8 UJ	10 UJ	8.4 UJ	10 UJ	8.5 UJ	5.7 UJ
ENDOSULFAN II	4.0 UJ	3.6 UJ	3.6 UJ	19 UJ	420 J	940 J	18 J	5.8 J
ENDOSULFAN SULFATE	4.0 UJ	3.6 UJ	2.5 J	19 UJ	16 UJ	22 R	17 UJ	11 UJ
ENDRIN	2.9 J	3.6 UJ	4.1 R	19 UJ	99 R	210 R	17 UJ	11 UJ
ENDRIN ALDEHYDE	2.7 R	3.6 UJ	3.7 R	19 UJ	580 J	1100 J	21 R	5.9 R
ENDRIN KETONE	3.2 J	3.6 UJ	3.6 UJ	13 R	16 UJ	19 UJ	17 UJ	7.8 R
GAMMA-BHC (LINDANE)	2.1 UJ	1.8 UJ	1.8 UJ	10 UJ	8.4 UJ	10 UJ	8.5 UJ	5.7 UJ
GAMMA-CHLORDANE	2.1 UJ	1.8 UJ	1.8 UJ	10 UJ	8.4 UJ	5.5 R	8.5 UJ	5.7 UJ
HEPTACHLOR	1.2 J	1.8 UJ	1.8 UJ	10 UJ	8.4 UJ	10 UJ	8.5 UJ	5.7 UJ
HEPTACHLOR EPOXIDE	2.1 UJ	1.8 UJ	1.8 UJ	10 UJ	8.4 UJ	10 UJ	8.5 UJ	5.7 UJ
METHOXYCHLOR	21 UJ	18 UJ	18 UJ	55 R	84 UJ	100 UJ	85 UJ	36 J
TOXAPHENE	210 UJ	180 UJ	180 UJ	1000 UJ	840 UJ	1000 UJ	850 UJ	570 UJ

APPENDIX B
SUMMARY OF ANALYTICAL RESULTS FOR 1999 SOIL SAMPLES
INDIAN HEAD - CTO-245
SITE 41

SAMPLE I.D.:	S41SS0060006	S41SS0060106	S41SS0070006	S41SS0070106	S41SS0080006	S41SS0080006-D	S41SS0090006	S41SS0090106
LOCATION:	S41SS006	S41SS006	S41SS007	S41SS007	S41SS008	S41SS008	S41SS009	S41SS009
SAMPLE DATE:	9/29/1999	9/29/1999	9/29/1999	9/29/1999	9/29/1999	9/29/1999	9/29/1999	9/29/1999
DEPTH (FEET):	0' - 0.5'	1 - 1.5'	0' - 0.5'	1 - 1.5'	0' - 0.5'	0' - 0.5'	0' - 0.5'	1 - 1.5'
DUPLICATE OF:					S41SS0080006-D	S41SS0080006		
INORGANICS (mg/kg)								
ALUMINUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ANTIMONY	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ARSENIC	3.8	5.2	6.9	6.5	24.0	16.7	77.6	73.0
BARIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
BERYLLIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CADMIUM	0.05 U	0.09	0.13	0.05 U	8.3	5.7	0.39	0.19
CALCIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CHROMIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
COBALT	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
COPPER	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CYANIDE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
IRON	4280	9660	6910	2330	21900	17800	13500	7940
LEAD	5.8	13.8	4.4	9.2	59.9	45.3	23.4	17.7
MAGNESIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MANGANESE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MERCURY	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
NICKEL	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
POTASSIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SELENIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SILVER	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SODIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
THALLIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
VANADIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ZINC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

APPENDIX B
SUMMARY OF ANALYTICAL RESULTS FOR 1999 SOIL SAMPLES
INDIAN HEAD - CTO-245
SITE 41

SAMPLE I.D.:	S41SS0100006	S41SS0100106	S41SS0110006	S41SS0110006-D	S41SS0110106	S41SS0120006	S41SS0120106	S41SS0130006
LOCATION:	S41SS010	S41SS010	S41SS011	S41SS011	S41SS011	S41SS012	S41SS012	S41SS013
SAMPLE DATE:	9/29/1999	9/29/1999	9/30/1999	9/30/1999	9/30/1999	9/30/1999	9/30/1999	9/30/1999
DEPTH (FEET):	0' - 0.5'	1 - 1.5'	0' - 0.5'	0' - 0.5'	1 - 1.5'	0' - 0.5'	1 - 1.5'	0' - 0.5'
DUPLICATE OF:			S41SS0110006-D	S41SS0110006				
PESTICIDES/PCBs (µg/kg)								
4,4'-DDD	13 U	3.6 UJ	73 U	78 U	3.9 U	20 U	19 U	3.9 U
4,4'-DDE	13 U	3.6 UJ	73 U	78 U	3.9 U	20 U	19 U	3.9 U
4,4'-DDT	13 U	3.6 UJ	1100 J	1500 J	3.9 U	310 J	99 J	3.9 U
ALDRIN	6.4 U	1.8 UJ	37 U	40 U	6.6 R	6.2 R	10 U	3.7 R
ALPHA-BHC	6.4 U	1.8 UJ	37 U	40 U	2 U	11 U	10 U	2 U
ALPHA-CHLORDANE	6.4 U	1.8 UJ	41	46	2 U	12	10 U	2 U
AROCLOR-1016	130 U	36 UJ	730 U	780 U	39 U	200 U	190 U	39 U
AROCLOR-1221	250 U	73 UJ	1500 U	1600 U	79 U	420 U	390 U	80 U
AROCLOR-1232	130 U	36 UJ	730 U	780 U	39 U	200 U	190 U	39 U
AROCLOR-1242	130 U	36 UJ	730 U	780 U	39 U	200 U	190 U	39 U
AROCLOR-1248	130 U	36 UJ	730 U	780 U	39 U	200 U	190 U	39 U
AROCLOR-1254	130 U	36 UJ	730 U	780 U	39 U	200 U	190 U	39 U
AROCLOR-1260	240	36 UJ	39000	42000	200	8800	2600	160
BETA-BHC	6.4 U	1.8 UJ	37 U	40 U	2 U	11 U	10 U	2 U
DELTA-BHC	6.4 U	1.8 UJ	37 U	40 U	2 U	11 U	10 U	2 U
DIELDRIN	13 U	3.6 UJ	120 J	180	3.9 U	42	14 J	3.9 U
ENDOSULFAN I	6.4 U	1.8 UJ	37 U	40 U	2 U	11 U	10 U	2 U
ENDOSULFAN II	13 U	3.6 UJ	880	990 J	4.7 J	210	74 J	3.7 J
ENDOSULFAN SULFATE	13 U	3.6 UJ	73 U	78 U	3.9 U	20 R	19 U	3.9 U
ENDRIN	13 U	3.6 UJ	240 R	280 R	3.9 U	61 R	21 R	2.2 R
ENDRIN ALDEHYDE	8.8 J	3.6 UJ	980	1200	5.9 R	300	100	3.7 R
ENDRIN KETONE	6.4 U	3.6 UJ	73 U	78 U	10 J	17 J	19 U	8.9
GAMMA-BHC (LINDANE)	6.4 U	1.8 UJ	37 U	40 U	2 U	11 U	10 U	2 U
GAMMA-CHLORDANE	6.4 U	1.8 UJ	37 U	40 U	2 U	11 U	10 U	2 U
HEPTACHLOR	6.4 U	1.8 UJ	37 U	40 U	1.4 R	11 U	10 U	1.1 R
HEPTACHLOR EPOXIDE	6.4 U	1.8 UJ	37 U	40 U	2 R	11 U	10 U	1.4 R
METHOXYCHLOR	64 U	18 UJ	370 U	400 U	42	67 J	100 U	36
TOXAPHENE	640 U	180 UJ	3700 U	4000 U	200 U	1100 U	1000 U	200 U

APPENDIX B
SUMMARY OF ANALYTICAL RESULTS FOR 1999 SOIL SAMPLES
INDIAN HEAD - CTO-245
SITE 41

SAMPLE I.D.:	S41SS0100006	S41SS0100106	S41SS0110006	S41SS0110006-D	S41SS0110106	S41SS0120006	S41SS0120106	S41SS0130006
LOCATION:	S41SS010	S41SS010	S41SS011	S41SS011	S41SS011	S41SS012	S41SS012	S41SS013
SAMPLE DATE:	9/29/1999	9/29/1999	9/30/1999	9/30/1999	9/30/1999	9/30/1999	9/30/1999	9/30/1999
DEPTH (FEET):	0' - 0.5'	1 - 1.5'	0' - 0.5'	0' - 0.5'	1 - 1.5'	0' - 0.5'	1 - 1.5'	0' - 0.5'
DUPLICATE OF:			S41SS0110006-D	S41SS0110006				
INORGANICS (mg/kg)								
ALUMINUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ANTIMONY	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ARSENIC	21.2	4.7	28.6	26.1	8.6	63.5	33.9	49.6
BARIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
BERYLLIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CADMIUM	0.26 B	0.23 B	1.1	1.5	0.11 B	49.0	10.8	0.31 B
CALCIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CHROMIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
COBALT	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
COPPER	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CYANIDE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
IRON	12300	20500	19200	18800	4720	35500	26400	11900
LEAD	24.3 J	10.0 J	52.2 J	46.6 J	8.4 J	55.5 J	49.4 J	32.0 J
MAGNESIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MANGANESE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MERCURY	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
NICKEL	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
POTASSIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SELENIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SILVER	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SODIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
THALLIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
VANADIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ZINC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

APPENDIX B
SUMMARY OF ANALYTICAL RESULTS FOR 1999 SOIL SAMPLES
INDIAN HEAD - CTO-245
SITE 41

SAMPLE I.D.:	S41SS0130106	S41SS0140006	S41SS0140106	S41SS0150006	S41SS0150106	S41SS0160006	S41SS0170006	S41SS0170106
LOCATION:	S41SS013	S41SS014	S41SS014	S41SS015	S41SS015	S41SS016	S41SS017	S41SS017
SAMPLE DATE:	9/30/1999	9/30/1999	9/30/1999	9/30/1999	9/30/1999	9/30/1999	9/30/1999	9/30/1999
DEPTH (FEET):	1 - 1.5'	0' - 0.5'	1 - 1.5'	0' - 0.5'	1 - 1.5'	0' - 0.5'	0' - 0.5'	1 - 1.5'
DUPLICATE OF:								
PESTICIDES/PCBs (µg/kg)								
4,4'-DDD	18 U	3.7 U	4.3 U	3.9 U	4.1 U	400 R	25 UJ	5.1 R
4,4'-DDE	18 U	3.7 U	4.3 U	3.9 U	4.1 U	770 U	25 UJ	8.2 UJ
4,4'-DDT	14 J	3.7 U	5.4	3.9 U	4.1 U	25000 J	25 UJ	10 R
ALDRIN	9.3 U	1.3 R	3.6 R	2 U	2.1 U	400 U	13 UJ	2.9 R
ALPHA-BHC	9.3 U	1.9 U	2.2 U	2 U	2.1 U	400 U	13 UJ	4.2 UJ
ALPHA-CHLORDANE	9.3 U	1.9 U	2.2 U	2 U	2.1 U	850	15 J	3.2 J
AROCLOR-1016	180 U	37 U	43 U	39 U	41 U	7700 U	250 UJ	82 UJ
AROCLOR-1221	370 U	75 U	87 U	80 U	84 U	16000 U	500 UJ	170 UJ
AROCLOR-1232	180 U	37 U	43 U	39 U	41 U	7700 U	250 UJ	82 UJ
AROCLOR-1242	180 U	37 U	43 U	39 U	41 U	7700 U	250 UJ	82 UJ
AROCLOR-1248	180 U	37 U	43 U	39 U	41 U	7700 U	250 UJ	82 UJ
AROCLOR-1254	180 U	37 U	43 U	39 U	41 U	7700 U	250 UJ	82 UJ
AROCLOR-1260	180 U	280	43 U	190	30 J	670000	14000 J	4800 J
BETA-BHC	9.3 U	1.9 U	2.2 U	2 U	2.1 U	400 U	13 UJ	4.2 UJ
DELTA-BHC	9.3 U	1.9 U	2.2 U	2 U	2.1 U	400 U	13 UJ	4.2 UJ
DIELDRIN	18 U	3.7 U	4.3 U	3.9 U	4.1 U	3500	48 J	20 J
ENDOSULFAN I	9.3 U	1.9 U	2.2 U	2 U	2.1 U	400 U	13 UJ	4.2 UJ
ENDOSULFAN II	18 U	6.9 J	2.8 J	3.6 J	4.1 U	20000	360 J	110 J
ENDOSULFAN SULFATE	18 U	2.2 J	4.3 U	3.9 U	4.1 U	770 U	31 R	27 J
ENDRIN	18 U	3.7 U	5.4	3.9 U	4.1 U	4300 R	87 R	29 R
ENDRIN ALDEHYDE	13 R	9.9	4.3 U	6.3	4.1 U	20000 J	570 J	150 R
ENDRIN KETONE	18 U	2.2 R	6.6 R	3.9 U	4.1 U	770 U	25 R	16 R
GAMMA-BHC (LINDANE)	9.3 U	1.9 U	2.2 U	2 U	2.1 U	400 U	13 UJ	4.2 UJ
GAMMA-CHLORDANE	9.3 U	1.9 U	2.2 U	2 U	2.1 U	400 U	13 UJ	4.2 UJ
HEPTACHLOR	9.3 U	1.3 J	1.6 R	2 U	2.1 U	400 U	13 UJ	4.2 UJ
HEPTACHLOR EPOXIDE	9.3 U	1.9 U	2.1 J	2 U	2.1 U	400 U	13 UJ	4.2 UJ
METHOXYCHLOR	98 R	12 R	41 J	20 U	21 U	4000 U	81 R	45 R
TOXAPHENE	930 U	190 U	220 U	200 U	210 U	40000 U	1300 UJ	420 UJ

APPENDIX B
SUMMARY OF ANALYTICAL RESULTS FOR 1999 SOIL SAMPLES
INDIAN HEAD - CTO-245
SITE 41

SAMPLE I.D.:	S41SS0130106	S41SS0140006	S41SS0140106	S41SS0150006	S41SS0150106	S41SS0160006	S41SS0170006	S41SS0170106
LOCATION:	S41SS013	S41SS014	S41SS014	S41SS015	S41SS015	S41SS016	S41SS017	S41SS017
SAMPLE DATE:	9/30/1999	9/30/1999	9/30/1999	9/30/1999	9/30/1999	9/30/1999	9/30/1999	9/30/1999
DEPTH (FEET):	1 - 1.5'	0' - 0.5'	1 - 1.5'	0' - 0.5'	1 - 1.5'	0' - 0.5'	0' - 0.5'	1 - 1.5'
DUPLICATE OF:								
INORGANICS (mg/kg)								
ALUMINUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ANTIMONY	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ARSENIC	67.8	16.9	390	11.1	4.3	15.3	46.6	173
BARIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
BERYLLIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CADMIUM	0.18 B	0.24 B	0.42	0.47	0.45	4.2	5.6	0.30
CALCIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CHROMIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
COBALT	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
COPPER	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CYANIDE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
IRON	7820	10400	37300	43400	27900	20700	35600	20900
LEAD	57.3 J	33.7 J	472 J	24.8 J	18.2 J	84.4 J	75.9	70.7
MAGNESIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MANGANESE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MERCURY	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
NICKEL	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
POTASSIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SELENIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SILVER	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SODIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
THALLIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
VANADIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ZINC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

APPENDIX B
SUMMARY OF ANALYTICAL RESULTS FOR 1999 SOIL SAMPLES
INDIAN HEAD - CTO-245
SITE 41

SAMPLE I.D.:	S41SS0180006	S41SS0180106	S41SS0190006	S41SS0190006-D	S41SS0190106	S41SS0200006	S41SS0210006	S41SS0220006
LOCATION:	S41SS018	S41SS018	S41SS019	S41SS019	S41SS019	S41SS020	S41SS021	S41SS022
SAMPLE DATE:	9/30/1999	9/30/1999	9/30/1999	9/30/1999	9/30/1999	9/30/1999	9/30/1999	9/30/1999
DEPTH (FEET):	0' - 0.5'	1 - 1.5'	0' - 0.5'	0' - 0.5'	1 - 1.5'	0' - 0.5'	0' - 0.5'	0' - 0.5'
DUPLICATE OF:			S41SS0190006-D	S41SS0190006				
PESTICIDES/PCBs (µg/kg)								
4,4'-DDD	3.6 UJ	3.6 UJ	4.9 U	4.6 U	4.2 U	3.8 U	22 UJ	48 UJ
4,4'-DDE	3.6 UJ	3.6 UJ	5.3	4.2 J	4.2 U	3.8 U	22 UJ	48 UJ
4,4'-DDT	3.6 UJ	1.9 R	9.6	11 J	4.2 U	2.8 J	22 UJ	48 UJ
ALDRIN	1.9 UJ	1.8 UJ	2.5 U	2.4 U	2.2 U	2 U	11 UJ	25 UJ
ALPHA-BHC	1.9 UJ	1.8 UJ	2.5 U	2.4 U	2.2 U	2 U	11 UJ	25 UJ
ALPHA-CHLORDANE	1.9 UJ	1.8 UJ	2.5 U	2.4 U	2.2 U	2 U	11 UJ	25 UJ
AROCLOR-1016	36 UJ	36 UJ	49 U	46 U	42 U	38 U	220 UJ	480 UJ
AROCLOR-1221	73 UJ	72 UJ	99 U	93 U	85 U	78 U	440 UJ	980 UJ
AROCLOR-1232	36 UJ	36 UJ	49 U	46 U	42 U	38 U	220 UJ	480 UJ
AROCLOR-1242	36 UJ	36 UJ	49 U	46 U	42 U	38 U	220 UJ	480 UJ
AROCLOR-1248	36 UJ	36 UJ	49 U	46 U	42 U	38 U	220 UJ	480 UJ
AROCLOR-1254	36 UJ	36 UJ	49 U	46 U	42 U	38 U	220 UJ	480 UJ
AROCLOR-1260	560 J	63 J	500	540	25 J	100	13000 J	29000 J
BETA-BHC	1.9 UJ	1.8 UJ	2.5 U	2.4 U	2.2 U	2 U	11 UJ	25 UJ
DELTA-BHC	1.9 UJ	1.8 UJ	2.5 U	2.4 U	2.2 U	2 U	11 UJ	25 UJ
DIELDRIN	1.9 J	3.6 UJ	4.9 U	4.6 U	4.2 U	3.8 U	38 J	120 J
ENDOSULFAN I	1.9 UJ	1.8 UJ	2.5 U	2.4 U	2.2 U	2 U	11 UJ	25 UJ
ENDOSULFAN II	14 J	3.6 UJ	12	14 J	4.2 U	2.5 J	320 J	670 J
ENDOSULFAN SULFATE	3.3 J	3.6 UJ	5.8	6	4.2 U	3.8 U	22 UJ	48 UJ
ENDRIN	4.3 R	3.6 UJ	5.6 R	5.7 R	4.2 U	3.8 U	54 R	210 R
ENDRIN ALDEHYDE	23 J	2.1 R	18 R	20 R	4.2 U	3.6 R	330 J	1200 J
ENDRIN KETONE	3.6 UJ	3.6 UJ	4.9 U	4.6 U	4.2 U	3.8 U	22 UJ	38 R
GAMMA-BHC (LINDANE)	1.9 UJ	1.8 UJ	2.5 U	2.4 U	2.2 U	2 U	11 UJ	25 UJ
GAMMA-CHLORDANE	1.9 UJ	1.8 UJ	2.5 U	2.4 U	2.2 U	2 U	11 UJ	25 UJ
HEPTACHLOR	1.9 UJ	1.8 UJ	2.5 U	2.4 U	2.2 U	2 U	11 UJ	25 UJ
HEPTACHLOR EPOXIDE	1.9 UJ	1.8 UJ	2.5 U	2.4 U	2.2 U	2 U	11 UJ	25 UJ
METHOXYCHLOR	19 UJ	18 UJ	33 R	35 R	22 U	20 U	110 UJ	250 UJ
TOXAPHENE	190 UJ	180 UJ	250 U	240 U	220 U	200 U	1100 UJ	2500 UJ

APPENDIX B
SUMMARY OF ANALYTICAL RESULTS FOR 1999 SOIL SAMPLES
INDIAN HEAD - CTO-245
SITE 41

SAMPLE I.D.:	S41SS0180006	S41SS0180106	S41SS0190006	S41SS0190006-D	S41SS0190106	S41SS0200006	S41SS0210006	S41SS0220006
LOCATION:	S41SS018	S41SS018	S41SS019	S41SS019	S41SS019	S41SS020	S41SS021	S41SS022
SAMPLE DATE:	9/30/1999	9/30/1999	9/30/1999	9/30/1999	9/30/1999	9/30/1999	9/30/1999	9/30/1999
DEPTH (FEET):	0' - 0.5'	1 - 1.5'	0' - 0.5'	0' - 0.5'	1 - 1.5'	0' - 0.5'	0' - 0.5'	0' - 0.5'
DUPLICATE OF:			S41SS0190006-D	S41SS0190006				
INORGANICS (mg/kg)								
ALUMINUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ANTIMONY	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ARSENIC	2.0	4.9	14.0	11.1	4.3	8.8	27.2	140
BARIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
BERYLLIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CADMIUM	0.16	0.06	5.5	1.9	0.67	2.0	42.2	39.6
CALCIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CHROMIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
COBALT	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
COPPER	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CYANIDE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
IRON	3720	10400	79900	54700	18000	47200	141000	33200
LEAD	19.3	10.0	1760 J	376 J	46.6 J	239 J	310	260
MAGNESIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MANGANESE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MERCURY	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
NICKEL	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
POTASSIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SELENIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SILVER	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SODIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
THALLIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
VANADIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ZINC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

APPENDIX B
SUMMARY OF ANALYTICAL RESULTS FOR 1999 SOIL SAMPLES
INDIAN HEAD - CTO-245
SITE 41

SAMPLE I.D.:	S41SS0220106	S41SS0230006	S41SS0230106	S41SS0240006	S41SS0240106	S41SS0250006	S41SS0260006	S41SS0270006
LOCATION:	S41SS022	S41SS023	S41SS023	S41SS024	S41SS024	S41SS025	S41SS026	S41SS027
SAMPLE DATE:	9/30/1999	9/30/1999	9/30/1999	9/30/1999	9/30/1999	9/30/1999	10/1/1999	10/1/1999
DEPTH (FEET):	1 - 1.5'	0' - 0.5'	1 - 1.5'	0' - 0.5'	1 - 1.5'	0' - 0.5'	0' - 0.5'	0' - 0.5'
DUPLICATE OF:								
PESTICIDES/PCBs (µg/kg)								
4,4'-DDD	21 UJ	85 J	16 J	21 UJ	3.9 UJ	21 UJ	36 U	77 R
4,4'-DDE	21 UJ	150	24 J	21 UJ	3.9 UJ	21 UJ	36 U	120
4,4'-DDT	18 J	290 J	56 J	31 R	3.9 UJ	12 R	36 U	220 R
ALDRIN	11 UJ	9.7 R	3.7 J	11 UJ	2.0 UJ	11 UJ	19 U	4.7 U
ALPHA-BHC	11 UJ	19 UJ	2.3 UJ	11 UJ	2.0 UJ	11 UJ	19 U	4.7 U
ALPHA-CHLORDANE	11 UJ	19 UJ	2.3 UJ	11 UJ	2.0 UJ	11 UJ	27	6.2
AROCLOR-1016	210 UJ	380 UJ	44 UJ	210 UJ	39 UJ	210 UJ	360 U	90 U
AROCLOR-1221	430 UJ	770 UJ	89 UJ	420 UJ	79 UJ	420 UJ	740 U	180 U
AROCLOR-1232	210 UJ	380 UJ	44 UJ	210 UJ	39 UJ	210 UJ	360 U	90 U
AROCLOR-1242	210 UJ	380 UJ	44 UJ	210 UJ	39 UJ	210 UJ	360 U	90 U
AROCLOR-1248	210 UJ	380 UJ	44 UJ	210 UJ	39 UJ	210 UJ	360 U	90 U
AROCLOR-1254	210 UJ	380 UJ	44 UJ	210 UJ	39 UJ	210 UJ	360 U	90 U
AROCLOR-1260	460 J	1500 J	200 J	1500 J	36 J	700 J	33000	5100
BETA-BHC	11 UJ	19 UJ	2.3 UJ	11 UJ	2.0 UJ	11 UJ	19 U	4.7 U
DELTA-BHC	11 UJ	19 UJ	2.3 UJ	11 UJ	2.0 UJ	11 UJ	19 U	4.7 U
DIELDRIN	21 UJ	38 UJ	4.4 UJ	21 UJ	3.9 UJ	21 UJ	110 J	25
ENDOSULFAN I	11 UJ	19 UJ	2.3 UJ	11 UJ	2.0 UJ	11 UJ	19 U	4.7 U
ENDOSULFAN II	15 J	42 J	6.0 J	36 J	3.9 UJ	17 J	36 U	9.0 U
ENDOSULFAN SULFATE	21 UJ	38 UJ	4.4 UJ	16 J	3.9 UJ	21 UJ	36 U	9.0 U
ENDRIN	18 J	38 UJ	2.4 R	21 UJ	3.9 UJ	21 UJ	36 U	9.0 U
ENDRIN ALDEHYDE	14 R	70 J	7.7 R	55 R	3.9 UJ	20 R	1100 J	220 J
ENDRIN KETONE	39 J	38 UJ	7.4 J	21 UJ	3.9 UJ	21 UJ	36 U	22 R
GAMMA-BHC (LINDANE)	11 UJ	19 UJ	2.3 UJ	11 UJ	2.0 UJ	11 UJ	19 U	4.7 U
GAMMA-CHLORDANE	11 UJ	19 UJ	2.3 UJ	11 UJ	2.0 UJ	5.9 J	19 U	4.7 U
HEPTACHLOR	11 UJ	19 UJ	4.6 J	11 UJ	2.0 UJ	11 UJ	19 U	4.7 U
HEPTACHLOR EPOXIDE	11 UJ	19 UJ	2.3 UJ	11 UJ	2.0 UJ	11 UJ	19 U	4.7 U
METHOXYCHLOR	110 UJ	190 UJ	21 J	110 UJ	20 UJ	110 UJ	190 U	29 R
TOXAPHENE	1100 UJ	1900 UJ	230 UJ	1100 UJ	200 UJ	1100 UJ	1900 U	470 U

APPENDIX B
SUMMARY OF ANALYTICAL RESULTS FOR 1999 SOIL SAMPLES
INDIAN HEAD - CTO-245
SITE 41

SAMPLE I.D.:	S41SS0220106	S41SS0230006	S41SS0230106	S41SS0240006	S41SS0240106	S41SS0250006	S41SS0260006	S41SS0270006
LOCATION:	S41SS022	S41SS023	S41SS023	S41SS024	S41SS024	S41SS025	S41SS026	S41SS027
SAMPLE DATE:	9/30/1999	9/30/1999	9/30/1999	9/30/1999	9/30/1999	9/30/1999	10/1/1999	10/1/1999
DEPTH (FEET):	1 - 1.5'	0' - 0.5'	1 - 1.5'	0' - 0.5'	1 - 1.5'	0' - 0.5'	0' - 0.5'	0' - 0.5'
DUPLICATE OF:								
INORGANICS (mg/kg)								
ALUMINUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ANTIMONY	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ARSENIC	480	39.2	48.3	13.7	5.6	364	13.6	140
BARIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
BERYLLIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CADMIUM	2.3	0.55	0.53	2.4	0.40	6.9	36.9	231
CALCIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CHROMIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
COBALT	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
COPPER	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CYANIDE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
IRON	27400	22800	13200	45900	28100	257000	129000	42500
LEAD	175	172	26.7	195	28.0	122	6400	1620
MAGNESIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MANGANESE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MERCURY	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
NICKEL	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
POTASSIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SELENIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SILVER	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SODIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
THALLIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
VANADIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ZINC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

APPENDIX B
SUMMARY OF ANALYTICAL RESULTS FOR 1999 SOIL SAMPLES
INDIAN HEAD - CTO-245
SITE 41

SAMPLE I.D.:	S41SS0270106	S41SS0280006	S41SS0280006-D	S41SS0280106	S41SS0290006	S41SS0290106	S41SS0300006	S41SS0300106
LOCATION:	S41SS027	S41SS028	S41SS028	S41SS028	S41SS029	S41SS029	S41SS030	S41SS030
SAMPLE DATE:	10/1/1999	10/1/1999	10/1/1999	10/1/1999	10/1/1999	10/1/1999	10/1/1999	10/1/1999
DEPTH (FEET):	1 - 1.5'	0' - 0.5'	0' - 0.5'	1 - 1.5'	0' - 0.5'	1 - 1.5'	0' - 0.5'	1 - 1.5'
DUPLICATE OF:		S41SS0280006-D	S41SS0280006					
PESTICIDES/PCBs (µg/kg)								
4,4'-DDD	3.9 U	34 U	4.3 R	4 UJ	16 J	8.5 J	12 U	69 R
4,4'-DDE	3.9 U	34 U	8.4 UJ	4 UJ	93 J	64 J	12 U	100
4,4'-DDT	5.1 R	34 U	110 J	4 UJ	200 R	69 J	6.2 J	170 J
ALDRIN	2.0 U	18 U	4.3 UJ	2 UJ	11 UJ	4.2 UJ	6.3 U	4.2 U
ALPHA-BHC	2.0 U	18 U	4.3 UJ	2 UJ	11 UJ	4.2 UJ	6.3 U	4.2 U
ALPHA-CHLORDANE	2.0 U	18 U	4.3 UJ	2 UJ	11 UJ	4.2 UJ	6.3 U	4.7 R
AROCLOR-1016	39 U	340 U	84 UJ	40 UJ	220 UJ	81 UJ	120 U	81 U
AROCLOR-1221	80 U	690 U	170 UJ	81 UJ	450 UJ	170 UJ	250 U	160 U
AROCLOR-1232	39 U	340 U	84 UJ	40 UJ	220 UJ	81 UJ	120 U	81 U
AROCLOR-1242	39 U	340 U	84 UJ	40 UJ	220 UJ	81 UJ	120 U	81 U
AROCLOR-1248	39 U	340 U	84 UJ	40 UJ	220 UJ	81 UJ	120 U	81 U
AROCLOR-1254	39 U	800 J	84 UJ	40 UJ	220 UJ	81 UJ	120 U	81 U
AROCLOR-1260	39 U	1900	3300 J	45 J	520 J	120 J	160	4200
BETA-BHC	2.0 U	18 U	4.3 UJ	2 UJ	11 UJ	4.2 UJ	6.3 U	4.2 U
DELTA-BHC	2.0 U	18 U	4.3 UJ	2 UJ	11 UJ	4.2 UJ	6.3 U	4.2 U
DIELDRIN	3.9 U	34 U	8.5 J	4 UJ	22 UJ	8.1 UJ	12 U	16 J
ENDOSULFAN I	2.0 U	18 U	4.3 UJ	2 UJ	11 UJ	4.2 UJ	6.3 U	4.2 U
ENDOSULFAN II	3.9 U	34 U	75 J	4 UJ	22 UJ	8.1 UJ	12 U	8.1 U
ENDOSULFAN SULFATE	3.9 U	34 U	8.4 UJ	4 UJ	22 UJ	8.1 UJ	12 U	8.1 U
ENDRIN	3.9 U	34 U	14 R	4 UJ	22 UJ	8.1 UJ	12 U	8.1 U
ENDRIN ALDEHYDE	3.9 U	52 J	85 J	2.2 R	20 R	5.6 R	12 U	170 J
ENDRIN KETONE	6.0 J	34 U	8.4 UJ	4 UJ	22 UJ	8.1 UJ	12 U	26 R
GAMMA-BHC (LINDANE)	2.0 U	18 U	4.3 UJ	2 UJ	11 UJ	4.2 UJ	6.3 U	4.2 U
GAMMA-CHLORDANE	2.0 U	18 U	4.3 UJ	2 UJ	11 UJ	4.2 UJ	6.3 U	4.7 R
HEPTACHLOR	2.0 U	18 U	4.3 UJ	2 UJ	11 UJ	4.2 UJ	6.3 U	4.2 U
HEPTACHLOR EPOXIDE	2.0 U	18 U	4.3 UJ	2 UJ	11 UJ	4.2 UJ	6.3 U	4.2 U
METHOXYCHLOR	44	180 U	43 UJ	20 UJ	110 UJ	42 UJ	63 U	31 R
TOXAPHENE	200 U	1800 U	430 UJ	200 UJ	1100 UJ	420 UJ	630 U	420 U

APPENDIX B
SUMMARY OF ANALYTICAL RESULTS FOR 1999 SOIL SAMPLES
INDIAN HEAD - CTO-245
SITE 41

SAMPLE I.D.:	S41SS0270106	S41SS0280006	S41SS0280006-D	S41SS0280106	S41SS0290006	S41SS0290106	S41SS0300006	S41SS0300106
LOCATION:	S41SS027	S41SS028	S41SS028	S41SS028	S41SS029	S41SS029	S41SS030	S41SS030
SAMPLE DATE:	10/1/1999	10/1/1999	10/1/1999	10/1/1999	10/1/1999	10/1/1999	10/1/1999	10/1/1999
DEPTH (FEET):	1 - 1.5'	0' - 0.5'	0' - 0.5'	1 - 1.5'	0' - 0.5'	1 - 1.5'	0' - 0.5'	1 - 1.5'
DUPLICATE OF:		S41SS0280006-D	S41SS0280006					
INORGANICS (mg/kg)								
ALUMINUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ANTIMONY	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ARSENIC	394	4.7	4.7	27.4	673	237	7.1	4.6
BARIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
BERYLLIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CADMIUM	0.32	0.97	0.37 J	0.23 B	4.2 J	1.4 J	0.42	0.13
CALCIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CHROMIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
COBALT	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
COPPER	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CYANIDE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
IRON	24600	4010	4530	24300	48800	36800	13400	17100
LEAD	49.3	22.2	21.0 J	17.3 J	85.1 J	14.6 J	58.6	26.7
MAGNESIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MANGANESE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MERCURY	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
NICKEL	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
POTASSIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SELENIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SILVER	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SODIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
THALLIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
VANADIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ZINC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

APPENDIX B
SUMMARY OF ANALYTICAL RESULTS FOR 1999 SOIL SAMPLES
INDIAN HEAD - CTO-245
SITE 41

SAMPLE I.D.:	S41SS0310006	S41SS0320006	S41SS0330006	S41SS0330106	S41SS0340006	S41SS0340006-D	S41SS0340106	S41SS0350006
LOCATION:	S41SS031	S41SS032	S41SS033	S41SS033	S41SS034	S41SS034	S41SS034	S41SS035
SAMPLE DATE:	10/1/1999	10/1/1999	10/1/1999	10/1/1999	10/1/1999	10/1/1999	10/1/1999	10/1/1999
DEPTH (FEET):	0' - 0.5'	0' - 0.5'	0' - 0.5'	1 - 1.5'	0' - 0.5'	0' - 0.5'	1 - 1.5'	0' - 0.5'
DUPLICATE OF:					S41SS0340006-D	S41SS0340006		
PESTICIDES/PCBs (µg/kg)								
4,4'-DDD	12 U	83 U	16 R	4.4 UJ	4.4 UJ	4.3 UJ	4.2 UJ	41 R
4,4'-DDE	12 U	83 U	14 R	4.4 UJ	4.4 UJ	4.3 UJ	4.2 UJ	66 J
4,4'-DDT	8.8 R	83 U	480 J	4.4 UJ	4.4 UJ	4.3 UJ	4.2 UJ	510 J
ALDRIN	6.2 U	43 U	10 UJ	2 R	2.3 UJ	2.2 UJ	2.2 UJ	12 UJ
ALPHA-BHC	6.2 U	43 U	10 UJ	2.2 UJ	2.3 UJ	2.2 UJ	2.2 UJ	12 UJ
ALPHA-CHLORDANE	6.2 U	78 J	11 J	2.2 UJ	2.3 UJ	2.2 UJ	2.2 UJ	31 J
AROCLOR-1016	120 U	830 U	200 UJ	44 UJ	44 UJ	43 UJ	42 UJ	230 UJ
AROCLOR-1221	250 U	1700 U	410 UJ	89 UJ	90 UJ	88 UJ	86 UJ	460 UJ
AROCLOR-1232	120 U	830 U	200 UJ	44 UJ	44 UJ	43 UJ	42 UJ	230 UJ
AROCLOR-1242	120 U	830 U	200 UJ	44 UJ	44 UJ	43 UJ	42 UJ	230 UJ
AROCLOR-1248	120 U	830 U	200 UJ	44 UJ	44 UJ	43 UJ	42 UJ	230 UJ
AROCLOR-1254	120 U	830 U	200 UJ	44 UJ	44 UJ	43 UJ	42 UJ	230 UJ
AROCLOR-1260	1200	69000	12000 J	200 J	320 J	460 J	94 J	11000 J
BETA-BHC	6.2 U	43 U	10 UJ	2.2 UJ	2.3 UJ	2.2 UJ	2.2 UJ	12 UJ
DELTA-BHC	6.2 U	43 U	10 UJ	2.2 UJ	2.3 UJ	2.2 UJ	2.2 UJ	12 UJ
DIELDRIN	12 U	380	46 J	4.4 UJ	4.4 UJ	4.3 UJ	4.2 UJ	44 J
ENDOSULFAN I	6.2 U	43 U	10 UJ	2.2 UJ	2.3 UJ	2.2 UJ	2.2 UJ	12 UJ
ENDOSULFAN II	12 U	83 U	270 J	5.4 J	6.4 R	9.9 R	4.2 UJ	250 J
ENDOSULFAN SULFATE	12 U	83 U	25 R	4.4 UJ	4.4 UJ	4.3 UJ	4.2 UJ	130 J
ENDRIN	12 U	83 U	84 R	4.4 UJ	4.4 UJ	4.3 UJ	4.2 UJ	120 R
ENDRIN ALDEHYDE	49 R	2600	480 R	6.7 R	8.3 J	13 J	2.6 J	360 J
ENDRIN KETONE	9.9 R	83 U	20 UJ	4 R	4.4 UJ	4.3 UJ	4.2 UJ	23 UJ
GAMMA-BHC (LINDANE)	6.2 U	43 U	10 UJ	2.2 UJ	2.3 UJ	2.2 UJ	2.2 UJ	12 UJ
GAMMA-CHLORDANE	6.2 U	43 U	10 UJ	2.2 UJ	2.3 UJ	2.2 UJ	2.2 UJ	6 R
HEPTACHLOR	6.2 U	43 U	10 UJ	2.2 UJ	2.3 UJ	2.2 UJ	2.2 UJ	12 UJ
HEPTACHLOR EPOXIDE	6.2 U	43 U	10 UJ	2.2 UJ	2.3 UJ	2.2 UJ	2.2 UJ	12 UJ
METHOXYCHLOR	99	210 R	53 R	21 J	23 UJ	22 UJ	22 UJ	120 UJ
TOXAPHENE	620 U	4300 U	1000 UJ	220 UJ	230 UJ	220 UJ	220 UJ	1200 UJ

APPENDIX B
SUMMARY OF ANALYTICAL RESULTS FOR 1999 SOIL SAMPLES
INDIAN HEAD - CTO-245
SITE 41

SAMPLE I.D.:	S41SS0310006	S41SS0320006	S41SS0330006	S41SS0330106	S41SS0340006	S41SS0340006-D	S41SS0340106	S41SS0350006
LOCATION:	S41SS031	S41SS032	S41SS033	S41SS033	S41SS034	S41SS034	S41SS034	S41SS035
SAMPLE DATE:	10/1/1999	10/1/1999	10/1/1999	10/1/1999	10/1/1999	10/1/1999	10/1/1999	10/1/1999
DEPTH (FEET):	0' - 0.5'	0' - 0.5'	0' - 0.5'	1 - 1.5'	0' - 0.5'	0' - 0.5'	1 - 1.5'	0' - 0.5'
DUPLICATE OF:					S41SS0340006-D	S41SS0340006		
INORGANICS (mg/kg)								
ALUMINUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ANTIMONY	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ARSENIC	28.1	195	136	193	8.2	11.1	6.5	64.7
BARIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
BERYLLIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CADMIUM	137	81.9	15.5 J	3.0 J	26.0 J	9.7	9.1 J	15.4 J
CALCIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CHROMIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
COBALT	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
COPPER	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CYANIDE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
IRON	301000	93600	28700	5820	33400	44600	29300	23800
LEAD	1020	936	337 J	35.9 J	246 J	419	41.6 J	1400 J
MAGNESIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MANGANESE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MERCURY	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
NICKEL	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
POTASSIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SELENIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SILVER	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SODIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
THALLIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
VANADIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ZINC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

APPENDIX B
SUMMARY OF ANALYTICAL RESULTS FOR 1999 SOIL SAMPLES
INDIAN HEAD - CTO-245
SITE 41

SAMPLE I.D.:	S41SS0350106	S41SS0360006	S41SS0360106	S41SS0370006	S41SS0370106	S41SS0380006	S41SS0380006-D	S41SS0380106
LOCATION:	S41SS035	S41SS036	S41SS036	S41SS037	S41SS037	S41SS038	S41SS038	S41SS038
SAMPLE DATE:	10/1/1999	10/1/1999	10/1/1999	10/1/1999	10/1/1999	10/1/1999	10/1/1999	10/1/1999
DEPTH (FEET):	1 - 1.5'	0' - 0.5'	1 - 1.5'	0' - 0.5'	1 - 1.5'	0' - 0.5'	0' - 0.5'	1 - 1.5'
DUPLICATE OF:						S41SS0380006-D	S41SS0380006	
PESTICIDES/PCBs (µg/kg)								
4,4'-DDD	2.6 R	4.3 UJ	4.1 UJ	9.6 UJ	4.1 UJ	71 UJ	40 R	20 UJ
4,4'-DDE	4.2 J	3.1 J	4.1 UJ	9.6 UJ	4.1 UJ	71 UJ	71 UJ	20 UJ
4,4'-DDT	2.5 R	5.8 J	4.1 UJ	130 J	4.1 UJ	2500 J	2700 J	20 R
ALDRIN	2.2 UJ	2.2 UJ	2.1 UJ	5 UJ	2.1 UJ	37 UJ	37 UJ	10 UJ
ALPHA-BHC	2.2 UJ	2.2 UJ	2.1 UJ	5 UJ	2.1 UJ	37 UJ	37 UJ	10 UJ
ALPHA-CHLORDANE	2.2 UJ	2.2 UJ	2.1 UJ	5 UJ	2.1 UJ	21 J	21 J	10 UJ
AROCLOR-1016	43 UJ	43 UJ	41 UJ	96 UJ	41 UJ	710 UJ	710 UJ	200 UJ
AROCLOR-1221	87 UJ	87 UJ	83 UJ	200 UJ	82 UJ	1400 UJ	1500 UJ	400 UJ
AROCLOR-1232	43 UJ	43 UJ	41 UJ	96 UJ	41 UJ	710 UJ	710 UJ	200 UJ
AROCLOR-1242	43 UJ	43 UJ	41 UJ	96 UJ	41 UJ	710 UJ	710 UJ	200 UJ
AROCLOR-1248	43 UJ	43 UJ	41 UJ	96 UJ	41 UJ	710 UJ	710 UJ	200 UJ
AROCLOR-1254	43 UJ	43 UJ	41 UJ	96 UJ	41 UJ	710 UJ	710 UJ	200 UJ
AROCLOR-1260	110 J	100 J	41 UJ	3600 J	25 J	55000 J	58000 J	1400 J
BETA-BHC	2.2 UJ	2.2 UJ	2.1 UJ	5 UJ	2.1 UJ	37 UJ	37 UJ	10 UJ
DELTA-BHC	2.2 UJ	2.2 UJ	2.1 UJ	5 UJ	2.1 UJ	37 UJ	37 UJ	10 UJ
DIELDRIN	4.3 UJ	4.3 UJ	4.1 UJ	8.6 J	4.1 UJ	110 R	110 R	20 UJ
ENDOSULFAN I	2.2 UJ	2.2 UJ	2.1 UJ	5 UJ	2.1 UJ	37 UJ	37 UJ	10 UJ
ENDOSULFAN II	2.6 J	4.3 UJ	4.1 UJ	79 J	4.1 UJ	1700 J	1600 J	55 J
ENDOSULFAN SULFATE	4.3 UJ	4.3 UJ	4.1 UJ	6.1 R	4.1 UJ	71 UJ	71 UJ	12 R
ENDRIN	4.3 UJ	4.3 UJ	4.1 UJ	20 R	4.1 UJ	170 R	190 R	27 R
ENDRIN ALDEHYDE	4 R	3.2 R	4.1 UJ	120 J	4.1 UJ	1700 J	1800 J	55 R
ENDRIN KETONE	4.3 UJ	4.3 UJ	4.1 UJ	9.6 UJ	4.1 UJ	71 UJ	71 UJ	28 R
GAMMA-BHC (LINDANE)	2.2 UJ	2.2 UJ	2.1 UJ	5 UJ	2.1 UJ	37 UJ	37 UJ	10 UJ
GAMMA-CHLORDANE	2.2 UJ	2.2 UJ	2.1 UJ	5 UJ	2.1 UJ	37 UJ	37 UJ	9.6 J
HEPTACHLOR	2.2 UJ	2.2 UJ	2.1 UJ	5 UJ	2.1 UJ	37 UJ	37 UJ	10 UJ
HEPTACHLOR EPOXIDE	2.2 UJ	2.2 UJ	2.1 UJ	5 UJ	2.1 UJ	37 UJ	37 UJ	5.4 J
METHOXYCHLOR	22 UJ	22 UJ	21 UJ	50 UJ	21 UJ	370 UJ	370 UJ	52 R
TOXAPHENE	220 UJ	220 UJ	210 UJ	500 UJ	210 UJ	3700 UJ	3700 UJ	1000 UJ

APPENDIX B
SUMMARY OF ANALYTICAL RESULTS FOR 1999 SOIL SAMPLES
INDIAN HEAD - CTO-245
SITE 41

SAMPLE I.D.:	S41SS0350106	S41SS0360006	S41SS0360106	S41SS0370006	S41SS0370106	S41SS0380006	S41SS0380006-D	S41SS0380106
LOCATION:	S41SS035	S41SS036	S41SS036	S41SS037	S41SS037	S41SS038	S41SS038	S41SS038
SAMPLE DATE:	10/1/1999	10/1/1999	10/1/1999	10/1/1999	10/1/1999	10/1/1999	10/1/1999	10/1/1999
DEPTH (FEET):	1 - 1.5'	0' - 0.5'	1 - 1.5'	0' - 0.5'	1 - 1.5'	0' - 0.5'	0' - 0.5'	1 - 1.5'
DUPLICATE OF:						S41SS0380006-D	S41SS0380006	
INORGANICS (mg/kg)								
ALUMINUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ANTIMONY	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ARSENIC	34.7	6.3	4.0	10.5	18.9	6.8	11.5	1290
BARIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
BERYLLIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CADMIUM	1.6 J	0.34 U	0.08 B	5.2 J	0.63 J	6.7 J	7.0 J	3.5 J
CALCIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CHROMIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
COBALT	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
COPPER	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CYANIDE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
IRON	23900	22600	28600	20400	23800	15700	20200	25300
LEAD	173 J	59.8 J	15.4 J	132 J	17.9 J	125 J	239 J	186 J
MAGNESIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MANGANESE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MERCURY	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
NICKEL	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
POTASSIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SELENIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SILVER	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SODIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
THALLIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
VANADIUM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ZINC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

APPENDIX B
SUMMARY OF ANALYTICAL RESULTS FOR 1999 SOIL SAMPLES
INDIAN HEAD - CTO-245
SITE 41

SAMPLE I.D.:	S41SS0390006	S41SS0390106	S41SS0400006	S41SS0400106
LOCATION:	S41SS039	S41SS039	S41SS040	S41SS040
SAMPLE DATE:	10/1/1999	10/1/1999	10/1/1999	10/1/1999
DEPTH (FEET):	0' - 0.5'	1 - 1.5'	0' - 0.5'	1 - 1.5'
DUPLICATE OF:				
PESTICIDES/PCBs (µg/kg)				
4,4'-DDD	7.1 UJ	18 UJ	21 UJ	21 UJ
4,4'-DDE	5.7 R	18 UJ	43 J	23 J
4,4'-DDT	150 J	29 J	55 J	32 J
ALDRIN	3.6 UJ	9.4 UJ	11 UJ	11 UJ
ALPHA-BHC	3.6 UJ	9.4 UJ	11 UJ	11 UJ
ALPHA-CHLORDANE	2.2 J	9.4 UJ	11 UJ	11 UJ
AROCLOR-1016	71 UJ	180 UJ	210 UJ	210 UJ
AROCLOR-1221	140 UJ	370 UJ	420 UJ	430 UJ
AROCLOR-1232	71 UJ	180 UJ	210 UJ	210 UJ
AROCLOR-1242	71 UJ	180 UJ	210 UJ	210 UJ
AROCLOR-1248	71 UJ	180 UJ	210 UJ	210 UJ
AROCLOR-1254	71 UJ	180 UJ	210 UJ	210 UJ
AROCLOR-1260	3400 J	760 J	800 J	500 J
BETA-BHC	3.6 UJ	9.4 UJ	11 UJ	11 UJ
DELTA-BHC	3.6 UJ	9.4 UJ	11 UJ	11 UJ
DIELDRIN	7.9 J	18 UJ	21 UJ	21 UJ
ENDOSULFAN I	3.6 UJ	9.4 UJ	11 UJ	11 UJ
ENDOSULFAN II	80 J	18 R	18 R	21 UJ
ENDOSULFAN SULFATE	6 R	18 UJ	21 UJ	21 UJ
ENDRIN	18 R	18 UJ	21 UJ	21 UJ
ENDRIN ALDEHYDE	140 J	33 J	35 R	26 R
ENDRIN KETONE	7.1 UJ	9.4 UJ	6.8 R	11 UJ
GAMMA-BHC (LINDANE)	3.6 UJ	9.4 UJ	11 UJ	11 UJ
GAMMA-CHLORDANE	3.6 UJ	9.4 UJ	11 UJ	11 UJ
HEPTACHLOR	3.6 UJ	9.4 UJ	11 UJ	11 UJ
HEPTACHLOR EPOXIDE	3.6 UJ	9.4 UJ	11 UJ	11 UJ
METHOXYCHLOR	20 R	94 UJ	110 UJ	110 UJ
TOXAPHENE	360 UJ	940 UJ	1100 UJ	1100 UJ

APPENDIX B
SUMMARY OF ANALYTICAL RESULTS FOR 1999 SOIL SAMPLES
INDIAN HEAD - CTO-245
SITE 41

SAMPLE I.D.:	S41SS0390006	S41SS0390106	S41SS0400006	S41SS0400106
LOCATION:	S41SS039	S41SS039	S41SS040	S41SS040
SAMPLE DATE:	10/1/1999	10/1/1999	10/1/1999	10/1/1999
DEPTH (FEET):	0' - 0.5'	1 - 1.5'	0' - 0.5'	1 - 1.5'
DUPLICATE OF:				
INORGANICS (mg/kg)				
ALUMINUM	N/A	N/A	N/A	N/A
ANTIMONY	N/A	N/A	N/A	N/A
ARSENIC	11.3	5.8	133	108
BARIUM	N/A	N/A	N/A	N/A
BERYLLIUM	N/A	N/A	N/A	N/A
CADMIUM	0.65 J	0.44	8.1	3.1
CALCIUM	N/A	N/A	N/A	N/A
CHROMIUM	N/A	N/A	N/A	N/A
COBALT	N/A	N/A	N/A	N/A
COPPER	N/A	N/A	N/A	N/A
CYANIDE	N/A	N/A	N/A	N/A
IRON	7100	17200	17600	20200
LEAD	53.7 J	30.8	322	226
MAGNESIUM	N/A	N/A	N/A	N/A
MANGANESE	N/A	N/A	N/A	N/A
MERCURY	N/A	N/A	N/A	N/A
NICKEL	N/A	N/A	N/A	N/A
POTASSIUM	N/A	N/A	N/A	N/A
SELENIUM	N/A	N/A	N/A	N/A
SILVER	N/A	N/A	N/A	N/A
SODIUM	N/A	N/A	N/A	N/A
THALLIUM	N/A	N/A	N/A	N/A
VANADIUM	N/A	N/A	N/A	N/A
ZINC	N/A	N/A	N/A	N/A

APPENDIX B
SUMMARY OF ANALYTICAL RESULTS FOR QUALITY CONTROL SAMPLES
INDIAN HEAD - CTO-245
SITE 41

SAMPLE I.D.:	S41RB0050001	S41RB0060001
LOCATION:	QC	QC
SAMPLE DATE:	09/30/99	10/01/99
DEPTH INTERVAL (FEET):	N/A	N/A
DUPLICATE OF:		

PESTICIDES/PCBs (µg/L)

4,4'-DDD	0.02 U	0.02 U
4,4'-DDE	0.02 U	0.02 U
4,4'-DDT	0.02 U	0.02 U
ALDRIN	0.01 U	0.01 U
ALPHA-BHC	0.01 U	0.01 U
ALPHA-CHLORDANE	0.01 U	0.01 U
AROCLOR-1016	0.2 U	0.2 U
AROCLOR-1221	0.4 U	0.4 U
AROCLOR-1232	0.2 U	0.2 U
AROCLOR-1242	0.2 U	0.2 U
AROCLOR-1248	0.2 U	0.2 U
AROCLOR-1254	0.2 U	0.2 U
AROCLOR-1260	0.2 U	0.2 U
BETA-BHC	0.01 U	0.01 U
DELTA-BHC	0.01 U	0.01 U
DIELDRIN	0.02 U	0.02 U
ENDOSULFAN I	0.01 U	0.01 U
ENDOSULFAN II	0.02 U	0.02 U
ENDOSULFAN SULFATE	0.02 U	0.02 U
ENDRIN	0.02 U	0.02 U
ENDRIN ALDEHYDE	0.02 U	0.02 U
ENDRIN KETONE	0.02 U	0.02 U
GAMMA-BHC (LINDANE)	0.01 U	0.01 U
GAMMA-CHLORDANE	0.01 U	0.01 U
HEPTACHLOR	0.01 U	0.01 U
HEPTACHLOR EPOXIDE	0.01 U	0.01 U
METHOXYCHLOR	0.1 U	0.1 U
TOXAPHENE	1 U	1 U

INORGANICS (µg/L)

ARSENIC	2.4 U	2.4 U
CADMIUM	0.22 U	0.22 U
IRON	15.0 U	15.0 U
LEAD	1.3 U	1.3 U

APPENDIX B
SUMMARY OF ANALYTICAL RESULTS FOR 1997 SOIL SAMPLES
INDIAN HEAD - CTO-245
SITE 41

SAMPLE I.D.:	S41SS0010001	S41SS0020001	S41SS0030001	S41SS0040001	S41SS0050001	S41SS0060001	S41SS0070001	S41SS0080001
LOCATION:	S41SS01	S41SS02	S41SS03	S41SS04	S41SS05	S41SS06	S41SS07	S41SS08
SAMPLE DATE:	10/22/1997	10/22/1997	10/22/1997	10/22/1997	10/22/1997	10/22/1997	10/22/1997	10/22/1997
DEPTH (FEET):	0' - 0.5'	0' - 0.5'	0' - 0.5'	0' - 0.5'	0' - 0.5'	0' - 0.5'	0' - 0.5'	0' - 0.5'
DUPLICATE OF:								S41SS0080001-D
VOLATILES (µg/kg)								
1,1,1-TRICHLOROETHANE	11 U	12 UJ	12 UJ	18 UJ	14 UJ	10 UJ	23 UJ	13 UJ
1,1,2,2-TETRACHLOROETHANE	11 U	12 UJ	12 UJ	18 UJ	14 UJ	10 UJ	23 UJ	13 UJ
1,1,2-TRICHLOROETHANE	11 U	12 UJ	12 UJ	18 UJ	14 UJ	10 UJ	23 UJ	13 UJ
1,1-DICHLOROETHANE	11 U	12 UJ	12 U	18 UJ	14 UJ	10 UJ	23 UJ	13 UJ
1,1-DICHLOROETHENE	11 U	12 UJ	12 U	18 UJ	14 UJ	10 UJ	23 UJ	13 UJ
1,2-DICHLOROETHANE	11 U	12 UJ	12 U	18 UJ	14 UJ	10 UJ	23 UJ	13 UJ
1,2-DICHLOROETHENE (TOTAL)	11 U	12 UJ	12 U	18 UJ	14 UJ	10 UJ	23 UJ	13 UJ
1,2-DICHLOROPROPANE	11 U	12 UJ	12 UJ	18 UJ	14 UJ	10 UJ	23 UJ	13 UJ
2-BUTANONE	11 U	12 UJ	12 U	18 UJ	14 UJ	10 UJ	23 UJ	13 UJ
2-HEXANONE	11 U	12 UJ	12 UJ	18 UJ	14 UJ	10 UJ	23 UJ	13 UJ
4-METHYL-2-PENTANONE	11 U	12 UJ	12 UJ	18 UJ	14 UJ	10 UJ	23 UJ	13 UJ
ACETONE	11 U	12 UJ	12 U	18 UJ	14 UJ	120 J	23 UJ	13 UJ
BENZENE	11 U	12 UJ	12 UJ	18 UJ	14 UJ	10 UJ	23 UJ	13 UJ
BROMODICHLOROMETHANE	11 U	12 UJ	12 UJ	18 UJ	14 UJ	10 UJ	23 UJ	13 UJ
BROMOFORM	11 U	12 UJ	12 UJ	18 UJ	14 UJ	10 UJ	23 UJ	13 UJ
BROMOMETHANE	11 U	12 UJ	12 U	18 UJ	14 UJ	10 UJ	23 UJ	13 UJ
CARBON DISULFIDE	11 UJ	12 UJ	12 UJ	18 UJ	14 UJ	10 UJ	23 UJ	13 UJ
CARBON TETRACHLORIDE	11 U	12 UJ	12 UJ	18 UJ	14 UJ	10 UJ	23 UJ	13 UJ
CHLOROBENZENE	11 U	12 UJ	12 UJ	18 UJ	14 UJ	10 UJ	23 UJ	13 UJ
CHLOROETHANE	11 U	12 UJ	12 U	18 UJ	14 UJ	10 UJ	23 UJ	13 UJ
CHLOROFORM	11 U	12 UJ	12 U	18 UJ	14 UJ	10 UJ	23 UJ	13 UJ
CHLOROMETHANE	11 U	12 UJ	12 U	18 UJ	14 UJ	10 UJ	23 UJ	13 UJ
CIS-1,3-DICHLOROPROPENE	11 U	12 UJ	12 UJ	18 UJ	14 UJ	10 UJ	23 UJ	13 UJ
DIBROMOCHLOROMETHANE	11 U	12 UJ	12 UJ	18 UJ	14 UJ	10 UJ	23 UJ	13 UJ
ETHYLBENZENE	11 U	12 UJ	12 UJ	18 UJ	14 UJ	10 UJ	23 UJ	13 UJ
METHYLENE CHLORIDE	9 B	11 B	9 B	14 B	16 B	15 B	43 B	12 B
STYRENE	11 U	12 UJ	12 UJ	18 UJ	14 UJ	10 UJ	23 UJ	13 UJ
TETRACHLOROETHENE	11 U	12 UJ	12 UJ	18 UJ	14 UJ	10 UJ	23 UJ	13 UJ
TOLUENE	11 U	12 UJ	12 UJ	18 UJ	14 UJ	10 UJ	23 UJ	13 UJ
TRANS-1,3-DICHLOROPROPENE	11 U	12 UJ	12 UJ	18 UJ	14 UJ	10 UJ	23 UJ	13 UJ
TRICHLOROETHENE	11 U	12 UJ	12 UJ	18 UJ	14 UJ	10 UJ	23 UJ	13 UJ
VINYL CHLORIDE	11 U	12 UJ	12 U	18 UJ	14 UJ	10 UJ	23 UJ	13 UJ
XYLENES, TOTAL	11 U	12 UJ	12 UJ	18 UJ	14 UJ	10 UJ	23 UJ	13 UJ
SEMIVOLATILES (µg/kg)								
1,2,4-TRICHLOROBENZENE	120 J	400 UJ	400 UJ	610 UJ	50 L	900 J	140 J	4800 J
1,2-DICHLOROBENZENE	380 UJ	400 UJ	400 UJ	610 UJ	470 UR	340 UJ	790 UJ	420 UJ
1,3-DICHLOROBENZENE	380 UJ	400 UJ	400 UJ	610 UJ	470 UR	340 UJ	790 UJ	420 UJ
1,4-DICHLOROBENZENE	380 UJ	400 UJ	400 UJ	610 UJ	470 UR	340 UJ	790 UJ	420 UJ
2,2'-OXYBIS(1-CHLOROPROPANE)	380 UJ	400 UJ	400 UJ	610 UJ	470 UR	340 UJ	790 UJ	420 UJ
2,4,5-TRICHLOROPHENOL	960 UJ	990 UJ	990 UJ	1500 UJ	1200 UR	850 UJ	2000 UJ	1100 UJ
2,4,6-TRICHLOROPHENOL	380 UJ	400 UJ	400 UJ	610 UJ	470 UR	340 UJ	790 UJ	420 UJ
2,4-DICHLOROPHENOL	380 UJ	400 UJ	400 UJ	610 UJ	470 UR	340 UJ	790 UJ	420 UJ
2,4-DIMETHYLPHENOL	380 UJ	400 UJ	400 UJ	610 UJ	470 UR	340 UJ	790 UJ	420 UJ
2,4-DINITROPHENOL	960 UJ	990 UJ	990 UJ	1500 UJ	1200 UR	850 UJ	2000 UJ	1100 UJ
2,4-DINITROTOLUENE	380 UJ	400 UJ	400 UJ	610 UJ	470 UR	340 UJ	790 UJ	420 UJ
2,6-DINITROTOLUENE	380 UJ	400 UJ	400 UJ	610 UJ	470 UR	340 UJ	790 UJ	420 UJ

APPENDIX B
SUMMARY OF ANALYTICAL RESULTS FOR 1997 SOIL SAMPLES
INDIAN HEAD - CTO-245
SITE 41

SAMPLE I.D.:	S41SS0010001	S41SS0020001	S41SS0030001	S41SS0040001	S41SS0050001	S41SS0060001	S41SS0070001	S41SS0080001
LOCATION:	S41SS01	S41SS02	S41SS03	S41SS04	S41SS05	S41SS06	S41SS07	S41SS08
SAMPLE DATE:	10/22/1997	10/22/1997	10/22/1997	10/22/1997	10/22/1997	10/22/1997	10/22/1997	10/22/1997
DEPTH (FEET):	0' - 0.5'	0' - 0.5'	0' - 0.5'	0' - 0.5'	0' - 0.5'	0' - 0.5'	0' - 0.5'	0' - 0.5'
DUPLICATE OF:								S41SS0080001-D
2-CHLORONAPHTHALENE	380 UJ	400 UJ	400 UJ	610 UJ	470 UR	340 UJ	790 UJ	420 UJ
2-CHLOROPHENOL	380 UJ	400 UJ	400 UJ	610 UJ	470 UR	340 UJ	790 UJ	420 UJ
2-METHYLNAPHTHALENE	380 UJ	400 UJ	400 UJ	69 J	690 L	130 J	470 J	47 J
2-METHYLPHENOL	380 UJ	400 UJ	400 UJ	610 UJ	470 UR	340 UJ	790 UJ	420 UJ
2-NITROANILINE	960 UJ	990 UJ	990 UJ	1500 UJ	1200 UR	850 UJ	2000 UJ	1100 UJ
2-NITROPHENOL	380 UJ	400 UJ	400 UJ	610 UJ	470 UR	340 UJ	790 UJ	420 UJ
3,3'-DICHLOROBENZIDINE	380 UJ	400 UJ	400 UJ	610 UJ	470 UR	340 UJ	790 UJ	420 UJ
3-NITROANILINE	960 UJ	990 UJ	990 UJ	1500 UJ	1200 UR	850 UJ	2000 UJ	1100 UJ
4,6-DINITRO-2-METHYLPHENOL	960 UJ	990 UJ	990 UJ	1500 UJ	1200 UR	850 UJ	2000 UJ	1100 UJ
4-BROMOPHENYL PHENYL ETHER	380 UJ	400 UJ	400 UJ	610 UJ	470 UR	340 UJ	790 UJ	420 UJ
4-CHLORO-3-METHYLPHENOL	380 UJ	400 UJ	400 UJ	610 UJ	470 UR	340 UJ	790 UJ	420 UJ
4-CHLOROANILINE	380 UJ	400 UJ	400 UJ	610 UJ	470 UR	340 UJ	790 UJ	420 UJ
4-CHLOROPHENYL PHENYL ETHER	380 UJ	400 UJ	400 UJ	610 UJ	470 UR	340 UJ	790 UJ	420 UJ
4-METHYLPHENOL	380 UJ	400 UJ	400 UJ	610 UJ	470 UR	340 UJ	200 J	420 UJ
4-NITROANILINE	960 UJ	990 UJ	990 UJ	1500 UJ	1200 UR	850 UJ	2000 UJ	1100 UJ
4-NITROPHENOL	960 UJ	990 UJ	990 UJ	1500 UJ	1200 UR	850 UJ	2000 UJ	1100 UJ
ACENAPHTHENE	380 UJ	400 UJ	400 UJ	610 UJ	560 L	130 J	420 J	420 UJ
ACENAPHTHYLENE	380 UJ	400 UJ	400 UJ	610 UJ	47 L	340 UJ	790 UJ	420 UJ
ANTHRACENE	57 J	61 J	61 J	62 J	370 L	95 J	940 J	420 UJ
BENZO(A)ANTHRACENE	370 J	560 J	870 J	370 J	2800 L	350 J	1700 J	64 J
BENZO(A)PYRENE	280 J	520 J	640 J	330 J	2000 L	290 J	1600 J	49 J
BENZO(B)FLUORANTHENE	550 J	1500 J	1400 J	1100 J	2900 L	780 J	3400 J	110 J
BENZO(G,H,I)PERYLENE	230 J	690 J	670 J	370 J	1500 L	310 J	1400 J	59 J
BENZO(K)FLUORANTHENE	130 J	280 J	540 J	260 J	2100 L	220 J	1100 J	420 UJ
BIS(2-CHLOROETHOXY)METHANE	380 UJ	400 UJ	400 UJ	610 UJ	470 UR	340 UJ	790 UJ	420 UJ
BIS(2-CHLOROETHYL)ETHER	380 UJ	400 UJ	400 UJ	610 UJ	470 UR	340 UJ	790 UJ	420 UJ
BIS(2-ETHYLHEXYL)PHTHALATE	43 J	45 J	47 J	610 UJ	110 L	94 J	170 J	1200 J
BUTYLBENZYL PHTHALATE	380 UJ	400 UJ	400 UJ	610 UJ	470 UR	340 UJ	790 UJ	420 UJ
CARBAZOLE	41 J	400 UJ	400 UJ	610 UJ	130 L	65 J	240 J	420 UJ
CHRYSENE	380 J	850 J	1000 J	780 J	2900 L	530 J	2600 J	210 J
DI-N-BUTYL PHTHALATE	44 J	400 UJ	45 J	64 J	470 UR	340 UJ	84 J	55 J
DI-N-OCTYL PHTHALATE	380 UJ	400 UJ	400 UJ	610 UJ	470 UR	340 UJ	790 UJ	420 UJ
DIBENZO(A,H)ANTHRACENE	93 J	340 J	310 J	190 J	850 L	120 J	650 J	420 UJ
DIBENZOFURAN	380 UJ	50 J	41 J	160 J	570 L	130 J	590 J	420 UJ
DIETHYL PHTHALATE	140 J	400 UJ	400 UJ	610 UJ	470 UR	340 UJ	120 J	420 UJ
DIMETHYL PHTHALATE	380 UJ	400 UJ	400 UJ	610 UJ	470 UR	340 UJ	790 UJ	420 UJ
FLUORANTHENE	560 J	550 J	570 J	600 J	2900 L	910 J	2900 J	97 J
FLUORENE	380 UJ	400 UJ	400 UJ	610 UJ	310 L	66 J	340 J	420 UJ
HEXACHLOROBENZENE	380 UJ	400 UJ	400 UJ	610 UJ	470 UR	340 UJ	790 UJ	420 UJ
HEXACHLOROBUTADIENE	380 UJ	400 UJ	400 UJ	610 UJ	470 UR	340 UJ	790 UJ	420 UJ
HEXACHLOROCYCLOPENTADIENE	380 UJ	400 UJ	400 UJ	610 UJ	470 UR	340 UJ	790 UJ	420 UJ
HEXACHLOROETHANE	380 UJ	400 UJ	400 UJ	610 UJ	470 UR	340 UJ	790 UJ	420 UJ
INDENO(1,2,3-CD)PYRENE	260 J	680 J	670 J	370 J	1600 L	290 J	1400 J	50 J
ISOPHORONE	380 UJ	400 UJ	400 UJ	610 UJ	470 UR	340 UJ	790 UJ	420 UJ
N-NITROSO-DI-N-PROPYLAMINE	380 UJ	400 UJ	400 UJ	610 UJ	470 UR	340 UJ	790 UJ	420 UJ
N-NITROSODIPHENYLAMINE	380 UJ	400 UJ	400 UJ	610 UJ	470 UR	340 UJ	790 UJ	420 UJ
NAPHTHALENE	380 UJ	400 UJ	48 J	63 J	980 L	230 J	740 J	420 UJ

APPENDIX B
SUMMARY OF ANALYTICAL RESULTS FOR 1997 SOIL SAMPLES
INDIAN HEAD - CTO-245
SITE 41

SAMPLE I.D.:	S41SS0010001	S41SS0020001	S41SS0030001	S41SS0040001	S41SS0050001	S41SS0060001	S41SS0070001	S41SS0080001
LOCATION:	S41SS01	S41SS02	S41SS03	S41SS04	S41SS05	S41SS06	S41SS07	S41SS08
SAMPLE DATE:	10/22/1997	10/22/1997	10/22/1997	10/22/1997	10/22/1997	10/22/1997	10/22/1997	10/22/1997
DEPTH (FEET):	0' - 0.5'	0' - 0.5'	0' - 0.5'	0' - 0.5'	0' - 0.5'	0' - 0.5'	0' - 0.5'	0' - 0.5'
DUPLICATE OF:								S41SS0080001-D
NITROBENZENE	380 UJ	400 UJ	400 UJ	610 UJ	470 UR	340 UJ	790 UJ	420 UJ
PENTACHLOROPHENOL	960 UJ	990 UJ	990 UJ	1500 UJ	1200 UR	850 UJ	2000 UJ	1100 UJ
PHENANTHRENE	240 J	270 J	270 J	380 J	1800 L	720 J	1900 J	150 J
PHENOL	380 UJ	400 UJ	400 UJ	610 UJ	470 UR	340 UJ	790 UJ	420 UJ
PYRENE	440 J	670 J	930 J	550 J	6100 L	680 J	3500 J	140 J
PESTICIDES/PCBs (µg/kg)								
4,4'-DDD	3.8 UJ	4 UJ	3.9 UJ	6.1 UJ	4.7 UJ	3.4 UJ	7.8 UJ	4.2 UJ
4,4'-DDE	3.8 UJ	4 UJ	3.9 UJ	6.1 UJ	4.7 UJ	3.4 UJ	7.8 UJ	4.2 UJ
4,4'-DDT	3.8 UJ	4 UJ	3.9 UJ	6.1 UJ	4.7 UJ	3.4 UJ	7.8 UJ	4.2 UJ
ALDRIN	1.9 UJ	2 UJ	2 UJ	3 UJ	2.4 UJ	1.7 UJ	3.9 UJ	2.1 UJ
ALPHA-BHC	1.9 UJ	2 UJ	2 UJ	3 UJ	2.4 UJ	1.7 UJ	3.9 UJ	2.1 UJ
ALPHA-CHLORDANE	1.9 UJ	2 UJ	2 UJ	3 UJ	2.4 UJ	1.7 UJ	3.9 UJ	2.1 UJ
AROCLOR-1016	38 UJ	40 UJ	39 UJ	61 UJ	47 UJ	34 UJ	78 UJ	42 UJ
AROCLOR-1221	77 UJ	79 UJ	79 UJ	120 UJ	94 UJ	68 UJ	160 UJ	85 UJ
AROCLOR-1232	38 UJ	40 UJ	39 UJ	61 UJ	47 UJ	34 UJ	78 UJ	42 UJ
AROCLOR-1242	38 UJ	40 UJ	39 UJ	61 UJ	47 UJ	34 UJ	78 UJ	42 UJ
AROCLOR-1248	38 UJ	40 UJ	39 UJ	61 UJ	47 UJ	34 UJ	78 UJ	42 UJ
AROCLOR-1254	38 UJ	40 UJ	39 UJ	61 UJ	47 UJ	34 UJ	78 UJ	42 UJ
AROCLOR-1260	11000 J	650 J	330 J	890 J	13000 J	21000 J	12000 J	180000 J
BETA-BHC	1.9 UJ	2 UJ	2 UJ	3 UJ	2.4 UJ	1.7 UJ	3.9 UJ	2.1 UJ
DELTA-BHC	1.9 UJ	2 UJ	2 UJ	3 UJ	2.4 UJ	1.7 UJ	3.9 UJ	2.1 UJ
DIELDRIN	3.8 UJ	4 UJ	3.9 UJ	6.1 UJ	4.7 UJ	3.4 UJ	7.8 UJ	4.2 UJ
ENDOSULFAN I	1.9 UJ	2 UJ	2 UJ	3 UJ	2.4 UJ	1.7 UJ	3.9 UJ	2.1 UJ
ENDOSULFAN II	3.8 UJ	4 UJ	3.9 UJ	6.1 UJ	4.7 UJ	3.4 UJ	7.8 UJ	4.2 UJ
ENDOSULFAN SULFATE	3.8 UJ	4 UJ	3.9 UJ	6.1 UJ	4.7 UJ	3.4 UJ	7.8 UJ	4.2 UJ
ENDRIN	3.8 UJ	4 UJ	3.9 UJ	6.1 UJ	4.7 UJ	3.4 UJ	7.8 UJ	4.2 UJ
ENDRIN ALDEHYDE	3.8 UJ	4 UJ	3.9 UJ	6.1 UJ	4.7 UJ	3.4 UJ	7.8 UJ	4.2 UJ
ENDRIN KETONE	3.8 UJ	4 UJ	3.9 UJ	6.1 UJ	4.7 UJ	3.4 UJ	7.8 UJ	4.2 UJ
GAMMA-BHC (LINDANE)	1.9 UJ	2 UJ	2 UJ	3 UJ	2.4 UJ	1.7 UJ	3.9 UJ	2.1 UJ
GAMMA-CHLORDANE	1.9 UJ	2 UJ	2 UJ	3 UJ	2.4 UJ	1.7 UJ	3.9 UJ	2.1 UJ
HEPTACHLOR	1.9 UJ	2 UJ	2 UJ	3 UJ	2.4 UJ	1.7 UJ	3.9 UJ	2.1 UJ
HEPTACHLOR EPOXIDE	1.9 UJ	2 UJ	2 UJ	3 UJ	2.4 UJ	1.7 UJ	3.9 UJ	2.1 UJ
METHOXYCHLOR	19 UJ	20 UJ	20 UJ	30 UJ	24 UJ	17 UJ	39 UJ	21 UJ
TOXAPHENE	190 UJ	200 UJ	200 UJ	300 UJ	240 UJ	170 UJ	390 UJ	210 UJ
EXPLOSIVES (µg/kg)								
1,3,5-TRINITROBENZENE	40.2 U	40.2 U	40.2 UL	40.2 U	40.2 UL	40.2 U	40.2 U	40.2 UL
1,3-DINITROBENZENE	37.2 U	37.2 U	37.2 UL	37.2 U	37.2 UL	37.2 U	37.2 U	37.2 UL
2,4 DINITROTOLUENE	51.6 U	51.6 U	51.6 UL	51.6 U	51.6 UL	51.6 U	51.6 U	51.6 UL
2,4,6-TRINITROTOLUENE	35.6 U	35.6 U	35.6 UL	35.6 U	35.6 UL	35.6 U	35.6 U	35.6 UL
2,6 DINITROTOLUENE	47.6 U	47.6 U	47.6 UL	47.6 U	47.6 UL	47.6 U	47.6 U	47.6 UL
2-AMINO-4,6-DINITROTOLUENE	46.7 U	46.7 U	46.7 UL	46.7 U	46.7 UL	46.7 U	46.7 U	46.7 UL
2-NITROTOLUENE	81.4 U	81.4 U	81.4 UL	81.4 U	81.4 UL	81.4 U	81.4 U	81.4 UL
3-NITROTOLUENE	81.8 U	81.8 U	81.8 UL	81.8 U	81.8 UL	81.8 U	81.8 U	81.8 UL
4-AMINO-2,6-DINITROTOLUENE	40.9 U	40.9 U	40.9 UL	40.9 U	40.9 UL	40.9 U	40.9 U	40.9 UL
4-NITROTOLUENE	87.2 U	87.2 U	87.2 UL	87.2 U	87.2 UL	87.2 U	87.2 U	87.2 UL
HMX	70.5 U	70.5 U	70.5 UL	70.5 U	70.5 UL	70.5 U	70.5 U	70.5 UL
NITRO-BENZENE	35.2 U	35.2 U	35.2 UL	35.2 U	35.2 UL	35.2 U	35.2 U	35.2 UL

APPENDIX B
SUMMARY OF ANALYTICAL RESULTS FOR 1997 SOIL SAMPLES
INDIAN HEAD - CTO-245
SITE 41

SAMPLE I.D.:	S41SS0010001	S41SS0020001	S41SS0030001	S41SS0040001	S41SS0050001	S41SS0060001	S41SS0070001	S41SS0080001
LOCATION:	S41SS01	S41SS02	S41SS03	S41SS04	S41SS05	S41SS06	S41SS07	S41SS08
SAMPLE DATE:	10/22/1997	10/22/1997	10/22/1997	10/22/1997	10/22/1997	10/22/1997	10/22/1997	10/22/1997
DEPTH (FEET):	0' - 0.5'	0' - 0.5'	0' - 0.5'	0' - 0.5'	0' - 0.5'	0' - 0.5'	0' - 0.5'	0' - 0.5'
DUPLICATE OF:								S41SS0080001-D
NITROCELLULOSE	28900	17500 U	24400	16900 U	17300 U	31600	33200	29100
NITROGLYCERIN	10000 U	10000 U	10000 U	10000 U	10000 U	10000 U	10000 U	10000 U
NITROGUANIDINE	62.5 U	62.5 U	62.5 U	62.5 U	62.5 U	115.4	288.4	62.5 U
RDX	50.9 U	50.9 U	50.9 UL	50.9 U	50.9 UL	50.9 U	50.9 U	50.9 UL
TETRYL	163 U	163 U	163 UL	163 U	163 UL	163 U	163 U	163 UL
INORGANICS (mg/kg)								
ALUMINUM	4660 J	3840 J	3770 J	4240 J	5790 J	9920 J	13800 J	3740 J
ANTIMONY	0.59 UL	0.61 UL	0.9 L	2.0 L	10.6 L	2.6 UL	5.9 UL	0.94 L
ARSENIC	115 L	77.1 L	104 L	216 L	138 L	39.3 L	176 L	21.8 L
BARIUM	40.2 L	53.1 L	51.9 L	75.8 L	80.0 L	192 L	148 L	62.6 L
BERYLLIUM	0.12 B	0.15 B	0.28 B	0.19 B	0.35 B	0.1 UL	0.23 UL	0.28 B
CADMIUM	1.7 J	0.63 J	0.56 J	2.6 J	8.0 J	11.4 J	45.6 J	10.7 J
CALCIUM	4420	1730 K	1730 K	7410	2770	111000	137000	1030 K
CHROMIUM	10.6 J	11.0 J	13.4 J	14.6 J	26.7 J	22.1 J	88.2 J	45.1 J
COBALT	4.3 J	2.8 J	5.0 J	4.8 J	5.9 J	3.8 J	8.8 J	9.4 J
COPPER	18.7 L	10.6 L	14.5 J	22.6 L	105 L	49.7 L	189 L	72.7 L
CYANIDE	0.17 U	0.29	0.22 U	0.38 U	0.22 U	0.27	0.52	0.28 U
IRON	21200	10700	23500	38200	46300	13300	39300	53000
LEAD	32.2	27.6	31.3	77.9	3540	91.1	457	187
MAGNESIUM	489 K	431 K	570 K	614 K	545 K	4940	9460	421 K
MANGANESE	90.3 L	98.3 L	114 L	137 L	204 L	172 L	754 L	238 L
MERCURY	0.49	0.27	0.63	0.44	0.78	0.5	3.9	0.29
NICKEL	7.1 B	9.6 B	13.1 B	12.3 B	20.3 B	17.3 B	44.3 J	21.7 B
POTASSIUM	514	465	687	693	623	503	702	404
SELENIUM	1.1 J	0.66 UJ	1.6 J	3.3 L	2.2 L	2.8 UJ	6.3 UJ	0.7 UJ
SILVER	0.18 UJ	0.19 UJ	0.19 UJ	0.29 UJ	0.64 B	0.79 UJ	4.0 J	1.8 J
SODIUM	55.7 B	79.4 B	90.1 B	223 B	149 B	198 U	452 U	139 B
THALLIUM	0.79 B	0.68 UL	0.68 UL	1.5 B	0.81 UL	4.3 B	6.6 UL	0.73 UL
VANADIUM	18.5 L	16.9 L	18.8 L	21.5 L	30.1 L	17.0 L	29.8 L	19.2 L
ZINC	35.1 L	38.3 L	37.5 L	309 L	423 L	343 L	536 L	282 L
MISCELLANEOUS PARAMETERS								
PH	8.65	6.07	6.49	6.9	7.36	11.9	11.46	5.56

APPENDIX B
SUMMARY OF ANALYTICAL RESULTS FOR 1997 SOIL SAMPLES
INDIAN HEAD - CTO-245
SITE 41

SAMPLE I.D.:	S41SS0080001-D	S41SS0090001
LOCATION:	S41SS08	S41SS09
SAMPLE DATE:	10/22/1997	10/22/1997
DEPTH (FEET):	0' - 0.5'	0' - 0.5'
DUPLICATE OF:	S41SS0080001	
VOLATILES (µg/kg)		
1,1,1-TRICHLOROETHANE	14 U	12 UJ
1,1,2,2-TETRACHLOROETHANE	14 U	12 UJ
1,1,2-TRICHLOROETHANE	14 U	12 UJ
1,1-DICHLOROETHANE	14 U	12 UJ
1,1-DICHLOROETHENE	14 U	12 UJ
1,2-DICHLOROETHANE	14 U	12 UJ
1,2-DICHLOROETHENE (TOTAL)	14 U	12 UJ
1,2-DICHLOROPROPANE	14 U	12 UJ
2-BUTANONE	14 U	12 UJ
2-HEXANONE	14 U	12 UJ
4-METHYL-2-PENTANONE	14 U	12 UJ
ACETONE	14 U	12 UJ
BENZENE	14 U	12 UJ
BROMODICHLOROMETHANE	14 U	12 UJ
BROMOFORM	14 U	12 UJ
BROMOMETHANE	14 U	12 UJ
CARBON DISULFIDE	14 UJ	12 UJ
CARBON TETRACHLORIDE	14 U	12 UJ
CHLOROBENZENE	14 U	12 UJ
CHLOROETHANE	14 U	12 UJ
CHLOROFORM	14 U	12 UJ
CHLOROMETHANE	14 U	12 UJ
CIS-1,3-DICHLOROPROPENE	14 U	12 UJ
DIBROMOCHLOROMETHANE	14 U	12 UJ
ETHYLBENZENE	14 U	12 UJ
METHYLENE CHLORIDE	15 B	16 B
STYRENE	14 U	12 UJ
TETRACHLOROETHENE	14 U	12 UJ
TOLUENE	14 U	12 UJ
TRANS-1,3-DICHLOROPROPENE	14 U	12 UJ
TRICHLOROETHENE	14 U	12 UJ
VINYL CHLORIDE	14 U	12 UJ
XYLENES, TOTAL	14 U	12 UJ
SEMIVOLATILES (µg/kg)		
1,2,4-TRICHLOROBENZENE	2900 J	280 J
1,2-DICHLOROBENZENE	470 UJ	410 UJ
1,3-DICHLOROBENZENE	470 UJ	410 UJ
1,4-DICHLOROBENZENE	470 UJ	410 UJ
2,2'-OXYBIS(1-CHLOROPROPANE)	470 UJ	410 UJ
2,4,5-TRICHLOROPHENOL	1200 UJ	1000 UJ
2,4,6-TRICHLOROPHENOL	470 UJ	410 UJ
2,4-DICHLOROPHENOL	470 UJ	410 UJ
2,4-DIMETHYLPHENOL	470 UJ	410 UJ
2,4-DINITROPHENOL	1200 UJ	1000 UJ
2,4-DINITROTOLUENE	470 UJ	410 UJ
2,6-DINITROTOLUENE	470 UJ	410 UJ

APPENDIX B
SUMMARY OF ANALYTICAL RESULTS FOR 1997 SOIL SAMPLES
INDIAN HEAD - CTO-245
SITE 41

SAMPLE I.D.:	S41SS0080001-D	S41SS0090001
LOCATION:	S41SS08	S41SS09
SAMPLE DATE:	10/22/1997	10/22/1997
DEPTH (FEET):	0' - 0.5'	0' - 0.5'
DUPLICATE OF:	S41SS0080001	
2-CHLORONAPHTHALENE	470 UJ	410 UJ
2-CHLOROPHENOL	470 UJ	410 UJ
2-METHYLNAPHTHALENE	68 J	96 J
2-METHYLPHENOL	470 UJ	410 UJ
2-NITROANILINE	1200 UJ	1000 UJ
2-NITROPHENOL	470 UJ	410 UJ
3,3'-DICHLOROBENZIDINE	470 UJ	410 UJ
3-NITROANILINE	1200 UJ	1000 UJ
4,6-DINITRO-2-METHYLPHENOL	1200 UJ	1000 UJ
4-BROMOPHENYL PHENYL ETHER	470 UJ	410 UJ
4-CHLORO-3-METHYLPHENOL	470 UJ	410 UJ
4-CHLOROANILINE	470 UJ	410 UJ
4-CHLOROPHENYL PHENYL ETHER	470 UJ	410 UJ
4-METHYLPHENOL	470 UJ	410 UJ
4-NITROANILINE	1200 UJ	1000 UJ
4-NITROPHENOL	1200 UJ	1000 UJ
ACENAPHTHENE	470 UJ	410 UJ
ACENAPHTHYLENE	470 UJ	410 UJ
ANTHRACENE	470 UJ	410 UJ
BENZO(A)ANTHRACENE	81 J	110 J
BENZO(A)PYRENE	67 J	88 J
BENZO(B)FLUORANTHENE	130 J	230 J
BENZO(G,H,I)PERYLENE	71 J	110 J
BENZO(K)FLUORANTHENE	470 UJ	410 UJ
BIS(2-CHLOROETHOXY)METHANE	470 UJ	410 UJ
BIS(2-CHLOROETHYL)ETHER	470 UJ	410 UJ
BIS(2-ETHYLHEXYL)PHTHALATE	430 J	2100 J
BUTYLBENZYL PHTHALATE	470 UJ	410 UJ
CARBAZOLE	470 UJ	410 UJ
CHRYSENE	170 J	320 J
DI-N-BUTYL PHTHALATE	65 J	440 J
DI-N-OCTYL PHTHALATE	470 UJ	410 UJ
DIBENZO(A,H)ANTHRACENE	470 UJ	410 UJ
DIBENZOFURAN	470 UJ	410 UJ
DIETHYL PHTHALATE	470 UJ	98 J
DIMETHYL PHTHALATE	470 UJ	410 UJ
FLUORANTHENE	110 J	170 J
FLUORENE	470 UJ	410 UJ
HEXACHLOROBENZENE	470 UJ	410 UJ
HEXACHLOROBUTADIENE	470 UJ	410 UJ
HEXACHLOROCYCLOPENTADIENE	470 UJ	410 UJ
HEXACHLOROETHANE	470 UJ	410 UJ
INDENO(1,2,3-CD)PYRENE	66 J	120 J
ISOPHORONE	470 UJ	410 UJ
N-NITROSO-DI-N-PROPYLAMINE	470 UJ	410 UJ
N-NITROSODIPHENYLAMINE	470 UJ	410 UJ
NAPHTHALENE	470 UJ	410 UJ

APPENDIX B
SUMMARY OF ANALYTICAL RESULTS FOR 1997 SOIL SAMPLES
INDIAN HEAD - CTO-245
SITE 41

SAMPLE I.D.:	S41SS0080001-D	S41SS0090001
LOCATION:	S41SS08	S41SS09
SAMPLE DATE:	10/22/1997	10/22/1997
DEPTH (FEET):	0' - 0.5'	0' - 0.5'
DUPLICATE OF:	S41SS0080001	
NITROBENZENE	470 UJ	410 UJ
PENTACHLOROPHENOL	1200 UJ	1000 UJ
PHENANTHRENE	190 J	220 J
PHENOL	470 UJ	410 UJ
PYRENE	160 J	190 J
PESTICIDES/PCBs (µg/kg)		
4,4'-DDD	4.7 UJ	4.1 UJ
4,4'-DDE	4.7 UJ	4.1 UJ
4,4'-DDT	4.7 UJ	4.1 UJ
ALDRIN	2.4 UJ	2 UJ
ALPHA-BHC	2.4 UJ	2 UJ
ALPHA-CHLORDANE	2.4 UJ	2 UJ
AROCLOR-1016	47 UJ	41 UJ
AROCLOR-1221	95 UJ	81 UJ
AROCLOR-1232	47 UJ	41 UJ
AROCLOR-1242	47 UJ	41 UJ
AROCLOR-1248	47 UJ	41 UJ
AROCLOR-1254	47 UJ	41 UJ
AROCLOR-1260	130000 J	16000 J
BETA-BHC	2.4 UJ	2 UJ
DELTA-BHC	2.4 UJ	2 UJ
DIELDRIN	4.7 UJ	4.1 UJ
ENDOSULFAN I	2.4 UJ	2 UJ
ENDOSULFAN II	4.7 UJ	4.1 UJ
ENDOSULFAN SULFATE	4.7 UJ	4.1 UJ
ENDRIN	4.7 UJ	4.1 UJ
ENDRIN ALDEHYDE	4.7 UJ	4.1 UJ
ENDRIN KETONE	4.7 UJ	4.1 UJ
GAMMA-BHC (LINDANE)	2.4 UJ	2 UJ
GAMMA-CHLORDANE	2.4 UJ	2 UJ
HEPTACHLOR	2.4 UJ	2 UJ
HEPTACHLOR EPOXIDE	2.4 UJ	2 UJ
METHOXYCHLOR	24 UJ	20 UJ
TOXAPHENE	240 UJ	200 UJ
EXPLOSIVES (µg/kg)		
1,3,5-TRINITROBENZENE	40.2 U	40.2 U
1,3-DINITROBENZENE	37.2 U	37.2 U
2,4 DINITROTOLUENE	51.6 U	51.6 U
2,4,6-TRINITROTOLUENE	35.6 U	35.6 U
2,6 DINITROTOLUENE	47.6 U	47.6 U
2-AMINO-4,6-DINITROTOLUENE	46.7 U	46.7 U
2-NITROTOLUENE	81.4 U	81.4 U
3-NITROTOLUENE	81.8 U	81.8 U
4-AMINO-2,6-DINITROTOLUENE	40.9 U	40.9 U
4-NITROTOLUENE	87.2 U	87.2 U
HMX	70.5 U	70.5 U
NITRO-BENZENE	35.2 U	35.2 U

APPENDIX B
SUMMARY OF ANALYTICAL RESULTS FOR 1997 SOIL SAMPLES
INDIAN HEAD - CTO-245
SITE 41

SAMPLE I.D.:	S41SS0080001-D	S41SS0090001
LOCATION:	S41SS08	S41SS09
SAMPLE DATE:	10/22/1997	10/22/1997
DEPTH (FEET):	0' - 0.5'	0' - 0.5'
DUPLICATE OF:	S41SS0080001	
NITROCELLULOSE	17400 U	17500 U
NITROGLYCERIN	10000 U	10000 U
NITROGUANIDINE	62.5 U	62.5 U
RDX	50.9 U	50.9 U
TETRYL	163 U	163 U
INORGANICS (mg/kg)		
ALUMINUM	4370 J	3710 J
ANTIMONY	2.0 L	1.3 L
ARSENIC	26.7 L	46.2 L
BARIUM	57.7 L	68.2 L
BERYLLIUM	0.52 L	0.46 L
CADMIUM	13.4 J	13.8 J
CALCIUM	1380 K	2900
CHROMIUM	26.5 J	33.9 J
COBALT	6.6 J	12.1 J
COPPER	76.7 L	86.6 L
CYANIDE	0.3 U	0.33
IRON	32500	39700
LEAD	265	251
MAGNESIUM	521 K	726 K
MANGANESE	136 L	243 L
MERCURY	0.29	0.15
NICKEL	19.9 B	23.9 B
POTASSIUM	437	600
SELENIUM	1.1 J	2.2 J
SILVER	1.6 J	0.82 B
SODIUM	100 B	161 B
THALLIUM	0.8 UL	0.71 UL
VANADIUM	22.0 L	23.9 L
ZINC	278 L	352 L
MISCELLANEOUS PARAMETERS		
PH	5.43	6.88

APPENDIX B
SUMMARY OF ANALYTICAL RESULTS FOR HISTORICAL SOIL SAMPLES
INDIAN HEAD - CTO-245
SITE 41

SAMPLE I.D.:	41SB0301
LOCATION:	41MW01/41SB03
SAMPLE DATE:	08/92
DEPTH (FEET):	0' - 2'
DUPLICATE OF:	

VOLATILES (µg/kg)	
1,1,1-TRICHLOROETHANE	11 UJ
1,1,2,2-TETRACHLOROETHANE	11 UJ
1,1,2-TRICHLOROETHANE	11 UJ
1,1-DICHLOROETHANE	11 U
1,1-DICHLOROETHENE	11 U
1,2-DICHLOROETHANE	11 U
1,2-DICHLOROETHENE (TOTAL)	11 U
1,2-DICHLOROPROPANE	11 UJ
2-BUTANONE	3 U
2-HEXANONE	11 UJ
4-METHYL-2-PENTANONE	11 UJ
ACETONE	16 U
BENZENE	11 UJ
BROMODICHLOROMETHANE	11 UJ
BROMOFORM	11 UJ
BROMOMETHANE	11 U
CARBON DISULFIDE	3 J
CARBON TETRACHLORIDE	11 UJ
CHLOROBENZENE	11 UJ
CHLOROETHANE	11 U
CHLOROFORM	11 U
CHLOROMETHANE	11 U
CIS-1,3-DICHLOROPROPENE	11 UJ
DIBROMOCHLOROMETHANE	11 UJ
ETHYLBENZENE	11 UJ
METHYLENE CHLORIDE	4 U
STYRENE	11 UJ
TETRACHLOROETHENE	11 UJ
TOLUENE	9 J
TRANS-1,3-DICHLOROPROPENE	11 UJ
TRICHLOROETHENE	11 UJ
VINYL CHLORIDE	11 U
XYLENES, TOTAL	11 UJ

SEMIVOLATILES (µg/kg)	
1,2,4-TRICHLOROBENZENE	360 U
1,2-DICHLOROBENZENE	360 U
1,3-DICHLOROBENZENE	360 U
1,4-DICHLOROBENZENE	360 U
2,2'-OXYBIS(1-CHLOROPROPANE)	360 U
2,4,5-TRICHLOROPHENOL	860 U
2,4,6-TRICHLOROPHENOL	360 U
2,4-DICHLOROPHENOL	360 U
2,4-DIMETHYLPHENOL	360 U
2,4-DINITROPHENOL	860 U
2,4-DINITROTOLUENE	360 U
2,6-DINITROTOLUENE	360 U

APPENDIX B
SUMMARY OF ANALYTICAL RESULTS FOR HISTORICAL SOIL SAMPLES
INDIAN HEAD - CTO-245
SITE 41

SAMPLE I.D.:	41SB0301
LOCATION:	41MW01/41SB03
SAMPLE DATE:	08/92
DEPTH (FEET):	0' - 2'
DUPLICATE OF:	

2-CHLORONAPHTHALENE	360 U
2-CHLOROPHENOL	360 U
2-METHYLNAPHTHALENE	42 J
2-METHYLPHENOL	360 U
2-NITROANILINE	860 U
2-NITROPHENOL	360 U
3,3'-DICHLOROBENZIDINE	360 U
3-NITROANILINE	860 U
4,6-DINITRO-2-METHYLPHENOL	860 U
4-BROMOPHENYL PHENYL ETHER	360 U
4-CHLORO-3-METHYLPHENOL	360 U
4-CHLOROANILINE	360 U
4-CHLOROPHENYL PHENYL ETHER	360 U
4-METHYLPHENOL	360 U
4-NITROANILINE	860 U
4-NITROPHENOL	860 U
ACENAPHTHENE	360 U
ACENAPHTHYLENE	100 J
ANTHRACENE	160 J
BENZO(A)ANTHRACENE	710
BENZO(A)PYRENE	230 J
BENZO(B)FLUORANTHENE	530
BENZO(G,H,I)PERYLENE	360 U
BENZO(K)FLUORANTHENE	610
BIS(2-CHLOROETHOXY)METHANE	360 U
BIS(2-CHLOROETHYL)ETHER	360 U
BIS(2-ETHYLHEXYL)PHTHALATE	360 U
BUTYLBENZYL PHTHALATE	360 U
CARBAZOLE	360 U
CHRYSENE	1200
DI-N-BUTYL PHTHALATE	360 U
DI-N-OCTYL PHTHALATE	360 U
DIBENZO(A,H)ANTHRACENE	360 U
DIBENZOFURAN	53 J
DIETHYL PHTHALATE	360 U
DIMETHYL PHTHALATE	360 U
FLUORANTHENE	1300
FLUORENE	360 U
HEXACHLOROBENZENE	360 U
HEXACHLOROBUTADIENE	360 U
HEXACHLOROCYCLOPENTADIENE	360 U
HEXACHLOROETHANE	360 U
INDENO(1,2,3-CD)PYRENE	120 J
ISOPHORONE	360 U
N-NITROSO-DI-N-PROPYLAMINE	360 U
N-NITROSODIPHENYLAMINE	360 U
NAPHTHALENE	92 J

APPENDIX B
SUMMARY OF ANALYTICAL RESULTS FOR HISTORICAL SOIL SAMPLES
INDIAN HEAD - CTO-245
SITE 41

SAMPLE I.D.:	**41SB0301**
LOCATION:	**41MW01/41SB03**
SAMPLE DATE:	**08/92**
DEPTH (FEET):	**0' - 2'**
DUPLICATE OF:	

NITROBENZENE	360 U
PENTACHLOROPHENOL	860 U
PHENANTHRENE	1000
PHENOL	360 U
PYRENE	1100
PESTICIDES/PCBs (µg/kg)	
4,4'-DDD	3.6 U
4,4'-DDE	3.6 U
4,4'-DDT	3.6 U
ALDRIN	1.8 U
ALPHA-BHC	1.8 U
ALPHA-CHLORDANE	1.8 U
AROCLOR-1016	36 U
AROCLOR-1221	73 U
AROCLOR-1232	36 U
AROCLOR-1242	36 U
AROCLOR-1248	36 U
AROCLOR-1254	36 U
AROCLOR-1260	36 U
BETA-BHC	1.8 U
DELTA-BHC	1.8 U
DIELDRIN	3.6 U
ENDOSULFAN I	1.8 U
ENDOSULFAN II	3.6 U
ENDOSULFAN SULFATE	3.6 U
ENDRIN	91 DP
ENDRIN ALDEHYDE	7.2 U
ENDRIN KETONE	3.6 U
GAMMA-BHC (LINDANE)	1.8 U
GAMMA-CHLORDANE	1.8 U
HEPTACHLOR	1.8 U
HEPTACHLOR EPOXIDE	5.5
METHOXYCHLOR	18 U
TOXAPHENE	180 U
INORGANICS (mg/kg)	
ALUMINUM	1880
ANTIMONY	5.4 UJ
ARSENIC	145 J
BARIUM	36.5 B
BERYLLIUM	0.41 B
CADMIUM	1.1 U
CALCIUM	8420
CHROMIUM	5.2
COBALT	4.1 B
COPPER	19.5
CYANIDE	1.3 U
IRON	7670

APPENDIX B
SUMMARY OF ANALYTICAL RESULTS FOR HISTORICAL SOIL SAMPLES
INDIAN HEAD - CTO-245
SITE 41

SAMPLE I.D.:	**41SB0301**
LOCATION:	**41MW01/41SB03**
SAMPLE DATE:	**08/92**
DEPTH (FEET):	**0' - 2'**
DUPLICATE OF:	

LEAD	22.5 J
MAGNESIUM	552 B
MANGANESE	57.1
MERCURY	0.28
NICKEL	6.4 B
POTASSIUM	347 B
SELENIUM	0.6 B
SILVER	1.4 B
SODIUM	71.7 U
THALLIUM	4.3 U
VANADIUM	5.4 B
ZINC	24.5
PETROLEUM HYDROCARBONS (mg/kg)	
TOTAL PETROLEUM HYDROCARBONS	16.2

APPENDIX C

PRE-FEASIBILITY STUDY TEST PIT LOGS

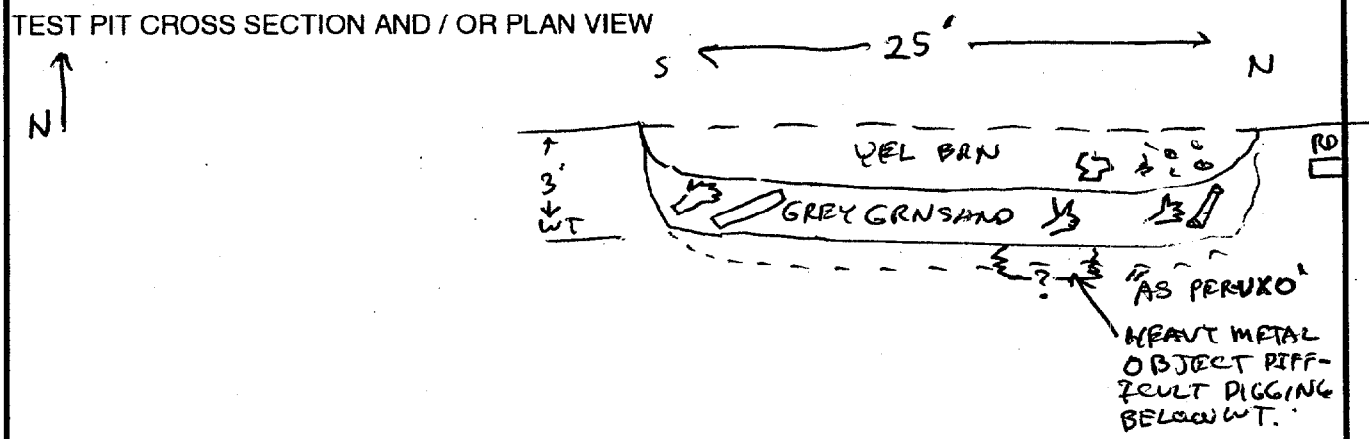
TEST PIT LOG

Tetra Tech NUS, Inc.

PROJECT NAME: SITES 12,41,42 PRE-FS TEST PIT No.: S12 TP01
PROJECT NUMBER: 7129 DATE: 9-14-99
LOCATION: INDIAN HEAD NSWC GEOLOGIST: FRED W. RAMSER

Depth (Ft.)	Lithology Change (Depth/Ft.)	MATERIAL DESCRIPTION: Soil/Waste Characteristics (lithology, density, color, etc.)	USCS	Remarks	PID/FID READING: Source (ppm)	PID/FID READING: BZ (ppm)
1		YELLOW BRN SAND & SILT	SP			
2						
3		GREY GRN SAND + GRAVEL	GP	METAL		
		ABUNDANT CONCRETE BLOCKS		OBJECT		
		ABUNDANT SOME WOOD LOGS		FNX @ ~3'		
		CHARRED WOOD, SLIGHT ODOR			0	0
		H_2O @ 3' BLS		WATER IN		
		CONTINUE TO TRENCH BACK TO THE		POND HIGH!		
		RD. (NORTH) GRAVEL INC AMOUNT		HEAVY METAL		
		WOOD & CONCRETE ~~DIMINISHES~~ INC TO THE		OBJECT NOT		
		NORTH.				
		COPPER CABLE @ NORTHERN		UNCOVERED BELOW WT.		
		END, WOOD, CONCRETE, TRACE METAL				
		DEBRIS ENC TO NORTHERN EXTENT		SAWED WOOD LOGS		
		MARKED BY RD/WATERLINE		STUMPS CHARRED		
				SLIGHT ODOR NO PID RESP.		

TEST PIT CROSS SECTION AND / OR PLAN VIEW



REMARKS: START 1250 HRS FINISH 1320 HRS

PHOTO LOG: #27, LOOKING TO THE NORTH, STANDING @ THE SOUTH END.

TEST PIT LOG

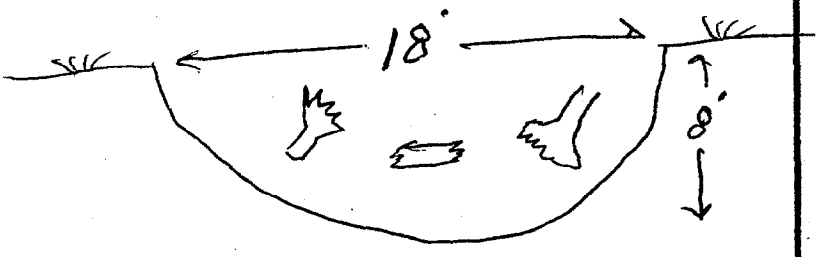
Tetra Tech NUS, Inc.

PROJECT NAME: SITES 12,41,42 PRE-FS TEST PIT No.: S12TP03
PROJECT NUMBER: 7129 DATE: 9-14-99
LOCATION: INDIAN HEAD NSWC GEOLOGIST: FRED W. RAMSER

Depth (Ft.)	Lithology Change (Depth/Ft.)	MATERIAL DESCRIPTION: Soil/Waste Characteristics (lithology, density, color, etc.)	USCS	Remarks	PID/FID READING: Source (ppm)	PID/FID READING: BZ (ppm)
1		YEL BRN TOP				
2		DISTINCT BLK LAYER (ASH) 6"				
3		ABUNDANT WOOD, LOGS CUT,				
4		FINNISH WOOD CHARRED HEAVILY				
5		STAINED SOILS INTERLAYER				
6		GREY SILT. METAL DEBRIS ½" CABLE		(RARE METAL)		
		ABUNDANT WOOD FRAGS.			0	0
		LANDSCAPING DEBRIS				
8		LEAVES, SHRUBS, ETC.				

TEST PIT CROSS SECTION AND / OR PLAN VIEW

FINNISH DIGGING @ 1500
BACK FILLED @ 1520



REMARKS: BASED ON WASTE ENCOUNTERED HERE, WILL NOT DO TP02, TP04 + TP05

PHOTO LOG: #23 AND #22 LOOK NORTH

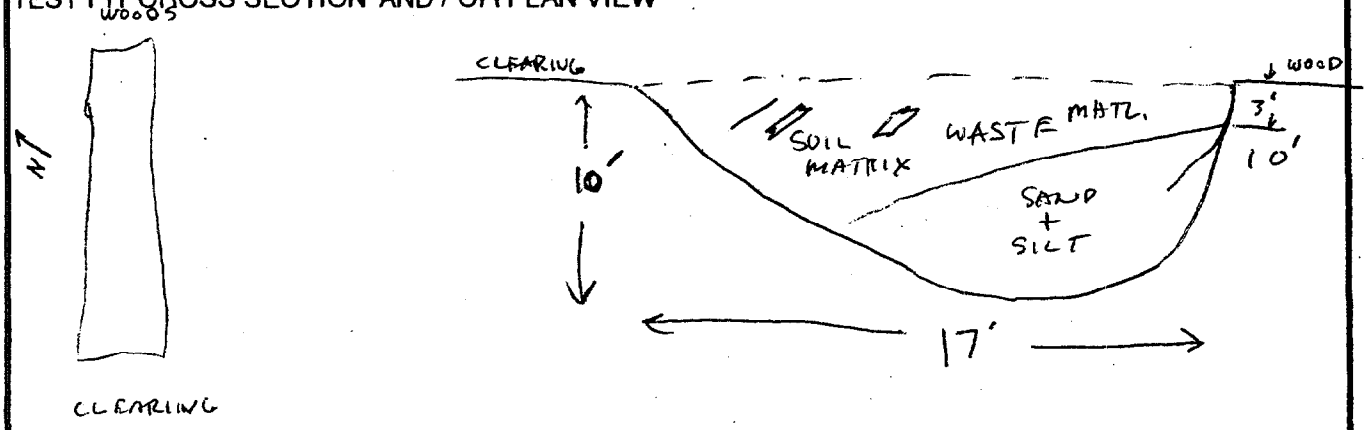
Tetra Tech NUS, Inc.

TEST PIT LOG

PROJECT NAME: SITES 12,41,42 PRE-FS
TEST PIT No.: S12TP07
PROJECT NUMBER: 7129
DATE: 9-14-99
LOCATION: INDIAN HEAD NSWC
GEOLOGIST: FRED W. RAMSER

Depth (Ft.)	Lithology Change (Depth/Ft.)	MATERIAL DESCRIPTION: Soil/Waste Characteristics (lithology, density, color, etc.)	USCS	Remarks	PID/FID READING: Source (ppm)	PID/FID READING: BZ (ppm)
1		YEL BRN SAND + SILT,			0	0
2		WASTE ABUNDANT, METAL		DRY		
3		WOOD FRAG. GLASS, CONDUIT				
4		PLASTIC ALUMINU GUTTERS			0	0
5		TERRA COTTA ETC		MOIST		
6						
7						
8						
9		FINISHED @				
10		1715 HRS				

TEST PIT CROSS SECTION AND / OR PLAN VIEW



REMARKS:

PHOTO LOG: #21 and #20

Tetra Tech NUS, Inc.

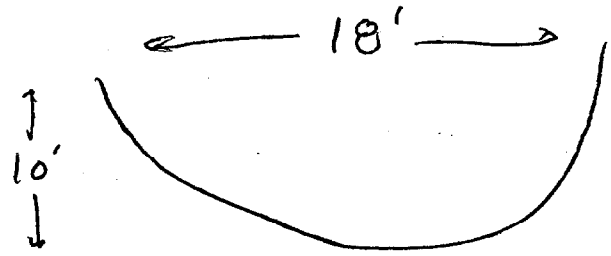
TEST PIT LOG

PROJECT NAME: SITES 12,41,42 PRE-FS
PROJECT NUMBER: 7129
LOCATION: INDIAN HEAD NSWC
TEST PIT No.: S12TP09
DATE: 9-15-99
GEOLOGIST: FRED W. RAMSER

Depth (Ft.)	Lithology Change (Depth/Ft.)	MATERIAL DESCRIPTION: Soil/Waste Characteristics (lithology, density, color, etc.)	USCS	Remarks	PID/FID READING: Source (ppm)	PID/FID READING: BZ (ppm)
1		YEL BRN SAND + SILT	SP			
2		MOTTLED GREY INC				
3		DOWNWARD AND SILT				
4		CONT. INC DOWNWARD				
5						
6						
7			SP/SM			
8		TR CLAY				
9						
10			SP/SM			
		"NO WASTE"				

TEST PIT CROSS SECTION AND / OR PLAN VIEW

HARD RAIN
NO PID READINGS
TAKEN.



REMARKS: START DIG @ 1130

PHOTO LOG: #19

TEST PIT LOG

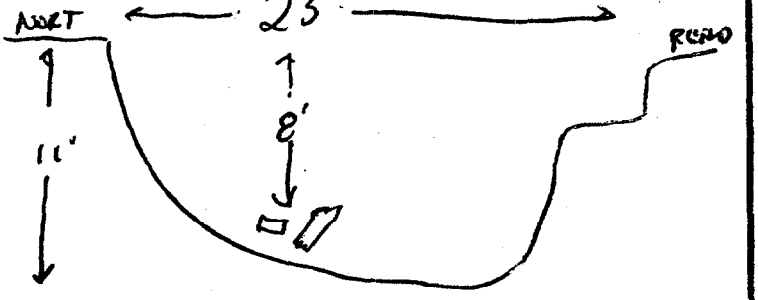
Tetra Tech NUS, Inc.

PROJECT NAME: SITES 12,41,42 PRE-FS
TEST PIT No.: S12TP10
PROJECT NUMBER: 7129
DATE: 9-15-99
LOCATION: INDIAN HEAD NSWC
GEOLOGIST: FRED W. RAMSER

Depth (Ft.)	Lithology Change (Depth/Ft.)	MATERIAL DESCRIPTION: Soil/Waste Characteristics (lithology, density, color, etc.)	USCS	Remarks	PID/FID READING: Source (ppm)	PID/FID READING: BZ (ppm)
1		YEL BRN SAND TR SIL				
2		MOTTLED		NO WASTE		
3		↓		TO 3'		
4		GREY SAND & SILT		EXTENDED		
5				PIT TO THE		
6				NORTH ~10'		
7						
8						
9				@8' RARE		
10				BRICK+WOOD		
11				ENCOUNTER		
12		WALL COLLAPSED				
		"NEAR MISS"				

TEST PIT CROSS SECTION AND / OR PLAN VIEW

BEGIN DIGGING @ 1205
RAIN NO PID READINGS
COMPLETE DIGGING
@ 1220 BEGIN TO BACKFILL
COMPLETED BACKFILLING
@ 1240



REMARKS:

PHOTO LOG: #18

TEST PIT LOG

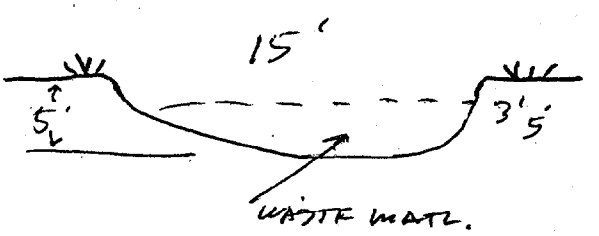
Tetra Tech NUS, Inc.

PROJECT NAME: SITES 12,41,42 PRE-FS
TEST PIT No.: S12TP011
PROJECT NUMBER: 7129
DATE: 9-15-99
LOCATION: INDIAN HEAD NSWC
GEOLOGIST: FRED W. RAMSER

Depth (Ft.)	Lithology Change (Depth/Ft.)	MATERIAL DESCRIPTION: Soil/Waste Characteristics (lithology, density, color, etc.)	USCS	Remarks	PID/FID READING: Source (ppm)	PID/FID READING: BZ (ppm)
1		DK BRN SAND, TR GRA.	SP	MOIST		
2						
3		BLK STAINED SOILS SAND	SP	MOIST		
4		W/ ABUNDANT WASTE		ODORIFFEROUS		
5		CHARRED WOOD, METAL				
		PLASTIC		RAINY		
				NO PID		
				MEASUREMENTS.		
		TD @ 5'				

TEST PIT CROSS SECTION AND / OR PLAN VIEW

BEGIN DIGGING @ 1242
FINNISH DIGGING/BACKFILL/300



REMARKS: #17

PHOTO LOG: #17

Tetra Tech NUS, Inc.

TEST PIT LOG

PROJECT NAME: SITES 12,41,42 PRE-FS
PROJECT NUMBER: 7129
LOCATION: INDIAN HEAD NSWC
TEST PIT No.: S12TP13
DATE: 9-15-99
GEOLOGIST: FRED W. RAMSER

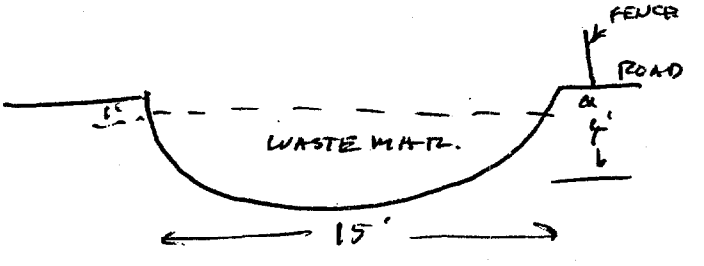
Depth (Ft.)	Lithology Change (Depth/Ft.)	MATERIAL DESCRIPTION: Soil/Waste Characteristics (lithology, density, color, etc.)	USCS	Remarks	PID/FID READING: Source (ppm)	PID/FID READING: BZ (ppm)
1	TOP	YEL ORG SAND, BLK STAIN				
2		SOILS W/ TAR SHINGLES		RAIN		
3		TERRA-COTTA, METAL		NO PID		
4		DEBRIS, CONCRETE FRAG		USED		
	TD=4	WOOD (CHARRED)				
		"WASTE ENCOUNTERED"				
		AT ~~FROM~~ 1'-~~2'~~ BGS. TO				
		THE BOTTOM				

TEST PIT CROSS SECTION AND / OR PLAN VIEW

START 1430

FINISH 1500

NOTE: MOVE PIT TO THE SOUTH EAST ~20' TO AVOID TELEPHONE POLE.



REMARKS:

PHOTO LOG: #16

Tetra Tech NUS, Inc.

TEST PIT LOG

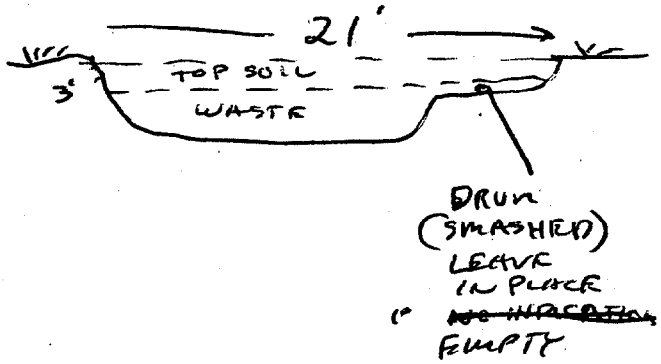
Page ___ of ___

PROJECT NAME: SITES 12,41,42 PRE-FS
PROJECT NUMBER: 7129
LOCATION: INDIAN HEAD NSWC
TEST PIT No.: S12TP14
DATE: 9-15-99
GEOLOGIST: FRED W. RAMSER

Depth (Ft.)	Lithology Change (Depth/Ft.)	MATERIAL DESCRIPTION: Soil/Waste Characteristics (lithology, density, color, etc.)	USCS	Remarks	PID/FID READING: Source (ppm)	PID/FID READING: BZ (ppm)
1		TOP SOIL ~TD-1.5'	SP			
2		WASTE MATL: SAND, WOOD		RAIN		
3		CHARRED WOOD, METAL		NO PID		
				MEASUREMENTS		
		TD @ 3'				

TEST PIT CROSS SECTION AND / OR PLAN VIEW

START 1505
FINISH 1520



REMARKS:

PHOTO LOG: #15

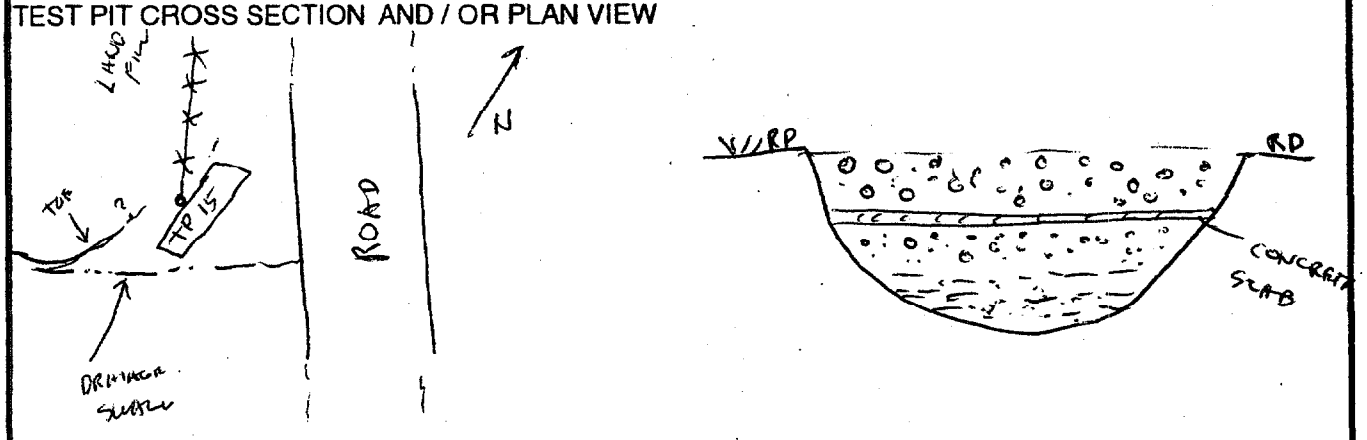
TEST PIT LOG

Tetra Tech NUS, Inc.

PROJECT NAME: SITES 12,41,42 PRE-FS TEST PIT No.: B12TP15
PROJECT NUMBER: 7129 DATE: 9-17-99
LOCATION: INDIAN HEAD NSWC GEOLOGIST: FRED W. RAMSER

Depth (Ft.)	Lithology Change (Depth/Ft.)	MATERIAL DESCRIPTION: Soil/Waste Characteristics (lithology, density, color, etc.)	USCS	Remarks	PID/FID READING: Source (ppm)	PID/FID READING: BZ (ppm)
1		BRN SAND + GRAVEL	GM			
2		ORG				
3				NO PID		
4		CONCRETE CURB? LENGTH OF		MEASUD		
5		TEST PIT ON THE ROAD SIDE	GM			
6		MAYBE RELIC ROAD SURFACE	SP			
7						
8		YEL BRN. SILT + SAND INC SILT				
9		MOTTLED GREY				
10			SP/SM			
		NO WASTE				

TEST PIT CROSS SECTION AND / OR PLAN VIEW



REMARKS:

PHOTO LOG: #11 + #10

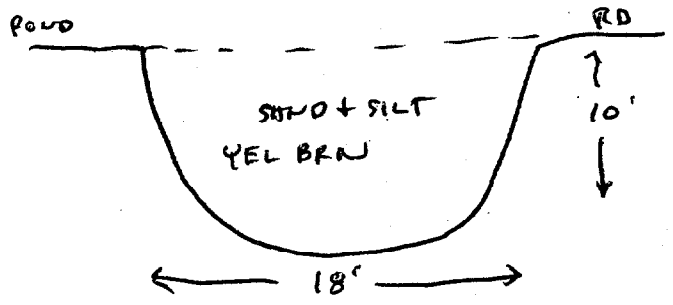
Tetra Tech NUS, Inc.

TEST PIT LOG

PROJECT NAME: SITES 12,41,42 PRE-FS
PROJECT NUMBER: 7129
LOCATION: INDIAN HEAD NSWC
TEST PIT No.: S12TP16
DATE: 9-15-99
GEOLOGIST: FRED W. RAMSER

Depth (Ft.)	Lithology Change (Depth/Ft.)	MATERIAL DESCRIPTION: Soil/Waste Characteristics (lithology, density, color, etc.)	USCS	Remarks	PID/FID READING: Source (ppm)	PID/FID READING: BZ (ppm)
1		SAND TR SILT				
2		YEL BRN TO GREY	SP	HARD RAIN		
3				NO PID		
4				READINGS		
5						
6						
7						
8						
9						
10			SP			
		"NO WASTE"				

TEST PIT CROSS SECTION AND / OR PLAN VIEW



REMARKS:

PHOTO LOG: #13

TEST PIT LOG

Tetra Tech NUS, Inc.

Page ___ of ___

PROJECT NAME: SITES 12,41,42 PRE-FS
PROJECT NUMBER: 7129
LOCATION: INDIAN HEAD NSWC

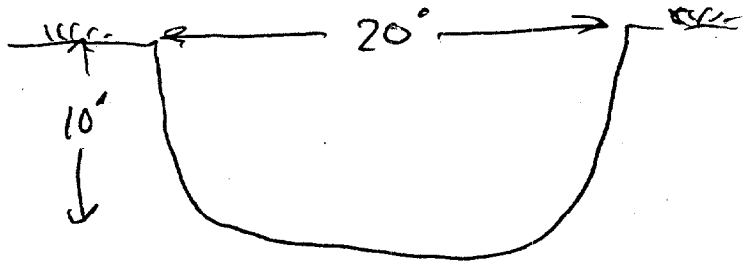
TEST PIT No.: S12 TP~~02~~ 17 FWR 4-14-99
DATE: 9
GEOLOGIST: FRED W. RAMSER

Depth (Ft.)	Lithology Change (Depth/Ft.)	MATERIAL DESCRIPTION: Soil/Waste Characteristics (lithology, density, color, etc.)	USCS	Remarks	PID/FID READING: Source (ppm)	PID/FID READING: BZ (ppm)
1		YEL BRN SAND + GRA. TR SILT	GP			
2		MOTTLED GREY Δ INC DOWN	SP	DRY	0	0
3		WARD. ORG BRN LAYERING.				
4		APPEARS NATURAL.				
5		SILT CONTENT INC DOWNWARD				
6		TR CLAY				
7						
8		BECOMING MOIST @ 8' BGS	SM	MOIST	0	0
		NO H_2O ENCOUNTERED				

TEST PIT CROSS SECTION AND / OR PLAN VIEW

START 1330 FINNISH DIGGING @ 1343 BEGIN TO BACK FILL

NO WASTE!!



FINNISH PIT @ 1400

REMARKS:

PHOTO LOG: #26 LOOKING TO THE NORTH (ROAD)

Tetra Tech NUS, Inc.

TEST PIT LOG

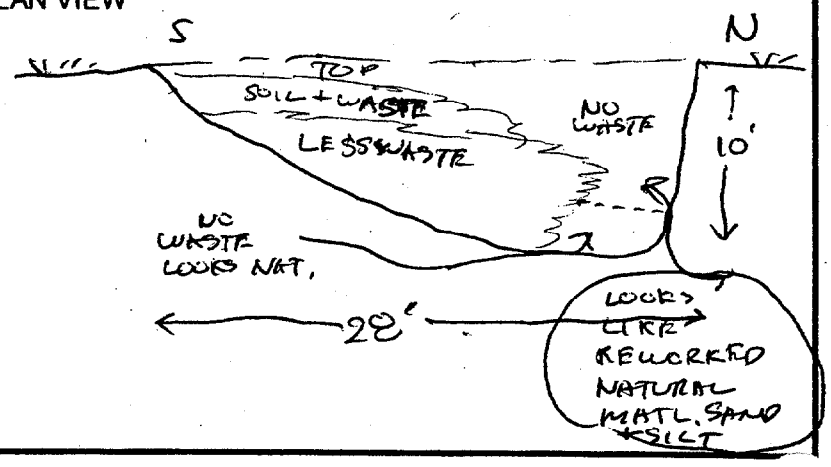
Page ___ of ___

PROJECT NAME: SITES 12,41,42 PRE-FS
PROJECT NUMBER: 7129
LOCATION: INDIAN HEAD NSWC
TEST PIT No.: S12TP018
DATE: 9-14-99
GEOLOGIST: FRED W. RAMSER

Depth (Ft.)	Lithology Change (Depth/Ft.)	MATERIAL DESCRIPTION: Soil/Waste Characteristics (lithology, density, color, etc.)	USCS	Remarks	PID/FID READING: Source (ppm)	PID/FID READING: BZ (ppm)
1		YEL BRN SAND WOOD FRAGS PLASTIC		CONCRETE		
2		WIRE, BOTTLES DOMESTIC WASTE		TRACE WASTE		
3		MIXED WELL IN SOIL MATRIX		CUT WOOD		
4		DARK BRN SAND + GRA, RARE		LOGS		
5		WASTE EXTENDED PIT TO THE				
		NORTH, WASTE VERY SPARSE		MOIST		
		SEEMS TO DIMINISHED TO THE		GREY DKGREY		
		NORTH				

TEST PIT CROSS SECTION AND / OR PLAN VIEW

START 1405
BEGIN TO BACKFILL @ 1425



REMARKS:

PHOTO LOG: #25 + #24 LOOKING NORTH + WAST PILE IN SOUTH PART.

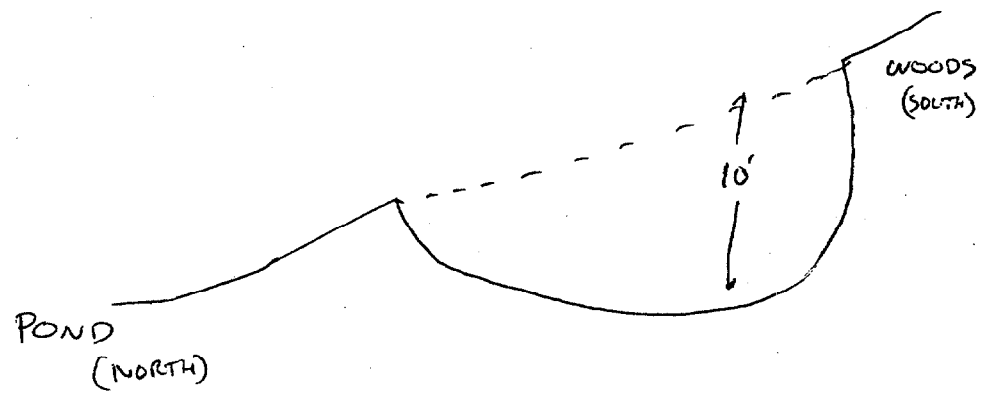
Tetra Tech NUS, Inc.

TEST PIT LOG

PROJECT NAME: SITES 12,41,42 PRE-FS TEST PIT No.: S12 TP19
PROJECT NUMBER: 7129 DATE: 9-15-99
LOCATION: INDIAN HEAD NSWC GEOLOGIST: FRED W. RAMSER

Depth (Ft.)	Lithology Change (Depth/Ft.)	MATERIAL DESCRIPTION: Soil/Waste Characteristics (lithology, density, color, etc.)	USCS	Remarks	PID/FID READING: Source (ppm)	PID/FID READING: BZ (ppm)
1			SM/SC			
2		YEL BRN SAND+SILT+CLAY				
3		GRADING DOWNWARD TO				
4		GREY SILT+CLAY				
5		LESSER AMOUNT OF	CL			
6		SAND				
7						
8						
9			CL			
10						

TEST PIT CROSS SECTION AND / OR PLAN VIEW



REMARKS:

PHOTO LOG: #12

APPENDIX D

PRE-FEASIBILITY STUDY CHAIN OF CUSTODY FORMS

Chain of Custody Record

Quanterra, Inc. - Pittsburgh PA Lab
460 William Pitt Way
Pittsburgh PA 15238

Quanterra

1 of 2

QUA-4124

Client: IT NUS	Project Manager: GEORGE LATULIPPE	Date: 9-29-99	Chain Of Custody Number: 63751
Address: 661 ANDERSEN DR	Telephone Number (Area Code)/Fax Number: 412-921-8684	Lab Number	Page ____ of ____
City: PITTSBURGH State: PA Zip Code: 15220	Site Contact: FRED WRAMSER		
Project Name: IH NSWC	Carrier/Waybill Number: FED Ex 811218749055		
Contract/Purchase Order/Quote No.: CTO 245 7129			

Analysis

Sample I.D. No. and Description	Date	Time	Sample Type	Total Volume	Containers Type	Containers No.	Preservative	Condition on Receipt	SILVER	TAL METALS	TOC	Exp + US	Arsenic GFAA	TCL PCB						
42D0030006	9-29-99	0750	SO	4oz	4oz	1	4°C		✓											
42D0030106		0759							✓											
42D0010001		0802							✓											
42DUP006		0000							✓				42D0010007							
42DDUP005		0000							✓				42D0020006							
42D0010101		0804							✓											
42D0020006		0810		8	4oz	2	4°C			✓	✓				RUN MS/MSD					
42D0020106		0815		4	4oz	1			✓											
42D0270006		0930		16oz	4oz	4	4°C			✓	✓	✓	✓	✓						
$41SS0010006	9-29-99	1140		8oz	4oz	2	4°						✓	✓						
$41SS0010106		1145		8oz		1							✓	✓						
$41SSDUP001		0000		8oz									✓	✓	$41SS0010006					
$41SS0020006		1200		8oz									✓	✓						
$41SS0030006		1205		8oz									✓	✓						
$41SS0030106		1210		8oz									✓	✓						
$41SS0040006		1215	SO	8oz	4oz	2	4°C						✓	✓						

Special Instructions

Possible Hazard Identification: ☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal: ☐ Return To Client ☒ Disposal By Lab ☐ Archive For ____ Months

Turn Around Time Required: ☒ Normal ☐ Rush

QC Level: ☐ I. ☐ II. ☐ III.

Project Specific (Specify)

	Date	Time		Date	Time
1. Relinquished By: [signature]	9-29-99	1900	1. Received By: FEDEX		
2. Relinquished By			2. Received By		
3. Relinquished By			3. Received By		

Comments

Chain of Custody Record

Quanterra, Inc. - Pittsburgh PA Lab
450 William Pitt Way
Pittsburgh PA 15238

Quanterra

2 OF 2

QUA-4124

Client	Project Manager	Date	Chain Of Custody Number
TtNUS	GEORGE LATUIPPA	9-29-99	64015
Address: 661 ANDERSEN DR	Telephone Number (Area Code)/Fax Number: 412 921 8684	Lab Number	Page ____ of ____
City: PITTSBURGH, State: PA, Zip Code: 15220	Site Contact: FRED WRAMSER		
Project Name: IH NSWC	Carrier/Waybill Number: FED Ex 811218149055		
Contract/Purchase Order/Quote No.: CTO 245 JOB# 7129			

Sample I.D. No. and Description	Date	Time	Sample Type	Total Volume	Containers Type	Containers No.	Preservative	Condition on Receipt	Analysis: Pb, Cd, Fe, Pb	Analysis: TCL PCBs	Analysis: TAL METALS	Analysis: TCL PCBs/PDC
$41SS0040106	9-29-99	1220	SO		4oz				✓	✓		
$41SS0050006		1230			4oz				✓	✓		
$41SS0060006		1235			4oz				✓	✓		
$41SS0060106		1240			4oz				✓	✓		
$41SS0070006		1245							✓	✓		
$41SS0070106		1249							✓	✓		
$41SS0080006		1500							✓	✓		
$41SSUP002		0000							✓	✓		$41SS0080006
$41SS0090006		1515							✓	✓		
$41SS0090106		1520							✓	✓		
$41SS0100006		1535							✓	✓		
$41SS0100106	9-29-99	1545							✓	✓		
$42RB0004 0001	9-29-99	0900									✓	✓

Special Instructions

Possible Hazard Identification: [X] Non-Hazard [ ] Flammable [ ] Skin Irritant [ ] Poison B [ ] Unknown

Sample Disposal: [ ] Return To Client [X] Disposal By Lab [ ] Archive For ____ Months

Turn Around Time Required: [X] Normal [ ] Rush

QC Level: [ ] I. [ ] II. [ ] III.

Project Specific (Specify)

1. Relinquished By	Date	Time	1. Received By	Date	Time
Fred W Ramser	9-29-99	1900	FED Ex		
2. Relinquished By	Date	Time	2. Received By	Date	Time
3. Relinquished By	Date	Time	3. Received By	Date	Time

Comments

Chain of Custody Record

Quanterra, Inc. - Pittsburgh PA Lab
450 William Pitt Way
Pittsburgh PA 15238

Quanterra

QUA-4124

Client: TENUS	Project Manager: GEORGE LATULIPPE	Date: 9-30-99	Chain Of Custody Number: 63752
Address: 661 ANDERSEN DR FOSTER	Telephone Number (Area Code)/Fax Number: 412 921 8486	Lab Number:	Page 1 of 2
City: PITTSBURGH State: PA Zip Code: 15220	Site Contact: FRED W. RAMSER		
Project Name: I H NSWC	Carrier/Waybill Number:		
Contract/Purchase Order/Quote No.: CTO 245 JOB # 7129			

Sample I.D. No. and Description	Date	Time	Sample Type	Total Volume	Containers Type	Containers No.	Preservative	Condition on Receipt	Arsenic, Cd, Fe, Pb	TCL PCBs	
$41RB0050001	9-30-99	0800	AQ	2L	1L/1L Pk	2	HNO3/4°C		✓	✓	
$41SS0110006		0930	S	8oz	4oz	2	4°C		✓	✓	
$41SSDUP003		0000	S	8oz					✓	✓	$41SS0110006
$41SS0110106		0939	S						✓	✓	
$41SS0120006		0950							✓	✓	
$41SS0120106		0959							✓	✓	
$41SS0130006		1005							✓	✓	
$41SS0130106		1010							✓	✓	
$41SS0140006		1120							✓	✓	
$41SS0140106		1130							✓	✓	
$41SS0150006		1140							✓	✓	
$41SS0150106		1148							✓	✓	
$41SS0160006		1330							✓	✓	
$41SS0190006		1337							✓	✓	
$41SSDUP004		0000							✓	✓	$41SS0190006
$41SS0190106		1345							✓	✓	

Special Instructions

Possible Hazard Identification: [X] Non-Hazard [ ] Flammable [ ] Skin Irritant [ ] Poison B [ ] Unknown

Sample Disposal: [ ] Return To Client [X] Disposal By Lab [ ] Archive For _____ Months

Turn Around Time Required: [ ] Normal [ ] Rush

QC Level: [ ] I. [ ] II. [ ] III.

Project Specific (Specify):

	Date	Time		Date	Time
1. Relinquished By: Fred W. Ramser	9-30-99	1900	1. Received By		
2. Relinquished By			2. Received By		
3. Relinquished By			3. Received By		

Comments

DISTRIBUTION: WHITE - Stays with Sample; CANARY - Returned to Client with Report; PINK - Field Copy

Chain of Custody Record

Quanterra, Inc. - Pittsburgh PA Lab
450 William Pitt Way
Pittsburgh PA 15238

Quanterra

QUA-4124

Client: TENUS	Project Manager: GEORGE LATULLIPPE	Date: 9-30-99	Chain Of Custody Number: 64014
Address: 661 ANDERSEN DR FOSTER	Telephone Number (Area Code)/Fax Number: 412 921 8486	Lab Number:	Page 2 of 2
City: PITTSBURGH State: PA Zip Code: 15220	Site Contact: FRED W. RAMSER		
Project Name: IH NSWC	Carrier/Waybill Number: FEDEX 2383807716		
Contract/Purchase Order/Quote No.: CTO 245 JOB# 7129			

Sample I.D. No. and Description	Date	Time	Sample Type	Total Volume	Containers Type	Containers No.	Preservative	Condition on Receipt	Analysis: Arsenic, Cd, Fe, Pb	Analysis: TCL PCBs	Analysis:	Analysis:	Analysis:	Analysis:	Analysis:	Analysis:	Analysis:	Analysis:	Analysis:
$41$$0200006	9-30-99	1347	SO	8oz	4oz	2	4°C		✓	✓									
$41$$0170006		1400							✓	✓									
$41$$0170106		1407							✓	✓									
$41$$0180006		1415							✓	✓									
$41$$0180106		1425							✓	✓									
$41$$0210006		1440							✓	✓									
$41$$0290006		1450		16		4			✓	✓	(RUN MS/MSD)								
$41$$0240106		1455							✓	✓									
$41$$0250006		1505							✓	✓									
$41$$0230006		1530		16		4			✓	✓	(RUN MS/MSD)								
$41$$0230106		1537							✓	✓									
$41$$0220006	9-30-99	1545	SO	8oz	4oz	2	4°C		✓	✓									
$41$$0220106	9-30-99	1555	SO	8oz	4oz	2	4°C		✓	✓	OMITTED FROM ORIGINAL COFC LAB RECEIVED PER								

Special Instructions

Possible Hazard Identification: ☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal: ☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Turn Around Time Required: ☐ Normal ☐ Rush

QC Level: ☐ I. ☐ II. ☐ III.

Project Specific (Specify)

	Date	Time		Date	Time
1. Relinquished By: Fred W Ramser	9-30-99	1700	1. Received By		
2. Relinquished By			2. Received By		
3. Relinquished By			3. Received By		

Comments

DISTRIBUTION: WHITE - Stays with Sample; CANARY - Returned to Client with Report; PINK - Field Copy

Chain of Custody Record

Quanterra, Inc. - Pittsburgh PA Lab
450 William Pitt Way
Pittsburgh PA 15238

Quanterra

QUA-4124

Client: TtNUS	Project Manager: GEORGE LATILLIPPE	Date: 10-1-99	Chain Of Custody Number: 63812
Address: 661 ANDERSEN DR FOSTER PL #7	Telephone Number (Area Code)/Fax Number: 412 921 8486	Lab Number:	Page 1 of 2
City: PITTSBURGH; State: PA; Zip Code: 15220	Site Contact: FRED W. RAMSER		
Project Name: TH NSWC	Carrier/Waybill Number: FED EX 811218149033		
Contract/Purchase Order/Quote No.: CT0245 7129			

Sample I.D. No. and Description	Date	Time	Sample Type	Total Volume	Containers Type	Containers No.	Preservative	Condition on Receipt	Analysis: Arsenic, Cd, Fe, Pb	Analysis: TCL PCB's	
$41$$0260006	10-1-99	0805	SO	8oz	4oz	2	4°C		✓	✓	
$41$$0320006		0810							✓	✓	
$41$$0310006		0812							✓	✓	
$41$$0300006		0815							✓	✓	
$41$$0300106		0820							✓	✓	
$41$$0270006		0840	SO	8oz					✓	✓	
$41$$0270106		0845							✓	✓	
$41$$0280006		0900							✓	✓	
$41$$DUP005		0000							✓	✓	$41$$0280006
$41$$0280106		0910							✓	✓	
$41$$0290006		0915							✓	✓	
$41$$0290106		0925							✓	✓	
$41$$0330006		1000							✓	✓	
$41$$0330106		1010							✓	✓	
$41$$0340006		1020							✓	✓	
$41$$DUP006	10-1-99	0000	SO	8oz	4oz	2	4°C		✓	✓	$41$$0340006

Special Instructions

Possible Hazard Identification: [X] Non-Hazard [ ] Flammable [ ] Skin Irritant [ ] Poison B [ ] Unknown

Sample Disposal: [ ] Return To Client [X] Disposal By Lab [ ] Archive For _____ Months

Turn Around Time Required: [X] Normal [ ] Rush

QC Level: [ ] I. [ ] II. [ ] III.

Project Specific (Specify):

	Date	Time		Date	Time
1. Relinquished By: Fred W Ramser	10-1-99	1800	1. Received By		
2. Relinquished By			2. Received By		
3. Relinquished By			3. Received By		

Comments

DISTRIBUTION: WHITE - Stays with Sample; CANARY - Returned to Client with Report; PINK - Field Copy

Chain of Custody Record

Quanterra, Inc. - Pittsburgh PA Lab
450 William Pitt Way
Pittsburgh PA 15238

Quanterra

QUA-4124

Client	Project Manager	Date	Chain Of Custody Number
TLNVS	GEORGE LAIULUPPE	10-1-99	63813
Address	**Telephone Number (Area Code)/Fax Number**	**Lab Number**	**Page 2 of 2**
661 ANDERSEN DR FOSTER PL#7	412 921-8486		
City / State / Zip Code	**Site Contact**		
PITTSBURGH / PA / 15220	FRED W. RAMSER		
Project Name	**Carrier/Waybill Number**		
IH NSWC	FEDEX 8112 18149033		
Contract/Purchase Order/Quote No.			
C10 245 7129			

Sample I.D. No. and Description	Date	Time	Sample Type	Total Volume	Containers Type	Containers No.	Preservative	Condition on Receipt	Analysis: Arsenic/Lead/Pb	Analysis: TCL PCBs	
$41RB0060001	10-1-99	0730	AQ	2 l	PE / AMB		HNO3 / 4°C		✓	✓	
$41SB0340106		1030	SO	8 oz	4 oz	2	4°C		✓	✓	
$41SB0350006		1035	SO	16 oz	8 oz	2	4°C		✓	✓	(RUN QA/QC MS/MSD)
$41SB0350106		1045							✓	✓	
$41SB0360006		1100							✓	✓	
$41SB0360106		1110							✓	✓	(RUN QA/QC MS/MSD)
$41SB0370006		1115							✓	✓	
$41SB0370106		1120							✓	✓	
$41SB0380006		1125							✓	✓	
$41SDUP007		0000							✓	✓	$41SS0380006
$41SB0380106		1130							✓	✓	
$41SB0390006		1135							✓	✓	
$41SB0390106		1137							✓	✓	
$41SB0400006		1145							✓	✓	
$41SB0400106	10-1-99	1150	SO	16 oz	8 oz	2	4°C		✓	✓	

Special Instructions

Possible Hazard Identification
☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Turn Around Time Required
☒ Normal ☐ Rush

QC Level
☐ I. ☐ II. ☐ III.

Project Specific (Specify)

	Date	Time		Date	Time
1. Relinquished By: Fred W Ramser	10-1-99	1800	1. Received By		
2. Relinquished By			2. Received By		
3. Relinquished By			3. Received By		

Comments

DISTRIBUTION: WHITE - Stays with Sample; CANARY - Returned to Client with Report; PINK - Field Copy

Chain of Custody Record

Quanterra, Inc. - Pittsburgh PA Lab
450 William Pitt Way
Pittsburgh PA 15238

Quanterra

QUA-4124

Client: TENUS	Project Manager: GEORGE LATULIPPE	Date: 9-16-99	Chain Of Custody Number: 64021
Address: 661 ANDERSEN DR.	Telephone Number (Area Code)/Fax Number: 412-921-6468	Lab Number:	Page ____ of ____
City: PGH / State: PA / Zip Code: 15220	Site Contact: FRED W. RAMSER		
Project Name: INDIAN HEAD JOB#7124 C70245	Carrier/Waybill Number: FEDEX AB# 2383807624		
Contract/Purchase Order/Quote No.			

Sample I.D. No. and Description	Date	Time	Sample Type	Total Volume	Containers Type	Containers No.	Preservative	Condition on Receipt	TAL METALS	BNAS	TOC	EXPLOSIVES
$12FB0010001	9-16-99	1500	AQ	5L	G+P	5	HNO_3 liq.		✓	✓	✓	✓
~~$12FB0020001~~	~~9-16-99~~	~~1515~~										
$12FB0020001	9-16-99	1515	AQ	5L	G+P	5	HNO_3 liq		✓	✓	✓	✓

Special Instructions

Possible Hazard Identification: [X] Non-Hazard [ ] Flammable [ ] Skin Irritant [ ] Poison B [ ] Unknown

Sample Disposal: [ ] Return To Client [ ] Disposal By Lab [ ] Archive For ____ Months

Turn Around Time Required: [X] Normal [ ] Rush

QC Level: [ ] I. [ ] II. [ ] III.

Project Specific (Specify)

	Date	Time		Date	Time
1. Relinquished By: Fred W Ramser			1. Received By		
2. Relinquished By			2. Received By		
3. Relinquished By			3. Received By		

Comments

DISTRIBUTION: WHITE - Stays with Sample; CANARY - Returned to Client with Report; PINK - Field Copy

Chain of Custody Record

Quanterra, Inc. - Pittsburgh PA Lab
450 William Pitt Way
Pittsburgh PA 15238

Quanterra

QUA-4124

Client: TETNUS	Project Manager: GEORGE LATULIPPE	Date: 9-20-99	Chain Of Custody Number: 64020
Address: 661 ANDERSEN DR POSTER #7	Telephone Number (Area Code)/Fax Number: 412-921-8684	Lab Number:	Page ____ of ____
City: PITTSBURGH; State: PA; Zip Code: 15220	Site Contact: FRED W. RAMSER		
Project Name: INDIAN HEAD NSWC	Carrier/Waybill Number: FED Ex AB# 811218148942		
Contract/Purchase Order/Quote No.: 7129 CTO 245			

Sample I.D. No. and Description	Date	Time	Sample Type	Total Volume	Containers Type	Containers No.	Preservative	Condition on Receipt	TAL MET.	TOC	EXP EXPLOS	SILVER	BNAs	TCL PCB						
42D0180106	9-19-99	1010	S	4oz	4oz	1	4°C					✓								
42D0170006		1545	S			1						✓								
42D0170106		1550	S			1						✓								
42D0160006		1600	S			1						✓								
42D0160106		1605	S			1						✓								
42DDUP002		0000	S			1						✓			42D0160106					
42D0130006		1610	S			1						✓								
42D0130106		1615	S			1						✓								
42D0140006		1625	S	2	4oz	3				✓		✓	✓							
42DDUP003		0000	S	4oz	4oz	1							✓		42D0140006					
42D0140106	9-19-99	1630	S	4oz	4oz	1	4°C					✓								
$12FB002000 1	9-20-99	1100	AQ	1l	1l	1	4°C							✓						
$12FB0010001	9-20-99	1115	AQ	1l	1l	1	4°C							✓						
~~$57SWRB0010002~~	~~9-20-99~~																			

Special Instructions

Possible Hazard Identification: [X] Non-Hazard [ ] Flammable [ ] Skin Irritant [ ] Poison B [ ] Unknown

Sample Disposal: [ ] Return To Client [X] Disposal By Lab [ ] Archive For ____ Months

Turn Around Time Required: [X] Normal [ ] Rush

QC Level: [ ] I. [ ] II. [ ] III.

Project Specific (Specify):

	Date	Time		Date	Time
1. Relinquished By: Fred M Ramser	9-20-99	1830	1. Received By: FED Ex		
2. Relinquished By			2. Received By		
3. Relinquished By			3. Received By		

Comments

DISTRIBUTION: WHITE - Stays with Sample; CANARY - Returned to Client with Report; PINK - Field Copy

APPENDIX E

PRE-FEASIBILITY STUDY SAMPLE LOG SHEETS

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: SITES 12, 41, 42 PRE-FS
Project No.: 7129, INDIAN HEAD NSWC

Sample ID No.: $41SS0010006
Sample Location: $41$$01
Sampled By: PJL
C.O.C. No.: 63751

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment
[ ] Other:
[ ] QA Sample Type:

Type of Sample:
[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

Date: 9-29-99	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 1140	0"-6"	YEL BRN	SILT + SAND TR CLAY
Method: S.S. TROWEL			
Monitor Reading (ppm): —			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
ARSENIC	4oz x 1	✓	
CADMIUM			
LEAD, IRON			
TCL PCBs	4oz x 1	✓	
SILVER			
TOX TEST			
TAL METALS			
TOC			
GRAIN SIZE			
EXPLOSIVES, NC, NU, NG			

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	$41$$DUP001

Signature(s): Fred W Ramser

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: SITES 12, 41, 42 PRE-FS
Project No.: 7129, INDIAN HEAD NSWC

Sample ID No.: S41SS0010106
Sample Location: S41SS001
Sampled By: PUR
C.O.C. No.: 63751

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 9-29-99 Time: 1145 Method: S.S. TROWEL/AUGER Monitor Reading (ppm):	12"-18"	DK BRN	SILT + SAND DRY

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
ARSENIC			
CADMIUM	4oz x 1	✓	
LEAD, IRON			
TCL PCBS	4oz x 1	✓	
SILVER			
TOX TEST			
TAL METALS			
TOC			
GRAIN SIZE			
EXPLOSIVES, NC, NU, NG			

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Fred M Ramsr

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: SITES 12, 41, 42 PRE-FS
Project No.: 7129, INDIAN HEAD NSWC

Sample ID No.: S41SS0020006
Sample Location: S41SS002
Sampled By: PJK
C.O.C. No.: 63751

- [X] Surface Soil
- [ ] Subsurface Soil
- [ ] Sediment
- [ ] Other:
- [ ] QA Sample Type:

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 9-29-99 Time: 1200 Method: S.S. TROWEL Monitor Reading (ppm): —	0"-6"	YEL BRN	SAND + GRA MOIST

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
ARSENIC	4oz x 1	✓	
CADMIUM			
LEAD, IRON			
TCL PCBS	4oz x 1	✓	
SILVER			
TOX TEST			
TAL METALS			
TOC			
GRAIN SIZE			
EXPLOSIVES, NC, NU, NG			

OBSERVATIONS / NOTES:

COLLECTED OF SURFACE COVER OVER CONCRETE 3"-4" THICK

MAP:

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): Fred W Ramser

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: SITES 12, 41, 42 PRE-FS
Project No.: 7129, INDIAN HEAD NSWC

Sample ID No.: $41SS0030006
Sample Location: $41SS003
Sampled By: PLR
C.O.C. No.: 63751

[X] Surface Soil
[] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 9-29-99 Time: 1205 Method: S.S. TROWEL Monitor Reading (ppm): —	0"-6"	BRN	SAND + GRA MOIST

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
ARSENIC			
CADMIUM	4oz x 1	✓	
LEAD, IRON			
TCL PCBs	4oz x 1	✓	
SILVER			
TOX TEST			
TAL METALS			
TOC			
GRAIN SIZE			
EXPLOSIVES, NC, NU, NG			

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): Fred W Ramser

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: SITES 12, 41, 42 PRE-FS
Project No.: 7129, INDIAN HEAD NSWC

Sample ID No.: S41SS0030106
Sample Location: S41SS003
Sampled By: PWR
C.O.C. No.: 63751

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 9-29-99 Time: 1210 Method: S.S. TROWEL/AUGER Monitor Reading (ppm):	12" - 18"	BLK DK BRN	SAND + GRA + SILT WET

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
ARSENIC	4oz x 1	✓	
CADMIUM			
LEAD, IRON			
TCL PCBs	4oz x 1	✓	
SILVER			
TOX TEST			
TAL METALS			
TOC			
GRAIN SIZE			
EXPLOSIVES, NC, NU, NG			

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): Fred W Ramsey

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: SITES 12, 41, 42 PRE-FS
Project No.: 7129, INDIAN HEAD NSWC

Sample ID No.: S41SS0040006
Sample Location: S41SS004
Sampled By: PWR
C.O.C. No.: 63751

[X] Surface Soil
[] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 9-29-99 Time: 1215 Method: S.S. TROWEL Monitor Reading (ppm): —	0"-6"	DK BRN	SAND + SILT + CLAY

COMPOSITE SAMPLE DATA:

	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date:				
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
ARSENIC			
CADMIUM	4oz x 1	✓	
LEAD, IRON			
TCL PCBs	4oz x 1	✓	
SILVER			
TOX TEST			
TAL METALS			
TOC			
GRAIN SIZE			
EXPLOSIVES, NC, NU, NG			

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): Fred W Ramsier

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: SITES 12, 41, 42 PRE-FS
Project No.: 7129, INDIAN HEAD NSWC

Sample ID No.: S41SS004Q06
Sample Location: S41SS004
Sampled By: FWR
C.O.C. No.: 64015

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 9-29-99 Time: 1220 Method: SS, TROWEL/AUGER Monitor Reading (ppm):	12"-18"	BLK	SAND (FLY ASH) MOIST

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
ARSENIC	4oz x 1	✓	
CADMIUM			
LEAD, IRON			
TCL PCBS	4oz x 1	✓	
SILVER			
TOX TEST			
TAL METALS			
TOC			
GRAIN SIZE			
EXPLOSIVES, NC, NU, NG			

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Fred M Ramsey

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: SITES 12, 41, 42 PRE-FS
Project No.: 7129, INDIAN HEAD NSWC

Sample ID No.: S41SS005 0006
Sample Location: S41SS005
Sampled By: PLR
C.O.C. No.: 64015

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment
[ ] Other:
[ ] QA Sample Type:

Type of Sample:
[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 9-29-99 Time: ~~1220~~ 1230 Method: S.S. TROWEL Monitor Reading (ppm): —	0"-6" 3"	BLF DK. BRN	SAND + GRA.

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
ARSENIC	4oz x 1	✓	
CADMIUM			
LEAD, IRON			
TCL PCBs	4oz x 1	✓	
SILVER			
TOX TEST			
TAL METALS			
TOC			
GRAIN SIZE			
EXPLOSIVES, NC, NU, NG			

OBSERVATIONS / NOTES:

COLLECTED FROM
3"-4" SURFACE COVER OVER
CONCRETE

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Fred W Ramser

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: SITES 12, 41, 42 PRE-FS
Project No.: 7129, INDIAN HEAD NSWC

Sample ID No.: S41SS0060006
Sample Location: S41SS006
Sampled By: PLR
C.O.C. No.: 67015

[X] Surface Soil
[] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 9-29-99 Time: 1235 Method: S.S. TROWEL Monitor Reading (ppm): —	0"-6"	DK BRN YEL BRN	SAND + GRA. MOIST

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
ARSENIC	4oz x 1	✓	
CADMIUM			
LEAD, IRON			
TCL PCBS	4oz x 1	✓	
SILVER			
TOX TEST			
TAL METALS			
TOC			
GRAIN SIZE			
EXPLOSIVES, NC, NU, NG			

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Fred W Ramser

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: SITES 12, 41, 42 PRE-FS
Project No.: 7129, INDIAN HEAD NSWC

Sample ID No.: S41SS0060106
Sample Location: S41SS006
Sampled By: FUR
C.O.C. No.: 64015

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 9-29-99	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 1240			
Method: S.S. TROWEL/AUGER	12"-18"	DK BRN + BLK	SAND + GRA + SILT MOIST
Monitor Reading (ppm):			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
ARSENIC			
CADMIUM	4oz x 1	✓	
LEAD, IRON			
TCL PCBs	4oz x 1	✓	
SILVER			
TOX TEST			
TAL METALS			
TOC			
GRAIN SIZE			
EXPLOSIVES, NC, NU, NG			

OBSERVATIONS / NOTES:

MAP:

Circle If Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Fred U Ramsr

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: SITES 12, 41, 42 PRE-FS
Project No.: 7129, INDIAN HEAD NSWC

Sample ID No.: S41SS0070006
Sample Location: S41SS0
Sampled By: PJR
C.O.C. No.: 64015

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment
[ ] Other:
[ ] QA Sample Type:

Type of Sample:
[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 9-29-99 Time: 1245 Method: S.S. TROWEL Monitor Reading (ppm): —	0"-6"	DK BRN	SAND+SILT MOIST

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
ARSENIC	4oz x 1	✓	
CADMIUM			
LEAD, IRON			
TCL PCBS	4oz x 1	✓	
SILVER			
TOX TEST			
TAL METALS			
TOC			
GRAIN SIZE			
EXPLOSIVES, NC, NU, NG			

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): Fred W Ramser

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: SITES 12, 41, 42 PRE-FS
Project No.: 7129, INDIAN HEAD NSWC

Sample ID No.: S41SS0070106
Sample Location: S41SS007
Sampled By: PUR
C.O.C. No.: 64015

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 9-29-99 Time: 1249 Method: S.S. TROWEL/AUGER Monitor Reading (ppm):	12" - 18"	DK BRN + BLK	SAND (FLYASH) & SILT WET

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
ARSENIC			
CADMIUM	4oz x 1	✓	
LEAD, IRON			
TCL PCBs	4oz x 1	✓	
SILVER			
TOX TEST			
TAL METALS			
TOC			
GRAIN SIZE			
EXPLOSIVES, NC, NU, NG			

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD ___

Duplicate ID No.: ___

Signature(s): Fred M Ramsey

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: SITES 12, 41, 42 PRE-FS
Project No.: 7129, INDIAN HEAD NSWC

Sample ID No.: $41SS0080006
Sample Location: $41SS008
Sampled By: PLR
C.O.C. No.: 64015

- [X] Surface Soil
- [ ] Subsurface Soil
- [ ] Sediment
- [ ] Other:
- [ ] QA Sample Type:

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 9-29-99			
Time: 1500	0"-~~6"~~ FR 3"	BLK BRN	SAND+GRA MOIST TO WET
Method: S.S. TROWEL			
Monitor Reading (ppm): —			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
ARSENIC			
CADMIUM	4oz x 1	✓	
LEAD, IRON			
TCL PCBs	4oz x 1	✓	
SILVER			
TOX TEST			
TAL METALS			
TOC			
GRAIN SIZE			
EXPLOSIVES, NC, NU, NG			

OBSERVATIONS / NOTES:

COLLECTED FROM SURFACE
COVER OVER CONCRETE ~3-4" THICK

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	$41SSDUP002

Signature(s): Fred W Ramser

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: SITES 12, 41, 42 PRE-FS
Project No.: 7129, INDIAN HEAD NSWC

Sample ID No.: $41SS0090006
Sample Location: $41SS009
Sampled By: PLR
C.O.C. No.: 64015

[X] Surface Soil
[] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 9-29-99 Time: 1515 Method: S.S. TROWEL Monitor Reading (ppm): —	0"-6"	DK BRN	SAND + SILT TR GRA

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
ARSENIC			
CADMIUM	4oz x 1	✓	
LEAD, IRON			
TCL PCBs	4oz x 1	✓	
SILVER			
TOX TEST			
TAL METALS			
TOC			
GRAIN SIZE			
EXPLOSIVES, NC, NU, NG			

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Fred M Ramser

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: SITES 12, 41, 42 PRE-FS
Project No.: 7129, INDIAN HEAD NSWC

Sample ID No.: S41SS0090106
Sample Location: S41SS009
Sampled By: PWR
C.O.C. No.: 64015

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 9-29-99 Time: 1520 Method: SS, TROWEL/AUGER Monitor Reading (ppm):	12"-18"	DK BRN	SILT + SAND MOIST TO WET

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
ARSENIC	4oz x 1	✓	
CADMIUM			
LEAD, IRON			
TCL PCBs	4oz x 1	✓	
SILVER			
TOX TEST			
TAL METALS			
TOC			
GRAIN SIZE			
EXPLOSIVES, NC, NU, NG			

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD –

Duplicate ID No.: –

Signature(s): Fred M Ramer

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: SITES 12, 41, 42 PRE-FS
Project No.: 7129, INDIAN HEAD NSWC

Sample ID No.: S41SS0100006
Sample Location: S41SS010
Sampled By: PJL
C.O.C. No.: 64015

[X] Surface Soil
[] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 9-29-99 Time: 1535 Method: S.S. TROWEL Monitor Reading (ppm): —	0"-6"	YEL BRN	SAND+SILT +GRA. MOIST

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
ARSENIC	4oz x 1	✓	
CADMIUM			
LEAD, IRON			
TCL PCBs	4oz x 1	✓	
SILVER			
TOX TEST			
TAL METALS			
TOC			
GRAIN SIZE			
EXPLOSIVES, NC, NU, NG			

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Fred W Ramser

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: SITES 12, 41, 42 PRE-FS
Project No.: 7129, INDIAN HEAD NSWC

Sample ID No.: S41SS0100106
Sample Location: S41SS010
Sampled By: PUR
C.O.C. No.: 64015

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 9-29-99 Time: 1545 Method: S.S. TROWEL/AUGER Monitor Reading (ppm):	12"-18"	DK BRN BLK	SAND + GRAVEL

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
ARSENIC	4oz x 1	✓	
CADMIUM			
LEAD, IRON			
TCL PCBs	4oz x 1	✓	
SILVER			
TOX TEST			
TAL METALS			
TOC			
GRAIN SIZE			
EXPLOSIVES, NC, NU, NG			

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): Fred M Ramsr

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: SITES 12, 41, 42 PRE-FS
Project No.: 7129, INDIAN HEAD NSWC

Sample ID No.: $41SS011 0006
Sample Location: $41SS011
Sampled By: PJR
C.O.C. No.: 63752

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment
[ ] Other:
[ ] QA Sample Type:

Type of Sample:
[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 9-30-99 Time: 0930 Method: S.S. TROWEL Monitor Reading (ppm): —	0"-6"	YEL BRN	SAND+SILT+GRA. MOIST

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
ARSENIC	4oz x 1	✓	
CADMIUM			
LEAD, IRON			
TCL PCBs	4oz x 1	✓	
SILVER			
TOX TEST			
TAL METALS			
TOC			
GRAIN SIZE			
EXPLOSIVES, NC, NU, NG			

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD —

Duplicate ID No.: $41SSDUP003
~~$41SS011000~~

Signature(s): Fred W Ramser

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: SITES 12, 41, 42 PRE-FS
Project No.: 7129, INDIAN HEAD NSWC

Sample ID No.: S41SS0110106
Sample Location: S41SS011
Sampled By: FUR
C.O.C. No.: 63752

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 9-30-99	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 0939 Method: S.S. TROWEL/AUGER Monitor Reading (ppm):	12" - 18"	BRN, DK BRN, TO BLK	SAND + GRAVEL

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
ARSENIC			
CADMIUM	4oz x 1	✓	
LEAD, IRON			
TCL PCBs	4oz x 1	✓	
SILVER			
TOX TEST			
TAL METALS			
TOC			
GRAIN SIZE			
EXPLOSIVES, NC, NU, NG			

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Fred U Ramer

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: SITES 12, 41, 42 PRE-FS
Project No.: 7129, INDIAN HEAD NSWC

Sample ID No.: S41SS012 0006
Sample Location: S41SS012
Sampled By: PLR
C.O.C. No.: 63752

[X] Surface Soil
[] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 9-30-99 Time: 0950 Method: S.S. TROWEL Monitor Reading (ppm): —	0"-6"	BLK	SAND + GRAVEL

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
ARSENIC	4oz x 1	✓	
CADMIUM			
LEAD, IRON			
TCL PCBs	4oz x 1	✓	
SILVER			
TOX TEST			
TAL METALS			
TOC			
GRAIN SIZE			
EXPLOSIVES, NC, NU, NG			

OBSERVATIONS / NOTES:

COLLECTED AT AREA W/ SURFACE COVER ~15"-16" THICK.

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Fred W Ramser

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: SITES 12, 41, 42 PRE-FS
Project No.: 7129, INDIAN HEAD NSWC

Sample ID No.: S41SS0120106
Sample Location: S41SS012
Sampled By: PUR
C.O.C. No.: 63752

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 9-30-99 Time: 0959 Method: S.S, TROWEL/AUGER Monitor Reading (ppm):	12" - ~~18"~~ 15"	BLK + DK BRN	SAND + GRAVEL

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
ARSENIC	4oz x 1	✓	
CADMIUM			
LEAD, IRON			
TCL PCBS	4oz x 1	✓	
SILVER			
TOX TEST			
TAL METALS			
TOC			
GRAIN SIZE			
EXPLOSIVES, NC, NU, NG			

OBSERVATIONS / NOTES:

FROM COVER 15" THICK OVER CONCRETE

MAP:

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): Fred M Ramsr

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SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: SITES 12, 41, 42 PRE-FS
Project No.: 7129, INDIAN HEAD NSWC

Sample ID No.: S415S0130006
Sample Location: S41S8013
Sampled By: PLR
C.O.C. No.: 63752

[X] Surface Soil
[] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 9-30-99 Time: 1005 Method: S.S. TROWEL Monitor Reading (ppm): —	0"-6"	DK BRN BRK	SILT + GRA.

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
ARSENIC	4oz x 1	✓	
CADMIUM			
LEAD, IRON			
TCL PCBs	4oz x 1	✓	
SILVER			
TOX TEST			
TAL METALS			
TOC			
GRAIN SIZE			
EXPLOSIVES, NC, NU, NG			

OBSERVATIONS / NOTES:

MAP:

Circle If Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Fred W Ramser

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SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: SITES 12, 41, 42 PRE-FS
Project No.: 7129, INDIAN HEAD NSWC

Sample ID No.: S41SS0130106
Sample Location: S41SS013
Sampled By: PUR
C.O.C. No.: 63752

- [ ] Surface Soil
- [x] Subsurface Soil
- [ ] Sediment
- [ ] Other:
- [ ] QA Sample Type:

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 9-30-99 Time: 1010 Method: S.S, TROWEL/AUGER Monitor Reading (ppm):	12" - 18"	DK BRN	SAND & GRA WET

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
ARSENIC			
CADMIUM	4oz x 1	✓	
LEAD, IRON			
TCL PCBS	4oz x 1	✓	
SILVER			
TOX TEST			
TAL METALS			
TOC			
GRAIN SIZE			
EXPLOSIVES, NC, NU, NG			

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): Fred M Ramsey

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: SITES 12, 41, 42 PRE-FS
Project No.: 7129, INDIAN HEAD NSWC

Sample ID No.: S41SS0140006
Sample Location: S41SS014
Sampled By: FWR
C.O.C. No.: 63752

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment
[ ] Other:
[ ] QA Sample Type:

Type of Sample:
[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

Date: 9-30-99
Time: 1120
Method: S.S. TROWEL
Monitor Reading (ppm): —

Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
0"-6"	DK BRN YEL BRN	SAND + GRA, MOIST

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
ARSENIC			
CADMIUM	4oz x 1	✓	
LEAD, IRON			
TCL PCBs	4oz x 1	✓	
SILVER			
TOX TEST			
TAL METALS			
TOC			
GRAIN SIZE			
EXPLOSIVES, NC, NU, NG			

OBSERVATIONS / NOTES:

MAP:

Circle If Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): Fred W Ramser

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: SITES 12, 41, 42 PRE-FS
Project No.: 7129, INDIAN HEAD NSWC

Sample ID No.: S41SS0140106
Sample Location: S41SS014
Sampled By: FWR
C.O.C. No.: 63752

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 9-30-99 Time: 1130 Method: SS, TROWEL/AUGER Monitor Reading (ppm):	12"-18"	BLK	GRAVEL + SAND WET

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
ARSENIC	4oz x 1	✓	
CADMIUM			
LEAD, IRON			
TCL PCBS	4oz x 1	✓	
SILVER			
TOX TEST			
TAL METALS			
TOC			
GRAIN SIZE			
EXPLOSIVES, NC, NU, NG			

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Fred M Ramser

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SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: SITES 12, 41, 42 PRE-FS
Project No.: 7129, INDIAN HEAD NSWC

Sample ID No.: S41SS0150006
Sample Location: S41SS0
Sampled By: PK
C.O.C. No.: 63752

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment
[ ] Other:
[ ] QA Sample Type:

Type of Sample:
[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 9-30-99 Time: 1140 Method: S.S. TROWEL Monitor Reading (ppm): —	0"-6"	YEL BRN DK BRN	SAND+SILT + GRA.

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
ARSENIC	4oz x 1	✓	
CADMIUM			
LEAD, IRON			
TCL PCBs	4oz x 1	✓	
SILVER			
TOX TEST			
TAL METALS			
TOC			
GRAIN SIZE			
EXPLOSIVES, NC, NU, NG			

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): Fred M Ramser

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SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: SITES 12, 41, 42 PRE-FS
Project No.: 7129, INDIAN HEAD NSWC

Sample ID No.: S41SS0150106
Sample Location: S41SS015
Sampled By: PWR
C.O.C. No.: 63752

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 9-30-99 Time: 1148 Method: SS, TROWEL/AUGER Monitor Reading (ppm):	12" - 18"	DK BRN	SAND + SILT MOIST TO WET

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
ARSENIC	4oz x 1	✓	
CADMIUM			
LEAD, IRON			
TCL PCBs	4oz x 1	✓	
SILVER			
TOX TEST			
TAL METALS			
TOC			
GRAIN SIZE			
EXPLOSIVES, NC, NU, NG			

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Fred M Ramer

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: SITES 12, 41, 42 PRE-FS
Project No.: 7129, INDIAN HEAD NSWC

Sample ID No.: S41S50160006
Sample Location: S41S8016
Sampled By: PLR
C.O.C. No.: 63752

- [X] Surface Soil
- [ ] Subsurface Soil
- [ ] Sediment
- [ ] Other:
- [ ] QA Sample Type:

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 9-30-99 Time: 1330 Method: S.S. TROWEL Monitor Reading (ppm): —	0"-~~6"~~ 3"	DK BRN BLK	SILT, SAND + GRA MOIST

COMPOSITE SAMPLE DATA:

	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date:				
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
ARSENIC	4oz x 1	✓	
CADMIUM			
LEAD, IRON			
TCL PCBs	4oz x 1	✓	
SILVER			
TOX TEST			
TAL METALS			
TOC			
GRAIN SIZE			
EXPLOSIVES, NC, NU, NG			

OBSERVATIONS / NOTES:

COLLECTED FROM SURFACE
COVER 3"-4" THICK OVER
CONCRETE

MAP:

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): Fred M Ramser

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: SITES 12, 41, 42 PRE-FS
Project No.: 7129, INDIAN HEAD NSWC

Sample ID No.: $41SS0190006
Sample Location: $41SS019
Sampled By: PJR
C.O.C. No.: 63752

[X] Surface Soil
[] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 9-30-99 Time: 1337 Method: S.S. TROWEL Monitor Reading (ppm): —	0"-6"	YEL BRN	SAND + SILT MOIST

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
ARSENIC			
CADMIUM	4oz x 1	✓	
LEAD, IRON			
TCL PCBs	4oz x 1	✓	
SILVER			
TOX TEST			
TAL METALS			
TOC			
GRAIN SIZE			
EXPLOSIVES, NC, NU, NG			

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD —

Duplicate ID No.: $41SSDUP004

Signature(s): Fred W Ramser

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SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: SITES 12, 41, 42 PRE-FS
Project No.: 7129, INDIAN HEAD NSWC

Sample ID No.: S41SS0190106
Sample Location: S41SS019
Sampled By: PUR
C.O.C. No.: 63752

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 9-30-99 Time: 1345 Method: S.S, TROWEL/AUGER Monitor Reading (ppm):	12" - 18"	DK BRN TO BLK	SAND+SILT WET + GRA.

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
ARSENIC			
CADMIUM	4oz x 1	✓	
LEAD, IRON			
TCL PCBS	4oz x 1	✓	
SILVER			
TOX TEST			
TAL METALS			
TOC			
GRAIN SIZE			
EXPLOSIVES, NC, NU, NG			

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): Fred M Ramer

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SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: SITES 12, 41, 42 PRE-FS
Project No.: 7129, INDIAN HEAD NSWC

Sample ID No.: S41SS0200006
Sample Location: S41SS020
Sampled By: PJR
C.O.C. No.: 64014

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment
[ ] Other:
[ ] QA Sample Type:

Type of Sample:
[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 9-30-99 Time: 1347 Method: S.S. TROWEL Monitor Reading (ppm): —	0"-6"	BLK	SAND + GRA W/METALLIC DEBRIS

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
ARSENIC	4oz x 1	✓	
CADMIUM			
LEAD, IRON			
TCL PCBS	4oz x 1	✓	
SILVER			
TOX TEST			
TAL METALS			
TOC			
GRAIN SIZE			
EXPLOSIVES, NC, NU, NG			

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): Fred W Ramser

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SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: SITES 12, 41, 42 PRE-FS
Project No.: 7129, INDIAN HEAD NSWC

Sample ID No.: S41S0170006
Sample Location: S41S017
Sampled By: PJR
C.O.C. No.: 64014

- [x] Surface Soil
- [ ] Subsurface Soil
- [ ] Sediment
- [ ] Other:
- [ ] QA Sample Type:

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 9-30-99 Time: 1400 Method: S.S. TROWEL Monitor Reading (ppm): —	0"-6"	YEL BRN TO BLK	SAND + GRAVEL MOIST

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
ARSENIC			
CADMIUM	4oz x 1	✓	
LEAD, IRON			
TCL PCBS	4oz x 1	✓	
SILVER			
TOX TEST			
TAL METALS			
TOC			
GRAIN SIZE			
EXPLOSIVES, NC, NU, NG			

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): Fred W Ramser

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: SITES 12, 41, 42 PRE-FS
Project No.: 7129, INDIAN HEAD NSWC

Sample ID No.: S41SS0170106
Sample Location: S41SS017
Sampled By: FUR
C.O.C. No.: 64014

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 9-30-99	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 1407 Method: SS, TROWEL/AUGER Monitor Reading (ppm):	12"-18"	DK BRN TO BLK	SAND+GRAVEL WET

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
ARSENIC	4oz x 1	✓	
CADMIUM			
LEAD, IRON			
TCL PCBs	4oz x 1	✓	
SILVER			
TOX TEST			
TAL METALS			
TOC			
GRAIN SIZE			
EXPLOSIVES, NC, NU, NG			

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): Fred U Ramer

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: SITES 12, 41, 42 PRE-FS
Project No.: 7129, INDIAN HEAD NSWC

Sample ID No.: $41SS0180006
Sample Location: $41SS018
Sampled By: PLR
C.O.C. No.: 64014

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment
[ ] Other:
[ ] QA Sample Type:

Type of Sample:
[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 9-30-99 Time: 1415 Method: S.S. TROWEL Monitor Reading (ppm): —	0"-6"	DK BRN	SAND + GRA MOIST

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
ARSENIC			
CADMIUM	4oz x 1	✓	
LEAD, IRON			
TCL PCBS	4oz x 1	✓	
SILVER			
TOX TEST			
TAL METALS			
TOC			
GRAIN SIZE			
EXPLOSIVES, NC, NU, NG			

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): Fred Ramser

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SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: SITES 12, 41, 42 PRE-FS
Project No.: 7129, INDIAN HEAD NSWC

Sample ID No.: S41SS0180106
Sample Location: S41SS018
Sampled By: PWR
C.O.C. No.: 64014

[ ] Surface Soil
[X] Subsurface Soil
[ ] Sediment
[ ] Other:
[ ] QA Sample Type:

Type of Sample:
[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 9-30-99 Time: 1425 Method: S.S, TROWEL/AUGER Monitor Reading (ppm):	12" - 18"	BLK	GRAVEL + SAND WET

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
ARSENIC	4oz x 1	✓	
CADMIUM			
LEAD, IRON			
TCL PCBS	4oz x 1	✓	
SILVER			
TOX TEST			
TAL METALS			
TOC			
GRAIN SIZE			
EXPLOSIVES, NC, NU, NG			

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): Fred M Ramsey

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SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: SITES 12, 41, 42 PRE-FS
Project No.: 7129, INDIAN HEAD NSWC

Sample ID No.: $41SS0210006
Sample Location: $41SS021
Sampled By: PJR
C.O.C. No.: 64014

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment
[ ] Other:
[ ] QA Sample Type:

Type of Sample:
[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 9-30-99 Time: 1440 Method: S.S. TROWEL Monitor Reading (ppm): —	0"-~~6"~~ 3"	YEL BRN TO BRN	SAND + GRA DRY - MOIST

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
ARSENIC			
CADMIUM	4oz x 1	✓	
LEAD, IRON			
TCL PCBs	4oz x 1	✓	
SILVER			
TOX TEST			
TAL METALS			
TOC			
GRAIN SIZE			
EXPLOSIVES, NC, NU, NG			

OBSERVATIONS / NOTES:

COLLECTED FROM SURFACE COVER 3"-4" THICK OVER CONCRETE

MAP:

Circle If Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): Fred M Ramser

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SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: SITES 12, 41, 42 PRE-FS
Project No.: 7129, INDIAN HEAD NSWC

Sample ID No.: S41S50240006
Sample Location: S41S8024
Sampled By: PJR
C.O.C. No.: 64014

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment
[ ] Other:
[ ] QA Sample Type:

Type of Sample:
[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 9-30-99 Time: 1450 Method: S.S. TROWEL Monitor Reading (ppm): —	0"-6"	DR BRN TO BLK	SAND + SILT

COMPOSITE SAMPLE DATA:

	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date:				
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
ARSENIC	4oz x2	✓	
CADMIUM			
LEAD, IRON			
TCL PCBS	4oz x2	✓	
SILVER			
TOX TEST			
TAL METALS			
TOC			
GRAIN SIZE			
EXPLOSIVES, NC, NU, NG			

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD ✓

Duplicate ID No.: —

Signature(s): Fred W Ramser

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SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: SITES 12, 41, 42 PRE-FS
Project No.: 7129, INDIAN HEAD NSWC

Sample ID No.: S41SS0240106
Sample Location: S41SS024
Sampled By: FUR
C.O.C. No.: 64014

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 9-30-99 Time: 1455 Method: S.S, TROWEL/AUGER Monitor Reading (ppm):	12" - 18"	DK BRN TO BLK	SAND+SILT WET

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
ARSENIC			
CADMIUM	4oz x 1	✓	
LEAD, IRON			
TCL PCBs	4oz x 1	✓	
SILVER			
TOX TEST			
TAL METALS			
TOC			
GRAIN SIZE			
EXPLOSIVES, NC, NU, NG			

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): Fred U Ramer

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SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: SITES 12, 41, 42 PRE-FS
Project No.: 7129, INDIAN HEAD NSWC

Sample ID No.: S41SS0250006
Sample Location: S41SS025
Sampled By: PLR
C.O.C. No.: 64014

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment
[ ] Other:
[ ] QA Sample Type:

Type of Sample:
[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 9-30-99 Time: 1505 Method: S.S. TROWEL Monitor Reading (ppm): —	0"-~~6"~~ 3" BGS	BRN + BLK	SAND + GRA. W/ METALLIC DEBRIS

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
ARSENIC	4oz x 1	✓	
CADMIUM			
LEAD, IRON			
TCL PCBs	4oz x 1	✓	
SILVER			
TOX TEST			
TAL METALS			
TOC			
GRAIN SIZE			
EXPLOSIVES, NC, NU, NG			

OBSERVATIONS / NOTES:

COVER ~3" THICK OVER CONCRETE

MAP:

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): Fred W Ramser

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SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: SITES 12, 41, 42 PRE-FS
Project No.: 7129, INDIAN HEAD NSWC

Sample ID No.: S41SS0230006
Sample Location: S41SS023
Sampled By: PLR
C.O.C. No.: 64014

[X] Surface Soil
[] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 9-30-99 Time: 1530 Method: S.S. TROWEL Monitor Reading (ppm): —	0"-6"	YEL BRN TO BLK	SAND + GRAVEL MOIST

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
ARSENIC	4oz x2	✓	
CADMIUM			
LEAD, IRON			
TCL PCBs	4oz x2	✓	
SILVER			
TOX TEST			
TAL METALS			
TOC			
GRAIN SIZE			
EXPLOSIVES, NC, NU, NG			

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD ✓

Duplicate ID No.: —

Signature(s): Fred W Ramser

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SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: SITES 12, 41, 42 PRE-FS
Project No.: 7129, INDIAN HEAD NSWC

Sample ID No.: S41SS0230106
Sample Location: S41SS023
Sampled By: PUR
C.O.C. No.: 64014

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 9-30-99 Time: 1537 Method: S.S. TROWEL/AUGER Monitor Reading (ppm):	12"-18"	DK BRN	SILT, SAND + GRA. WET

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
ARSENIC			
CADMIUM	4oz x 1	✓	
LEAD, IRON			
TCL PCBs	4oz x 1	✓	
SILVER			
TOX TEST			
TAL METALS			
TOC			
GRAIN SIZE			
EXPLOSIVES, NC, NU, NG			

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Fred M Ramsey

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SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: SITES 12, 41, 42 PRE-FS
Project No.: 7129, INDIAN HEAD NSWC

Sample ID No.: $41S$0220106
Sample Location: $41SS022
Sampled By: FWC
C.O.C. No.: 64014

- [x] Surface Soil
- [ ] Subsurface Soil
- [ ] Sediment
- [ ] Other:
- [ ] QA Sample Type:

Type of Sample:
- [ ] Low Concentration
- [ ] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 9-30-99 Time: 1555 Method: S.S. TROWEL + AUGER Monitor Reading (ppm): –	12"-18"	BLK	SAND + GRA. + SILT WET

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
ARSENIC	4oz x1		
CADMIUM			
LEAD, IRON			
TCL PCBs	4oz x1		

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Fred W. Ramsor

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SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: SITES 12, 41, 42 PRE-FS
Project No.: 7129, INDIAN HEAD NSWC

Sample ID No.: S41SS022 0006
Sample Location: S41SS022
Sampled By: PLR
C.O.C. No.: 64014

[X] Surface Soil
[] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 9-30-99 Time: 1545 Method: S.S. TROWEL Monitor Reading (ppm): —	0"-6"	DK BRN	SAND+SILT + GRAVEL MOIST

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
ARSENIC			
CADMIUM	4oz x 1	✓	
LEAD, IRON			
TCL PCBs	4oz x 1	✓	
SILVER			
TOX TEST			
TAL METALS			
TOC			
GRAIN SIZE			
EXPLOSIVES, NC, NU, NG			

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): Fred W Ramser

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SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: SITES 12, 41, 42 PRE-FS
Project No.: 7129, INDIAN HEAD NSWC

Sample ID No.: $41SS026 0006
Sample Location: $41SS026
Sampled By: PLR
C.O.C. No.: 63812

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment
[ ] Other:
[ ] QA Sample Type:

Type of Sample:
[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 10-1-99 Time: 0805 Method: S.S. TROWEL Monitor Reading (ppm): —	0"-3"	BLK + DK BRN	SAND + GRA MOIST

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
ARSENIC	4oz x 1	✓	
CADMIUM			
LEAD, IRON			
TCL PCBs	4oz x 1	✓	
SILVER			
TOX TEST			
TAL METALS			
TOC			
GRAIN SIZE			
EXPLOSIVES, NC, NU, NG			

OBSERVATIONS / NOTES:

COLLECTED FROM COVER ~3-4" OVER CONCRETE.

MAP:

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): Fred W Ramser

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SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: SITES 12, 41, 42 PRE-FS
Project No.: 7129, INDIAN HEAD NSWC

Sample ID No.: S41SS032 0006
Sample Location: S41SS032
Sampled By: PWR
C.O.C. No.: 63812

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment
[ ] Other:
[ ] QA Sample Type:

Type of Sample:
[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 10-1-99 Time: 0810 Method: S.S. TROWEL Monitor Reading (ppm): —	0"-0" 3"	BLK + BRN	GRAVEL + SAND

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
ARSENIC			
CADMIUM	4oz x 1	✓	
LEAD, IRON			
TCL PCBs	4oz x 1	✓	
SILVER			
TOX TEST			
TAL METALS			
TOC			
GRAIN SIZE			
EXPLOSIVES, NC, NU, NG			

OBSERVATIONS / NOTES:

COLLECTED FROM COVER 3" THICK OVER CONCRETE

MAP:

Circle If Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): Fred W Ramser

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SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: SITES 12, 41, 42 PRE-FS
Project No.: 7129, INDIAN HEAD NSWC

Sample ID No.: S41SS0310006
Sample Location: S41SS031
Sampled By: PJR
C.O.C. No.: 63812

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment
[ ] Other:
[ ] QA Sample Type:

Type of Sample:
[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 10-1-99 Time: 0812 Method: S.S. TROWEL Monitor Reading (ppm): —	0"-~~6"~~ 3"	BLK + BRN	SAND+GRAVEL W/METALIC DEBRIS MOIST TO WET

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
ARSENIC			
CADMIUM	4oz x 1	✓	
LEAD, IRON			
TCL PCBs	4oz x 1	✓	
SILVER			
TOX TEST			
TAL METALS			
TOC			
GRAIN SIZE			
EXPLOSIVES, NC, NU, NG			

OBSERVATIONS / NOTES:

COLLECTED FROM COVER ~3" THICK OVER CONCRETE

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Fred W Ramser

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SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: SITES 12, 41, 42 PRE-FS
Project No.: 7129, INDIAN HEAD NSWC

Sample ID No.: S41S50300006
Sample Location: S41S5030
Sampled By: PJR
C.O.C. No.: 63812

[X] Surface Soil
[] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 10-1-99 Time: 0815 Method: S.S. TROWEL Monitor Reading (ppm): —	0"-6"	BRN	SAND + SILT MOIST TO WET

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
ARSENIC			
CADMIUM	4oz x 1	✓	
LEAD, IRON			
TCL PCBs	4oz x 1	✓	
SILVER			
TOX TEST			
TAL METALS			
TOC			
GRAIN SIZE			
EXPLOSIVES, NC, NU, NG			

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Fred W Ramser

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SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: SITES 12, 41, 42 PRE-FS
Project No.: 7129, INDIAN HEAD NSWC

Sample ID No.: S41SS0300106
Sample Location: S41SS030
Sampled By: FUR
C.O.C. No.: 63812

[ ] Surface Soil
[X] Subsurface Soil
[ ] Sediment
[ ] Other:
[ ] QA Sample Type:

Type of Sample:
[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 10-1-99 Time: 0820 Method: SS, TROWEL/AUGER Monitor Reading (ppm):	12" - 18"	YEL BRN DK BRN	SAND + SILT MOIST

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
ARSENIC			
CADMIUM	4oz x 1	✓	
LEAD, IRON			
TCL PCBs	4oz x 1	✓	
SILVER			
TOX TEST			
TAL METALS			
TOC			
GRAIN SIZE			
EXPLOSIVES, NC, NU, NG			

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Fred M Ramer

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SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: SITES 12, 41, 42 PRE-FS
Project No.: 7129, INDIAN HEAD NSWC

Sample ID No.: S41SS0270006
Sample Location: S41SS027
Sampled By: PLR
C.O.C. No.: 63812

[X] Surface Soil
[] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 10-1-99 Time: 0840 Method: S.S. TROWEL Monitor Reading (ppm): —	0"-6"	BRN + BLK	SAND + GRA. WET

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
ARSENIC	4oz x 1	✓	
CADMIUM			
LEAD, IRON			
TCL PCBS	4oz x 1	✓	
SILVER			
TOX TEST			
TAL METALS			
TOC			
GRAIN SIZE			
EXPLOSIVES, NC, NU, NG			

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): Fred W Ramser

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SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: SITES 12, 41, 42 PRE-FS
Project No.: 7129, INDIAN HEAD NSWC

Sample ID No.: S41SS0270106
Sample Location: S41SS027
Sampled By: PUR
C.O.C. No.: 63812

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 10-1-99 Time: 0845 Method: SS, TROWEL/AUGER Monitor Reading (ppm):	12" - 18"	DK BRN	SAND + GRA. + SILT WET

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
ARSENIC	4oz x 1	✓	
CADMIUM			
LEAD, IRON			
TCL PCBS	4oz x 1	✓	
SILVER			
TOX TEST			
TAL METALS			
TOC			
GRAIN SIZE			
EXPLOSIVES, NC, NU, NG			

OBSERVATIONS / NOTES:

COLLECTED UNDER STANDING WATER

MAP:

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s):

Fred M Ramsey

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SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: SITES 12, 41, 42 PRE-FS
Project No.: 7129, INDIAN HEAD NSWC

Sample ID No.: $41SS0280006
Sample Location: $41SS028
Sampled By: PWR
C.O.C. No.: 63812

- [X] Surface Soil
- [ ] Subsurface Soil
- [ ] Sediment
- [ ] Other:
- [ ] QA Sample Type:

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 10-1-99 Time: 0900 Method: S.S. TROWEL Monitor Reading (ppm): —	0"-6"	BRN TO BLK	WET SAND+SILT TR GRA.

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
ARSENIC	4oz x 1	✓	
CADMIUM			
LEAD, IRON			
TCL PCBs	4oz x 1	✓	
SILVER			
TOX TEST			
TAL METALS			
TOC			
GRAIN SIZE			
EXPLOSIVES, NC, NU, NG			

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	$41SSDUP005

Signature(s): Fred W Ramser

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SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: SITES 12, 41, 42 PRE-FS
Project No.: 7129, INDIAN HEAD NSWC

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Sample ID No.: S41SS0280106
Sample Location: S41SS028
Sampled By: PUR
C.O.C. No.: 63812

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 10-1-99 Time: 0910 Method: SS, TROWEL/AUGER Monitor Reading (ppm):	12"-18"	YEL BRN	SAND+SILT WET

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
ARSENIC	4oz x 1	✓	
CADMIUM			
LEAD, IRON			
TCL PCBs	4oz x 1	✓	
SILVER			
TOX TEST			
TAL METALS			
TOC			
GRAIN SIZE			
EXPLOSIVES, NC, NU, NG			

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Fred M Ramsey

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SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: SITES 12, 41, 42 PRE-FS
Project No.: 7129, INDIAN HEAD NSWC

Sample ID No.: S41S50290006
Sample Location: S41S8029
Sampled By: PJR
C.O.C. No.: 63812

- [X] Surface Soil
- [ ] Subsurface Soil
- [ ] Sediment
- [ ] Other:
- [ ] QA Sample Type:

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 10-1-99 Time: 0915 Method: S.S. TROWEL Monitor Reading (ppm): —	0"-6"	YEL BRN	SAND+GRA. WET

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
ARSENIC			
CADMIUM	4oz x 1	✓	
LEAD, IRON			
TCL PCBs	4oz x 1	✓	
SILVER			
TOX TEST			
TAL METALS			
TOC			
GRAIN SIZE			
EXPLOSIVES, NC, NU, NG			

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Fred W Ramser

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: SITES 12, 41, 42 PRE-FS
Project No.: 7129, INDIAN HEAD NSWC

Sample ID No.: S41SS0290106
Sample Location: S41SS029
Sampled By: PUR
C.O.C. No.:

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 10-1-99 Time: 0925 Method: S.S. TROWEL/AUGER Monitor Reading (ppm):	12"-18"	BRN	SILT, SAND + GRA. WET

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
ARSENIC			
CADMIUM	4oz x 1	✓	
LEAD, IRON			
TCL PCBs	4oz x 1	✓	
SILVER			
TOX TEST			
TAL METALS			
TOC			
GRAIN SIZE			
EXPLOSIVES, NC, NU, NG			

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Fred M Ramsey

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: SITES 12, 41, 42 PRE-FS
Project No.: 7129, INDIAN HEAD NSWC

Sample ID No.: S41S50330006
Sample Location: S41S8033
Sampled By: PLR
C.O.C. No.:

- [X] Surface Soil
- [ ] Subsurface Soil
- [ ] Sediment
- [ ] Other:
- [ ] QA Sample Type:

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 10-1-99 Time: 1000 Method: S.S. TROWEL Monitor Reading (ppm): —	0"-6"	DK BRN BLK	SAND + GRA. WET

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
ARSENIC			
CADMIUM	4oz x 1	✓	
LEAD, IRON			
TCL PCBs	4oz x 1	✓	
SILVER			
TOX TEST			
TAL METALS			
TOC			
GRAIN SIZE			
EXPLOSIVES, NC, NU, NG			

OBSERVATIONS / NOTES:

MAP:

Circle If Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Fred W Ramser

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: SITES 12, 41, 42 PRE-FS
Project No.: 7129, INDIAN HEAD NSWC

Sample ID No.: S41SS0330106
Sample Location: S41SS033
Sampled By: PUR
C.O.C. No.: 63812

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 10-1-99 Time: 1010 Method: S.S, TROWEL/AUGER Monitor Reading (ppm):	12" - 18"	DK BRN BLK	SAND+SILT +GRA. WET

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
ARSENIC			
CADMIUM	4oz x 1	✓	
LEAD, IRON			
TCL PCBS	4oz x 1	✓	
SILVER			
TOX TEST			
TAL METALS			
TOC			
GRAIN SIZE			
EXPLOSIVES, NC, NU, NG			

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD

Duplicate ID No.: ___

Signature(s): Fred M Ramer

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: SITES 12, 41, 42 PRE-FS
Project No.: 7129, INDIAN HEAD NSWC

Sample ID No.: $41SS0340006
Sample Location: $41$$034
Sampled By: PGR
C.O.C. No.: 63812

[X] Surface Soil
[] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 10-1-99 Time: 1020 Method: S.S. TROWEL Monitor Reading (ppm): —	0"-6"	YEL BRN	SAND + GRA + SILT

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
ARSENIC	4oz x 1	✓	
CADMIUM			
LEAD, IRON			
TCL PCBs	4oz x 1	✓	
SILVER			
TOX TEST			
TAL METALS			
TOC			
GRAIN SIZE			
EXPLOSIVES, NC, NU, NG			

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD —

Duplicate ID No.: $41$$DUP006

Signature(s): Fred W Ramser

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: SITES 12, 41, 42 PRE-FS
Project No.: 7129, INDIAN HEAD NSWC

Sample ID No.: S41SS0340106
Sample Location: S41SS034
Sampled By: PUR
C.O.C. No.: 63813

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 10-1-99 Time: 1030 Method: S.S, TROWEL/AUGER Monitor Reading (ppm):	12"-18"	DK BRN TO YEL BRN	SILT + SAND MOIST

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
ARSENIC	4oz x 1	✓	
CADMIUM			
LEAD, IRON			
TCL PCBs	4oz x 1	✓	
SILVER			
TOX TEST			
TAL METALS			
TOC			
GRAIN SIZE			
EXPLOSIVES, NC, NU, NG			

OBSERVATIONS / NOTES:

MAP:

Circle If Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Fred M Ramer

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: SITES 12, 41, 42 PRE-FS
Project No.: 7129, INDIAN HEAD NSWC

Sample ID No.: S41S0350006
Sample Location: S41S8035
Sampled By: PJR
C.O.C. No.: 63813

- [X] Surface Soil
- [ ] Subsurface Soil
- [ ] Sediment
- [ ] Other:
- [ ] QA Sample Type:

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 10-1-99 Time: 1035 Method: S.S. TROWEL Monitor Reading (ppm): —	0"-6"	DK BRN	SAND + GRA. WET

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
ARSENIC	8oz x 1	✓	
CADMIUM			
LEAD, IRON			
TCL PCBs	8oz x 1	✓	
SILVER			
TOX TEST			
TAL METALS			
TOC			
GRAIN SIZE			
EXPLOSIVES, NC, NU, NG			

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD ✓

Duplicate ID No.: —

Signature(s): Fred W Ramser

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: SITES 12, 41, 42 PRE-FS
Project No.: 7129, INDIAN HEAD NSWC

Sample ID No.: S41SS035D106
Sample Location: S41SS0
Sampled By: PUR
C.O.C. No.: 63813

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 10-1-99 Time: 1045 Method: S.S, TROWEL/AUGER Monitor Reading (ppm):	12" - 18"	DK BRN TO BLK	SAND+SILT TR GRA. WET.

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
ARSENIC	4oz x 1	✓	
CADMIUM			
LEAD, IRON			
TCL PCBs	4oz x 1	✓	
SILVER			
TOX TEST			
TAL METALS			
TOC			
GRAIN SIZE			
EXPLOSIVES, NC, NU, NG			

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): Fred M Ramos

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: SITES 12, 41, 42 PRE-FS
Project No.: 7129, INDIAN HEAD NSWC

Sample ID No.: S41SS0360006
Sample Location: S41SS036
Sampled By: PJR
C.O.C. No.: 63818

[X] Surface Soil
[] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 10-1-99			
Time: 1100	0"-6"	BRN YEL BRN	SILT + SAND DRY
Method: S.S. TROWEL			
Monitor Reading (ppm): —			

COMPOSITE SAMPLE DATA:

	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date:				
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
ARSENIC	4oz x 1	✓	
CADMIUM			
LEAD, IRON			
TCL PCBs	4oz x 1	✓	
SILVER			
TOX TEST			
TAL METALS			
TOC			
GRAIN SIZE			
EXPLOSIVES, NC, NU, NG			

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD

Duplicate ID No.: —

Signature(s): Fred W Ramser

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: SITES 12, 41, 42 PRE-FS
Project No.: 7129, INDIAN HEAD NSWC

Sample ID No.: S41SS036010C
Sample Location: S41SS036
Sampled By: FUR
C.O.C. No.: 63813

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 10-1-99 Time: 1110 Method: S.S, TROWEL/AUGER Monitor Reading (ppm):	12" - 18"	YEL GREY BRN	SAND + SILT + CLAY DRY

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
ARSENIC			
CADMIUM	4oz x 1	✓	
LEAD, IRON			
TCL PCBs	4oz x 1	✓	
SILVER			
TOX TEST			
TAL METALS			
TOC			
GRAIN SIZE			
EXPLOSIVES, NC, NU, NG			

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): Fred U Ramsr

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: SITES 12, 41, 42 PRE-FS
Project No.: 7129, INDIAN HEAD NSWC

Sample ID No.: S41S0370006
Sample Location: S41S0037
Sampled By: PWR
C.O.C. No.: 63813

- [X] Surface Soil
- [ ] Subsurface Soil
- [ ] Sediment
- [ ] Other:
- [ ] QA Sample Type:

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 10-1-99 Time: 1115 Method: S.S. TROWEL Monitor Reading (ppm): —	0"-6"	BRN TO BLK	SAND + GRA + SILT WET

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color*	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
ARSENIC			
CADMIUM	4oz x 1	✓	
LEAD, IRON			
TCL PCBs	4oz x 1	✓	
SILVER			
TOX TEST			
TAL METALS			
TOC			
GRAIN SIZE			
EXPLOSIVES, NC, NU, NG			

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Fred W Ramser

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: SITES 12, 41, 42 PRE-FS
Project No.: 7129, INDIAN HEAD NSWC

Sample ID No.: S41SS0370106
Sample Location: S41SS037
Sampled By: PWR
C.O.C. No.: 63813

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 10-1-99 Time: 1120 Method: SS, TROWEL/AUGER Monitor Reading (ppm):	12"-18"	DK BRN	SILT, SAND + GRA. WET

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
ARSENIC	4oz x 1	✓	
CADMIUM			
LEAD, IRON			
TCL PCBS	4oz x 1	✓	
SILVER			
TOX TEST			
TAL METALS			
TOC			
GRAIN SIZE			
EXPLOSIVES, NC, NU, NG			

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): Fred W Ramsey

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: SITES 12, 41, 42 PRE-FS
Project No.: 7129, INDIAN HEAD NSWC

Sample ID No.: $41SS0380006
Sample Location: $41$$038
Sampled By: PUR
C.O.C. No.: 63813

[X] Surface Soil
[] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 10-1-99 Time: 1125 Method: S.S. TROWEL Monitor Reading (ppm): —	0"-6"	YEL BRN	SAND + GRA. MOIST

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
ARSENIC			
CADMIUM	4oz x 1	✓	
LEAD, IRON			
TCL PCBs	4oz x 1	✓	
SILVER			
TOX TEST			
TAL METALS			
TOC			
GRAIN SIZE			
EXPLOSIVES, NC, NU, NG			

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	$41$$DUP007

Signature(s): Fred W Ramser

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: SITES 12, 41, 42 PRE-FS
Project No.: 7129, INDIAN HEAD NSWC

Sample ID No.: S41SS0380106
Sample Location: S41SS038
Sampled By: PUR
C.O.C. No.: 63813

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 10-1-99	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 1130	12"-18"	DK BRN	SAND + GRA. MOIST
Method: S.S. TROWEL/AUGER			
Monitor Reading (ppm):			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
ARSENIC	4oz x 1	✓	
CADMIUM			
LEAD, IRON			
TCL PCBs	4oz x 1	✓	
SILVER			
TOX TEST			
TAL METALS			
TOC			
GRAIN SIZE			
EXPLOSIVES, NC, NU, NG			

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Fred M Ramer

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: SITES 12, 41, 42 PRE-FS
Project No.: 7129, INDIAN HEAD NSWC

Sample ID No.: S41SS0390006
Sample Location: S41S8039
Sampled By: PJK
C.O.C. No.: 63813

[X] Surface Soil
[ ] Subsurface Soil
[ ] Sediment
[ ] Other:
[ ] QA Sample Type:

Type of Sample:
[X] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 10-1-99 Time: 1135 Method: S.S. TROWEL Monitor Reading (ppm): —	0"-6"	YEL BRN	GRAVEL + SAND + SILT WET

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
ARSENIC			
CADMIUM	4oz x 1	✓	
LEAD, IRON			
TCL PCBs	4oz x 1	✓	
SILVER			
TOX TEST			
TAL METALS			
TOC			
GRAIN SIZE			
EXPLOSIVES, NC, NU, NG			

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): Fred W Ramser

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: SITES 12, 41, 42 PRE-FS
Project No.: 7129, INDIAN HEAD NSWC

Sample ID No.: S41SS0390106
Sample Location: S41SS039
Sampled By: PWR
C.O.C. No.: 63813

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: 10-1-99	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: 1137	12"-18"	DK BRN	SAND + GRA. WET
Method: S.S. TROWEL/AUGER			
Monitor Reading (ppm):			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
ARSENIC			
CADMIUM	4oz x 1	✓	
LEAD, IRON			
TCL PCBS	4oz x 1	✓	
SILVER			
TOX TEST			
TAL METALS			
TOC			
GRAIN SIZE			
EXPLOSIVES, NC, NU, NG			

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): Fred W Ramsr

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: SITES 12, 41, 42 PRE-FS
Project No.: 7129, INDIAN HEAD NSWC

Sample ID No.: S4155040006
Sample Location: S4158040
Sampled By: PJK
C.O.C. No.: 63813

- [X] Surface Soil
- [ ] Subsurface Soil
- [ ] Sediment
- [ ] Other:
- [ ] QA Sample Type:

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 10-1-99 Time: 1145 Method: S.S. TROWEL Monitor Reading (ppm): —	0"-6"	DK BRN TO BLK	SAND & SILT TR GRA. MOIST TO WET

COMPOSITE SAMPLE DATA:

	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date:				
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
ARSENIC	4oz x 1	✓	
CADMIUM			
LEAD, IRON			
TCL PCBs	4oz x 1	✓	
SILVER			
TOX TEST			
TAL METALS			
TOC			
GRAIN SIZE			
EXPLOSIVES, NC, NU, NG			

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:
—	—

Signature(s): Fred W Ramser

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

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Project Site Name: SITES 12, 41, 42 PRE-FS
Project No.: 7129, INDIAN HEAD NSWC

Sample ID No.: S41SS0400106
Sample Location: S41SS040
Sampled By: PWR
C.O.C. No.: 63813

[] Surface Soil
[X] Subsurface Soil
[] Sediment
[] Other:
[] QA Sample Type:

Type of Sample:
[X] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date: 10-1-99 Time: 1150 Method: S.S. TROWEL/AUGER Monitor Reading (ppm):	12" - 18"	DK BRN TO BLK	SAND + SILT WET

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
ARSENIC			
CADMIUM	4oz x 1	✓	
LEAD, IRON			
TCL PCBS	4oz x 1	✓	
SILVER			
TOX TEST			
TAL METALS			
TOC			
GRAIN SIZE			
EXPLOSIVES, NC, NU, NG			

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD —

Duplicate ID No.: —

Signature(s): Fred W Ramsr

APPENDIX F

PRE-FEASIBILITY STUDY DATA VALIDATION MEMORANDA

Tetra Tech NUS

INTERNAL CORRESPONDENCE

PITT-11-9-079

TO :	G. LATULIPPE	DATE:	NOVEMBER 9, 1999
FROM:	GRETCHEN A. PHIPPS	COPIES:	DV FILE

SUBJECT: MISCELLANEOUS DATA VALIDATION –SEMIVOLATILE ORGANICS AND EXPLOSIVES
CTO 245- NSWC INDIAN HEAD, MARYLAND
SAMPLE DELIVERY GROUP SDG – IH001

SAMPLES: 3/Aqueous/

S12FB0010001 S12FB0020001 S42RB0010001

2/Soils/

S42SD0260006 S42SDDUP001

Overview

The sample set for SDG IH001, NSWC Indian Head, consists of two (2) soil environmental samples, two (2) field blanks (S12FB0010001 and S12FB0020001) and one (1) rinsate blank (S42RB0010001). One (1) field duplicate pair (S42SD0260006 / S42SDDUP001) was included within this SDG.

All samples were analyzed for explosives. Samples S12FB0010001 and S12FB0020001 were also analyzed for target compound list (TCL) semivolatiles. The samples were collected by Tetra Tech NUS on September 16 and 18, 1999 and analyzed by Quanterra Laboratories under Naval Facilities Engineering Service Center (NFESC) Quality Assurance / Quality Control (QA/QC) criteria. Explosive analyses were conducted using SW 846 method 8330. Semivolatile analyses were conducted using OCLP OLC02.1 methodologies.

Summary

All analytes were successfully analyzed. The findings offered in this report are based upon a general review of all available data including data completeness, holding times, GC/MS tuning and system performance, calibration data, laboratory method/preparation blanks, matrix spike results, laboratory duplicate results, internal standard performance, field duplicate results, laboratory control sample (LCS) results, detection limits and analyte quantitation.

Areas of concern with respect to data quality are listed below.

Notes

Diethyl phthalate was present in the laboratory method blank at a concentration of 0.77µg/L and in a field blank at the concentration of 3.2µg/L. However, field blanks are not qualified for laboratory or field blank contamination.

The Laboratory Control Sample (LCS) Percent Recovery (%R) for nitrocellulose was <80% quality control limit. No validation action was taken on this basis.

A comparison of field duplicate pair (S42SD0260006 / S42SDDUP001) is included in Appendix C.

The positive results less than the Contract Required Quantitation Limits (CRQLs) were qualified as estimated, "J".

Executive Summary

Laboratory Performance: None.

Other Factors Affecting Data Quality: None.

The data for these analyses were reviewed with reference to the "National Functional Guidelines for Organic and Inorganic Data Validation", April 1993 Revision as amended for use within USEPA Region III, and the NFESC document entitled "Navy Installation Restoration Laboratory Quality Assurance Guide" (NFESC 2/96).

The text of this report has been formulated to address only those problem areas affecting data quality.

"I attest that the data referenced herein were validated according to the agreed upon validation criteria as specified in the NFESC Guidelines and the Quality Assurance Project Plan (QAPP)."

Gretchen A. Phipps

Tetra Tech NUS
Gretchen A. Phipps
Chemist

Tetra Tech NUS
Joseph A. Samchuck
Quality Assurance Officer

Attachments:

1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as reported by the Laboratory
3. Appendix C - Support Documentation

Data Qualifier Key:

U - Value is a nondetect as reported by the laboratory.

Tetra Tech NUS **INTERNAL CORRESPONDENCE**

PITT-11-9-005

TO :	**G. LATULIPPE**	**DATE:**	**NOVEMBER 23, 1999**
FROM:	**JENNIFER MALLE**	**COPIES:**	**DV FILE**

SUBJECT: **INORGANIC DATA VALIDATION –TAL METALS, SILVER AND MISCELLANEOUS PARAMETERS**
CTO 245- NSWC INDIAN HEAD, MARYLAND
SAMPLE DELIVERY GROUP SDG – IH001

SAMPLES: 4/Aqueous/

S12FB0010001	S12FB0020001	S42RB0010001
S42RB0020001		

14/Sediment/

S42SD0170006	S42SD0180006	S42SD0180106
S42SD0190006	S42SD0190106	S42SD0200006
S42SD02000106	S42SD0210006	S42SD0210106
S42SD0220006	S42SD0220106	S42SD0230006
S42SD0240006	S42SD0250006	S42SD0260006
S42SDDUP001		

Overview

The sample set for SDG IH001, NSWC Indian Head, consists of four (4) aqueous field quality control samples and fourteen (14) sediment environmental samples. One (1) field duplicate pair (S42SD0260006 / S42SDDUP001) was included within this SDG.

The samples S12FB0010001, S12FB0020001, and S42RB0010001 were analyzed for Target Analyte List (TAL) metals, Total Organic Carbon (TOC), and nitrocellulose. Samples S42RB0020001, S425D0190006, S42D0230006, S42D0240006, and S42D0250006 were analyzed for TAL metals and TOC. Samples S42SD0260006 and S42SDDUP001 were analyzed for TAL metals, TOC, and nitrocellulose. The remaining samples, S42SD0170006, S42SD0180006, S42SD0180106, S42SD0190106, S42SD0200006, S42SD02000106, S42SD0210006, S42SD0210106, S42SD0220006, S42SD0220106 were analyzed for silver only.

The samples were collected by Tetra Tech NUS on September 16, 18-19, 1999 and analyzed by Quanterra Laboratories under Naval Facilities Engineering Service Center (NFESC) Quality Assurance / Quality Control (QA/QC) criteria. TAL metal analyses were conducted under CLP SOW ILM04.0 methodologies. TOC analyses were conducted using the Walkley-Black method and nitrocellulose analyses were conducted using EPA method 353.2.

Summary

All analytes were successfully analyzed. The findings offered in this report are based upon a general review of all available data including data completeness, holding times, calibration data, laboratory method/preparation/field blanks, field duplicate results, detection limits and analyte quantitation.

Areas of concern with respect to data quality are listed below.

Major Problems

- None

Minor Problems

- The Contract Required Detection Limits (CRDL) Percent Recoveries (%Rs) for cadmium, mercury and selenium were less than the 90% quality control limits. The positive and nondetected results reported for cadmium, mercury and selenium were qualified as biased low, "L" and "UL", respectively.

- The Contract Required Detection Limits (CRDL) Percent Recovery (%R) for thallium was greater than the 110% quality control limit. The positive results less than two times the CRDL value reported for thallium were qualified as biased high, "K".

- The following contaminants were detected in the laboratory method/preparation/field quality control blanks at the following maximum concentrations :

Samples Affected: All

Analyte	Maximum Concentration	Action Level (soil)
Aluminum [1]	22.5 ug/L	22.5 mg/kg
Antimony	2.1 ug/L	2.1 mg/kg
Barium	0.44 ug/L	0.44 mg/kg
Beryllium	0.62 ug/L	0.62 mg/kg
Calcium [1]	24.0 ug/L	24.0 mg/kg
Copper [1]	4.2 ug/L	4.2 mg/kg
Iron [2]	13.4 mg/kg	43 mg/kg
Sodium [2]	28.9 mg/kg	144.5 mg/kg
Thallium [2]	7.8 mg/kg	39 mg/kg
Zinc [1]	4.4 ug/L	4.4 mg/kg
Total Organic Carbon	96.0 mg/kg	480 mg/kg

[1] - Maximum concentration present in a rinse blank / field blank
[2] - Maximum concentration present in a soil preparation blank

An action level of 5x the maximum contaminant level has been used to evaluate sample data for blank contamination. Sample aliquot, percent solids and dilution factors were taken into consideration when evaluating for blank contamination. Positive results less than the action level for antimony, beryllium, sodium, thallium and TOC were qualified, "B", as a result of blank contamination. No action was taken for the remaining analytes since either the results were greater than the

action level or were nondetects. It should be noted that field quality control samples are not qualified for field blank or laboratory blank contamination.

- Field duplicate imprecision greater than the 50% quality control limits was noted for silver affecting the sediment sample. Positive results reported for silver in the affected samples were qualified as estimated, "J".

- Samples S42SD0200006 and S42SD0210006 have percent solids less than 30%. The positive and nondetected results reported in the above listed samples were qualified as estimated, "J" and "UJ", respectively.

Notes

Field quality control samples S12FB0010001, S12FB0020001, S42RB0010001, S42RB0020001 are for quality control purposes and therefore are not qualified for blank contamination.

Sample S12FB0020001 is a potable water source and the results are not used in qualifying for blank contamination.

The laboratory reported the analytical spike results for sample S42SD0260006 on the Electronic Deliverable Data (EDD) instead of the sample results. The laboratory was contacted and Veronica Bortot of Quanterra Laboratories verified that the correct sample results are found on the Form 1's. The EDD was corrected by the data reviewer.

The laboratory has a preparation factor of 1g/200 mL.

A comparison of the field duplicate pair (S42SD0260006/S42SDDUP001) is included in Appendix C.

Executive Summary

Laboratory Performance: Several contaminants were found in the laboratory blanks.

Other Factors Affecting Data Quality: Several contaminants were present in the field QC blanks. Field duplicate imprecision was noted for silver. The CRDL %Rs for mercury, cadmium, selenium and thallium were outside the 90-110% quality control limits. All results were qualified as estimated in samples S42SD00200006 and S42SD0210006 due to low percent solids.

The data for these analyses were reviewed with reference to the "National Functional Guidelines for Inorganic Data Validation", April 1993 Revision as amended for use within USEPA Region III, and the NFESC document entitled "Navy Installation Restoration Laboratory Quality Assurance Guide" (NFESC 2/96).

The text of this report has been formulated to address only those problem areas affecting data quality.

"I attest that the data referenced herein were validated according to the agreed upon validation criteria as specified in the NFESC Guidelines and the Quality Assurance Project Plan (QAPP)."

Tetra Tech NUS
Jennifer M. Malle
Environmental Scientist

Tetra Tech NUS
Joseph A. Samchuck
Quality Assurance Officer

Attachments:

1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as reported by the Laboratory
3. Appendix C - Support Documentation

Data Qualifier Key:

U	-	Value is a nondetect as reported by the laboratory.
B	-	Positive result is considered to be an artifact of blank contamination and should not be considered present.
UL	-	Nondetected result is considered biased low, "UL", as a result of technical noncompliances.
L	-	Positive result is considered biased low, "L", as a result of technical noncompliances.
K	-	Positive result is considered biased high, "K", as a result of technical noncompliances.
J	-	Positive result is considered estimated, "J", as a result of technical noncompliances.
UJ	-	Nondetected result is considered estimated, "UJ", as a result of technical noncompliances.

Tetra Tech NUS **INTERNAL CORRESPONDENCE**

PITT-11-9-113

TO:	**G. LATULIPPE**	**DATE:**	**DECEMBER 15, 1999**
FROM:	**TERRI L. SOLOMON**	**COPIES:**	**DV FILE**

SUBJECT: **ORGANIC DATA VALIDATION –SVOA / PESTICIDES / PCBs**
CTO 245-NSWC INDIAN HEAD, MARYLAND
SDG – IH002

SAMPLES: 2/Sediments/

S42SD0140006 S42SDDUP003

2/Aqueous/

S12FB0010001 S12FB0020001

Overview

The sample set for CTO 245, NSWC Indian Head, SDG IH007 consists of two (2) sediment environmental samples and two (2) field blanks. The sediment samples were analyzed for Target Compound List (TCL) semivolatile organic compounds (SVOAs). The aqueous samples were analyzed for low-level TCL pesticides and polychlorinated biphenyls (PCBs). One (1) field duplicate pair (S42SD0140006 / S42SDDUP003) was included within this SDG.

The samples were collected by Tetra Tech NUS on September 19 and 20, 1999 and analyzed by Quanterra Laboratories under Naval Facilities Engineering Service Center (NFESC) Quality Assurance/Quality Control (QA/QC) criteria. All analyses were conducted using Contract Laboratory (CLP) Statement of Work (SOW) ILMO3.1 and OLC02.1 analytical and reporting protocols.

Summary

All analytes were successfully analyzed. The findings offered in this report are based upon a general review of all available data including data completeness, holding times, initial / continuing calibration data, laboratory method blanks, surrogate spike recoveries, field duplicate results and detection limits.

Areas of concern with respect to data quality are listed below.

Minor Problems

- The seven day holding time for the semivolatile analyses was marginally exceeded affecting samples S42SD0140006 and S42SDDUP003. The positive results and nondetects reported in the affected samples were qualified as estimated, "J" and "UJ", respectively

- Positive results below the Contract Required Detection Limit (CRQL) were qualified as estimated, "J", due to uncertainty near the detection limit. The direction of bias cannot be determined.

Notes

A comparison of positive results for field duplicate pair S42SD0140006 / S42SDDUP003 is contained in Appendix C.

Executive Summary

Laboratory Performance: The seven day holding time for the SVOA analyses was marginally exceeded.

Other Factors Affecting Data Quality: Positive results below the CRQL were qualified as estimated.

The data for these analyses were reviewed with reference to the EPA Functional Guidelines for Organic Data Validation (9/94) as modified by Region III, and the NFESC document entitled "Navy Installation Restoration Laboratory Quality Assurance Guide " (NFESC 2/96).

The text of this report has been formulated to address only those problem areas affecting data quality.

"I attest that the data referenced herein were validated according to the agreed upon validation criteria as specified in the NFESC Guidelines and the Quality Assurance Project Plan (QAPP)."

Tetra Tech NUS
Terri L. Solomon
Chemist

Tetra Tech NUS
Joseph A. Samchuck
Quality Assurance Officer

Attachments:

1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as reported by the Laboratory
3. Appendix C - Support Documentation.

DATA QUALIFIER TABLE:

U	-	Value is a nondetect as reported by the laboratory.
J	-	Positive result is considered estimated as a result of validation noncompliances.
UJ	-	Nondetected result is considered estimated as a result of validation noncompliances.

Tentatively Identified Compounds

Semivolatiles	Unknown branched alkanes
	Unknowns
	Unknown organic acid
	Unknown straight alkanes
	Sulfur
	Unknown substituted phenol
	Unknown alcohol
	Unknown substituted benzenea
	3-methyl-benzenamine
	2,6-dichlorobenzenamine
	4-methyl benzenesulfonamide

Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration (i.e., % RSDs, %Ds, ICVs, CCVs, RPDs, RRFs, etc.) Noncompliance
D = MS/MSD Noncompliance
E = LCS/LCSD Noncompliance
F = Lab Duplicate Imprecision
G = Field Duplicate Imprecision
H = Holding Time Exceedance
I = ICP Serial Dilution Noncompliance
J = GFAA PDS - GFAA MSA's $r < 0.995$
K = ICP Interference - include ICSAB % R's
L = Instrument Calibration Range Exceedance
M = Sample Preservation
N = Internal Standard Noncompliance
O = Poor Instrument Performance (i.e., base-time drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT and Endrin
U = Pest/PCB D% between columns for positive results
V = Non-linear calibrations, tuning $r < 0.995$ (correlation coefficient)
W = EMPC result
X = Signal to noise response drop
Y = % Solid content is less than 30%

Tetra Tech NUS **INTERNAL CORRESPONDENCE**

PITT-11-9-089

TO :	**G. LATULIPPE**	**DATE:**	**DECEMBER 16, 1999**
FROM:	**GRETCHEN A. PHIPPS**	**COPIES:**	**DV FILE**

SUBJECT: **INORGANIC DATA VALIDATION –TAL METALS, SELECT METALS, TOC**
CTO 245- NSWC INDIAN HEAD, MARYLAND
SAMPLE DELIVERY GROUP SDG – IH005

SAMPLES: 3/Sediments/

S42SD0020006 S422SD0020106 S42SD0270006

16/Soils/

S41SS0010006 S41SS0020006 S41SS0030006
S41SS0030106 S41SS0040006 S41SS0040106
S41SS0050006 S41SS0060006 S41SS0060106
S41SS0070006 S41SS0070106 S41SS0080006
S41SS0090006 S41SS0090106 S41SSDUP001
S41SSDUP002

Overview

The sample set for SDG IH005, NSWC Indian Head, consists of three (3) sediment environmental samples and sixteen (16) soil environmental samples. Two (2) field duplicate pairs (S41SS0010006 / S41SSDUO001 and S41SS0080006 / S41SSDUP002) were included within this SDG.

All soil samples were analyzed for arsenic, cadmium, iron and lead. Samples S42SD002006 and S42SD0270006 were analyzed for target analyte list (TAL) metals and total organic carbon (TOC). Sample S42SD0020106 was analyzed for silver. The samples were collected by Tetra Tech NUS on September 19 and 28, 1999 and analyzed by Quanterra Laboratories under Naval Facilities Engineering Service Center (NFESC) Quality Assurance / Quality Control (QA/QC) criteria. Metals analyses were conducted using Contract Laboratory Program (CLP) methodologies. TOC analyses were conducted using the Walkley-Black method.

Summary

All analytes were successfully analyzed. The findings offered in this report are based upon a general review of all available data including data completeness, holding times, calibration data, laboratory method/preparation blanks, field duplicate results, detection limits and analyte quantitation.

All metals analyses, with the exception of Mercury, were conducted using Inductively Coupled Plasma (ICP) methodologies. Mercury analyses were conducted using cold vapor AA.

Areas of concern with respect to data quality are listed below.

Major Problems - None.

Minor Problems

- The Contract Required Detection Limit (CRDL) Percent Recovery (%R) for thallium was < 90% quality control limit. The nondetected results reported for thallium were qualified as bias low, "UL".

- The following contaminants were detected in the laboratory method / preparation blanks at the following maximum concentrations :

Samples Affected: All

Analyte	Maximum Concentration	Action Level
Barium	0.48µg/L	0.48 mg/kg
Beryllium	0.45µg/L	0.45 mg/kg
Calcium(1)	25.5 mg/kg	127.5 mg/kg
Copper	1.7µg/L	1.7 mg/kg
Iron	24.3µg/L	24.3 mg/kg
Manganese	1.1µg/L	1.1 mg/kg
Nickel(2)	8.5µg/L	8.5mg/kg
Potassium	496µg/L	496 mg/kg
Silver(2)	3.5µg/L	3.5mg/kg
Sodium(1)	3.2 mg/kg	16.0 mg/kg
Zinc(1)	3.2 mg/kg	16.0 mg/kg

(1) Maximum concentration found in a preparation blank.
(2) Maximum concentration found in a rinsate blank.

An action level of 5x the maximum contaminant level has been used to evaluate sample data for blank contamination. Sample aliquot and dilution factors were taken into consideration when evaluating for blank contamination. Positive results < the action level for beryllium, nickel, potassium, silver and zinc were qualified, "B", as a result of blank contamination.

Notes

The CRDL %R for iron was <90% quality control limit. However, no validation actions were required as the results for iron were greater than 2X CRDL.

A comparison of field duplicate pairs (S41SS0010006 / S41SSDUO001 and S41SS0080006 / S41SSDUP002) is included in Appendix C.

Executive Summary

Laboratory Performance: The CRDL %Rs for iron and thallium were <90% quality control limits. Several analytes were present in the laboratory method / preparation blanks.

Other Factors Affecting Data Quality: None.

The data for these analyses were reviewed with reference to the "National Functional Guidelines for Inorganic Data Validation", April 1993 Revision as amended for use within USEPA Region III, and the NFESC document entitled "Navy Installation Restoration Laboratory Quality Assurance Guide" (NFESC 2/96).

The text of this report has been formulated to address only those problem areas affecting data quality.

"I attest that the data referenced herein were validated according to the agreed upon validation criteria as specified in the NFESC Guidelines and the Quality Assurance Project Plan (QAPP)."

Gretchen A. Phipps

Tetra Tech NUS
Gretchen A. Phipps
Chemist

Tetra Tech NUS
Joseph A. Samchuck
Quality Assurance Officer

Attachments:

1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as reported by the Laboratory
3. Appendix C - Support Documentation

Tetra Tech NUS **INTERNAL CORRESPONDENCE**

PITT-11-9-119

TO:	**G. LATULIPPE**	**DATE:**	**NOVEMBER 15, 1999**
FROM:	**TERRI L. SOLOMON**	**COPIES:**	**DV FILE**

SUBJECT: **ORGANIC DATA VALIDATION –PESTICIDES / PCBs / EXPLOSIVES / NITROGUANIDINE / NITROCELLULOSE**
CTO 245-NSWC INDIAN HEAD, MARYLAND
SDG – IH005

SAMPLES: 18/Solids/

S41SS0010006	S41SS0020006	S41SS0030006	S41SS0030106
S41SS0040006	S41SS0040106	S41SS0050006	S41SS0060006
S41SS0060106	S41SS0070006	S41SS0070106	S41SS0080006
S41SS0090006	S41SS0090106	S41SS0100106	S41SSDUP001
S41SSDUP002	S42SD0270006		

Overview

The sample set for CTO 245, NSWC Indian Head, SDG IH005 consists of eighteen (18) solid environmental samples. All samples, with the exception of S42SD0270006, were analyzed for Target Compound List (TCL) pesticides and polychlorinated biphenyls (PCBs). Sample S42SD0270006 was analyzed for explosives and nitroguanidine. Two (2) field duplicate pairs (S41SS0010006 / S41SSDUP001 and S41SS0080006 / S41SSDUP002) were included within this SDG.

The samples were collected by Tetra Tech NUS on September 29, 1999 and analyzed by Quanterra Laboratories under Naval Facilities Engineering Service Center (NFESC) Quality Assurance/Quality Control (QA/QC) criteria. All pesticide / PCB analyses were conducted using Contract Laboratory (CLP) Statement of Work (SOW) ILMO3.1 analytical and reporting protocols. Nitroguanidine analyses were conducted using UV/HPLC. Explosive analyses were conducted using SW-846 method 8330.

Summary

All analytes were successfully analyzed with the exception of those designated, "R". The findings offered in this report are based upon a general review of all available data including data completeness, holding times, initial / continuing calibration data, laboratory method blanks, surrogate spike recoveries and detection limits.

Areas of concern with respect to data quality are listed below.

Major Problems

- The following percent differences (%Ds) between columns for the pesticide analyses were > 100% quality control limit. Positive results were qualified as rejected, "R".

Sample	Compound	%D
S41SS0010006	Aldrin	172.7
	4,4'-DDT	107.5
S41SS0040006	4,4'-DDT	639.1
S41SS0040106	Aldrin	141.4
	4,4'-DDT	107.7
	Endrin ketone	130.8
S41SS0050006	Endrin	351.6
	Endosulfan sulfate	152.6
	Endrin ketone	999.9
S41SS0060006	Endrin aldehyde	999.9
S41SS0070006	Endrin	150.0
	4,4'-DDT	367.5
	Endrin aldehyde	999.9
S41SS0070106	Aldrin	141.7
	4,4'-DDT	140.0
	Methoxychlor	197.9
	Endrin ketone	263.6
S41SS0080006	Aldrin	266.7
	Endrin	762.5
	4,4'-DDD	999.9
S41SS0090006	Endrin aldehyde	300.0
S41SS0090106	Aldrin	167.7
	Endrin ketone	142.8
	Endrin aldehyde	999.9
S41SSDUP002	Endrin	788.9
	4,4'-DDD	999.9
	Endosulfan sulfate	999.9
	gamma-Chlordane	999.9

Minor Problems

- The seven day holding time for the pesticide / PCB analyses was marginally exceeded affecting all samples. The positive results and nondetects reported in the affected samples were qualified as estimated, "J" and "UJ", respectively.

- The seven day holding time for the nitroguanidine and explosive analyses was marginally exceeded affecting sample S42SD0270006. The nondetected results reported in the affected sample were qualified as estimated, "UJ".

- The following percent differences (%Ds) between columns for the pesticide analyses were > 25% quality control but < 100%. The %Ds between columns for the PCB analyses were > 25% quality control limit. Positive results were qualified as estimated, "J". The direction of bias could not be determined.

Sample	Compound	%D
S41SS0020006	4,4'-DDT	56.2
	Aroclor-1260	28.6
S41SS0040106	Methoxychlor	69.2
S41SS0050006	Aldrin	27.8
	Endosulfan II	45.4

S41SS0060006	Endrin ketone	73.1
	Aroclor-1254	324.2
S41SS0060106	4,4'-DDT	28.4
S41SS0080006	Endosulfan II	35.3
S41SS0090006	Endosulfan II	78.6
S41SS0090106	Endosulfan II	75.0
S41SSDUP001	4,4'-DDT	50.7

- Positive results below the Contract Required Detection Limit (CRQL) were qualified as estimated, "J", due to uncertainty near the detection limit. The direction of bias cannot be determined.

Notes

Several surrogate recoveries were < 10% quality control limit due to sample dilutions. No validation actions were warranted.

Positive results for Aroclor-1260, Endosulfan II and Endrin aldehyde exceeded the linear calibration range of the instrument for sample S41SS0080006. The sample was reanalyzed at a 40X dilution. The original data, with the exception of the results for the aforementioned compounds were used in validation. The diluted results for Aroclor-1260, Endosulfan II and Endrin aldehyde were transposed over the undiluted results and used in validation.

The positive results for Aroclor-1260, 4,4'-DDT, Endosulfan II and Endrin aldehyde exceeded the linear calibration range of the instrument for sample S41SSDUP002. The sample was reanalyzed at a 50X dilution. The original data, with the exception of the results for the aforementioned compounds were used in validation. The diluted results for Aroclor-1260, 4,4'-DDT, Endosulfan II and Endrin aldehyde were transposed over the undiluted results and used in validation.

A comparison positive results of field duplicate pairs, S41SS0010006 / S41SSDUP001 and S41SS0080006 / S41SSDUP002, is contained in Appendix C.

It should be noted that the laboratory did not do a GC/MS conformation for Aroclor-1260 for sample S41SS008006.

Executive Summary

Laboratory Performance: Many %Ds between columns for the pesticide / PCB analyses were greater than the 25% and 100% quality control limits. The seven day holding time for the pesticide / PCB, nitroguanidine and explosive analyses was marginally exceeded affecting several samples.

Other Factors Affecting Data Quality: Positive results below the CRQL were qualified as estimated.

The data for these analyses were reviewed with reference to the EPA Functional Guidelines for Organic Data Validation (9/94) as modified by Region III, and the NFESC document entitled "Navy Installation Restoration Laboratory Quality Assurance Guide " (NFESC 2/96).

The text of this report has been formulated to address only those problem areas affecting data quality.

"I attest that the data referenced herein were validated according to the agreed upon validation criteria as specified in the NFESC Guidelines and the Quality Assurance Project Plan (QAPP)."

Tetra Tech NUS
Terri L. Solomon
Chemist

Tetra Tech NUS
Joseph A. Samchuck
Quality Assurance Officer

Attachments:

1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as reported by the Laboratory
3. Appendix C - Support Documentation.

DATA QUALIFIER TABLE:

U	-	Value is a nondetect as reported by the laboratory.
J	-	Positive result is considered estimated as a result of validation noncompliances.
UJ	-	Nondetected result is considered estimated as a result of validation noncompliances.
R	-	Positive result is considered rejected as a result of severe validation noncompliances.

Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration (i.e., % RSDs, %Ds, ICVs, CCVs, RPDs, RRFs, etc.) Noncompliance
D = MS/MSD Noncompliance
E = LCS/LCSD Noncompliance
F = Lab Duplicate Imprecision
G = Field Duplicate Imprecision
H = Holding Time Exceedance
I = ICP Serial Dilution Noncompliance
J = GFAA PDS - GFAA MSA's $r < 0.995$
K = ICP Interference - include ICSAB % R's
L = Instrument Calibration Range Exceedance
M = Sample Preservation
N = Internal Standard Noncompliance
O = Poor Instrument Performance (i.e., base-time drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT and Endrin
U = Pest/PCB D% between columns for positive results
V = Non-linear calibrations, tuning $r < 0.995$ (correlation coefficient)
W = EMPC result
X = Signal to noise response drop
Y = % Solid content is less than 30%

Tetra Tech NUS

INTERNAL CORRESPONDENCE

PITT 12-9-074

TO:	GEORGE LATULIPPE	DATE:	DECEMBER 16, 1999
FROM:	SEAN NIXON	COPIES:	DV FILE

SUBJECT: ORGANIC DATA VALIDATION – PESTICIDE/PCBS
CTO 245 NSWC INDIAN HEAD, MARYLAND
SDG – IH006

SAMPLES: 17/Solid

S41SS0100006	S41SS0110006	S41SS0110106	S41SS0120006
S41SS0120106	S41SS0130006	S41SS0130106	S41SS0140006
S41SS0140106	S41SS0150006	S41SS0150106	S41SS0160006
S41SS0190006	S41SS0190106	S41SS0200006	S41SSDUP003
S41SSDUP004			

2/Aqueous

S41RB0050001	S42RB00040001

Overview

The Sample Delivery Group (SDG) for CTO 245 NSWC Indian Head, Maryland SDG IH006, consists of seveneen (17) solid environmental samples and two (2) aqueous rinse blanks. Two (2) field duplicate pairs, samples S41SS011006/S41SSDUP003 and S41SS0190006/S41SSDUP004, were included in this SDG.

All of the soil samples were analyzed for Target Compound List (TCL) pesticide/PCBs. The rinse blank was analyzed for Low Concentration TCL pesticide/PCBs. The samples were collected by Tetra Tech NUS on September 29 - 30, 1999 and analyzed by Quanterra – Pittsburgh under Naval Facilities Engineering Service Center (NFESC) Quality Assurance/Quality Control (QA/QC) criteria. The pesticide/PCB analyses were conducted according to Contract Laboratory Procedure (CLP) OLM03.1 for soils, and CLP OLC02.1 for the rinse blank.

Summary

All analytes were successfully analyzed with the exception of those compounds that were rejected. The findings offered in this report were based upon a limited review of data including data completeness, holding times, calibration data, laboratory and field quality control blank results, surrogate spike recoveries, compound identification and quantification, and detection limits.

Areas of concern with respect to data quality are listed below.

MAJOR PROBLEMS

Pesticides/PCBs

- The following samples contained positive results for the following compounds which were qualified as rejected, R, for gross analytical imprecision (Percent Difference between columns greater than 100%).

Sample	Rejected Compounds
S41SS0110006:	Endrin
S41SS0110106:	Aldrin, Endrin aldehyde, Heptachlor, Heptachlor epoxide
S41SS0120006:	Aldrin, Endosulfan sulfate, Endrin
S41SS0120106:	Endrin
S41SS0130006:	Aldrin, Endrin, Endrin aldehyde, Heptachlor, Heptachlor epoxide
S41SS0130106:	Endrin aldehyde, Methoxychlor
S41SS0140006:	Aldrin, Endrin ketone, Methoxychlor
S41SS0140106:	Aldrin, Endrin ketone, Heptachlor
S41SS0160006:	4,4'-DDD, Endrin
S41SS0190006:	Endrin, Endrin aldehyde
S41SS0200006:	Endrin aldehyde
S41SSDUP003:	Endrin
S41SSDUP004:	Endrin, Endrin aldehyde, Methoxychlor

NOTES

As a result of the high concentration of Aroclor 1260 in sample S41SS0160006, the pesticide results in that sample may be wholly attributable to the PCB.

Positive results reported below the Contract Required Quantitation Limits were qualified as estimated, J.

Several samples required dilutions because of high concentrations of target analytes and elevated detection limits were reported for the nondetected results.

Several samples contained positive results that were qualified as estimated, J, for %Ds above 25%, but less than 100%, between analytical columns.

The positive results for Aroclor 1260 in samples S41SS0110006, S41SS0120006, S41SS0120106, S41SS0160006, and S41SSDUP003 were confirmed via GC-MS

Executive Summary

Laboratory Performance: Positive results for several compounds were rejected for gross analytical imprecision.

Other Factors Affecting Data Quality: None.

The data for these analyses were reviewed with reference to the "National Functional Guidelines for Organic Data Validation", September 1996 Revision as amended for use within USEPA Region III, and the NFESC document entitled "Navy Installation Restoration Laboratory Quality Assurance Guide " (NFESC 2/96).

The text of this report has been formulated to address only those problem areas affecting data quality.

"I attest that the data referenced herein were validated according to the agreed upon validation criteria as specified in the NFESC Guidelines and the Quality Assurance Project Plan (QAPP)."

Sean T. Nixon
Environmental Scientist
Tetra Tech NUS

Joseph A. Samchuck
Data Validation Quality Assurance Officer
Tetra Tech NUS

Attachments:

1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as reported by the Laboratory
3. Appendix C - Support Documentation.

DATA QUALIFIER TABLE:

U	-	Value is a nondetected result as reported by the laboratory.
UJ	-	Nondetected result is considered estimated as a result of various technical noncompliances.
J	-	Positive result is considered estimated as a result of various technical noncompliances.
R	-	Positive result is rejected for gross technical noncompliances.

Tetra Tech NUS **INTERNAL CORRESPONDENCE**

PITT-11-9-179

TO :	**G. LATULIPPE**	**DATE:**	**DECEMBER 16, 1999**
FROM:	**GRETCHEN A. PHIPPS**	**COPIES:**	**DV FILE**

SUBJECT: **INORGANIC DATA VALIDATION –TAL METALS, SELECT METALS AND TOC**
CTO 245- NSWC INDIAN HEAD, MARYLAND
SAMPLE DELIVERY GROUP SDG – IH006

SAMPLES: 2/Aqueous/

S41RB0050001 S42RB00040001

18/Soils/

S41SS0100006	S41SS0100106	S41SS0110006
S41SS0110106	S41SS0120006	S41SS0120106
S41SS0130006	S41SS0130106	S41SS0140006
S41SS0140106	S41SS0150006	S41SS0150106
S41SS0160006	S41SS0190006	S41SS0190106
S41SS0200006	S41SSDUP003	S41SSDUP004

Overview

The sample set for SDG IH006, NSWC Indian Head, consists of eighteen (18) soil environmental samples and two (2) rinsate blanks (S41RB0050001 and S42RB00040001). Two (2) field duplicate pairs (S41SS0110006 / S41SSDUP003 and S41SS0190006 / S41SSDUP004) were included within this SDG.

All samples, with exception to sample S42RB00040001, were analyzed for arsenic, cadmium, iron and lead. Sample S42RB00040001 was analyzed for target analyte list (TAL) metals and total organic carbon (TOC). The samples were collected by Tetra Tech NUS on September 29 and 30, 1999 and analyzed by Quanterra Laboratories under Naval Facilities Engineering Service Center (NFESC) Quality Assurance / Quality Control (QA/QC) criteria. Metals analyses were conducted using Contract Laboratory Program (CLP) methodologies. TOC analyses were conducted using the Walkley-Black method.

Summary

All analytes were successfully analyzed. The findings offered in this report are based upon a general review of all available data including data completeness, holding times, calibration data, laboratory method/preparation blanks, field duplicate results, detection limits and analyte quantitation.

All metals analyses, with the exception of Mercury, were conducted using Inductively Coupled Plasma (ICP) methodologies. Mercury analyses were conducted using cold vapor AA.

Areas of concern with respect to data quality are listed below.

Major Problems - None.

Minor Problems

- The Contract Required Detection Limit (CRDL) Percent Recoveries (%Rs) for mercury and iron were < 90% quality control limit. The nondetected results reported for mercury and iron were qualified as biased low, "UL".

- The CRDL %Rs for lead and thallium were both above and below the 90-110% quality control limits. The positive result <2X CRDL reported for thallium was qualified as estimated, "J". The nondetected result reported for lead was qualified as estimated, "UJ". The direction of bias could not be determined.

- The following contaminants were detected in the laboratory method / preparation blanks at the following maximum concentrations :

Samples Affected: All

Analyte	Maximum Concentration	Action Level
Cadmium	0.28 µg/L	0.28 mg/kg
Iron	32.2µg/L	32.2 mg/kg

An action level of 5x the maximum contaminant level has been used to evaluate sample data for blank contamination. Sample aliquot, percent solids and dilution factors were taken into consideration when evaluating for blank contamination. Positive results < the action level for cadmium were qualified, "B", as a result of blank contamination. It should be noted that the field quality control blanks were not qualified for field or laboratory blank contamination.

Field Duplicate Results

Field duplicate imprecision, >50% the relative percent difference (RPD), was noted for lead affecting the soil matrix. The positive results reported for lead in the affected samples were qualified as estimated, "J". The direction of bias could not be determined.

Notes

The CRDL %R for selenium was >110% quality control limit. However, no validation action was required as the result for selenium was nondetected.

A comparison of field duplicate pairs (S41SS0110006 / S41SSDUP003 and S41SS0190006 / S41SSDUP004) is included in Appendix C.

Executive Summary

Laboratory Performance: The CRDL %Rs for several analytes were outside the 90-110% quality control limits. Several analytes were present in the laboratory method / preparation blanks.

Other Factors Affecting Data Quality: Field duplicate imprecision was noted for lead affecting the soil matrix.

The data for these analyses were reviewed with reference to the "National Functional Guidelines for Inorganic Data Validation", April 1993 Revision as amended for use within USEPA Region III, and the NFESC document entitled "Navy Installation Restoration Laboratory Quality Assurance Guide" (NFESC 2/96).

The text of this report has been formulated to address only those problem areas affecting data quality.

"I attest that the data referenced herein were validated according to the agreed upon validation criteria as specified in the NFESC Guidelines and the Quality Assurance Project Plan (QAPP)."

Gretchen A. Phipps

Tetra Tech NUS
Gretchen A. Phipps
Chemist

Tetra Tech NUS
Joseph A. Samchuck
Quality Assurance Officer

Attachments:

1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as reported by the Laboratory
3. Appendix C - Support Documentation

Data Qualifier Key:

U - Value is a nondetect as reported by the laboratory.

B - Positive result is considered to be an artifact of blank contamination and should not be considered present.

J - Positive result is considered estimated, "J", as a result of validation noncompliances.

UJ - Nondetected result is considered estimated, "UJ", as a result of validation noncompliances.

UL - Nondetected result is considered biased low, "UL", as a result of validation noncompliances.

Tetra Tech NUS

INTERNAL CORRESPONDENCE

PITT-11-9-104

TO :	G. LATULIPPE	DATE:	NOVEMBER 23, 1999
FROM:	JENNIFER MALLE	COPIES:	DV FILE

SUBJECT: INORGANIC DATA VALIDATION –ARSENIC, CADMIUM, IRON AND LEAD
CTO 245- NSWC INDIAN HEAD, MARYLAND
SAMPLE DELIVERY GROUP SDG – IH007

SAMPLES: 20/Soil/

S41SS0170006	S41SS0170106	S41SS0180006
S41SS0180106	S41SS0210006	S41SS0220006
S41SS0220106	S41SS0230006	S41SS0230106
S41SS0240006	S41SS0240106	S41SS0250006
S41SS0260006	S41SS0270006	S41SS0270106
S41SS0280006	S41SS0300006	S41SS0300106
S41SS0310006	S41SS0320006	

Overview

The sample set for SDG IH007, NSWC Indian Head, consists of twenty (20) soil environmental samples. No field duplicate pairs were included within this SDG.

All samples were analyzed for selected metals including arsenic, cadmium, iron and lead. The samples were collected by Tetra Tech NUS on September 30 and October 1, 1999 and analyzed by Quanterra Laboratories under Naval Facilities Engineering Service Center (NFESC) Quality Assurance / Quality Control (QA/QC) criteria. Arsenic, cadmium, iron and lead analyses were conducted under CLP method ILM04.0.

Summary

All analytes were successfully analyzed. The findings offered in this report are based upon a general review of all available data including data completeness, holding times, calibration data, laboratory method/ preparation/ blanks, detection limits and analyte quantitation.

Areas of concern with respect to data quality are listed below.

Major Problems

None

Minor Problems

- The following contaminant was detected in the laboratory blanks at the following maximum concentration :

Samples Affected: All

Analyte	Maximum Concentration	Action Level (soil)
Iron	44.7 ug/L	44.7 mg/kg

An action level of 5x the maximum contaminant level has been used to evaluate sample data for blank contamination. Sample aliquot, percent solids and dilution factors were taken into consideration when evaluating for blank contamination. No validation action was taken for iron since all results reported were greater than the action level.

Notes

The Contract Required Detection Limit (CRDL) Percent Recoveries (%Rs) for iron and lead were less than the 90% quality control limits. However, validation action was not warranted since all results reported for iron and lead were greater than 2x the CRDL.

Sample S41SS0210006 was analyzed at a 2x dilution for cadmium, iron and lead.

Samples S41SS0250006 and S41SS0310006 were analyzed at a 5x dilution for cadmium, iron and lead.

Sample S41SS0260006 was analyzed at a 2x dilution for cadmium and iron and a 10x dilution for lead.

Sample S41SS0270006 was analyzed at a 2x dilution for lead.

The laboratory has a preparation factor of 1g/200 mL.

Executive Summary

Laboratory Performance: Iron was found in the laboratory blanks.

Other Factors Affecting Data Quality: None.

The data for these analyses were reviewed with reference to the "National Functional Guidelines for Inorganic Data Validation", April 1993 Revision as amended for use within USEPA Region III, and the NFESC document entitled "Navy Installation Restoration Laboratory Quality Assurance Guide" (NFESC 2/96).

The text of this report has been formulated to address only those problem areas affecting data quality.

"I attest that the data referenced herein were validated according to the agreed upon validation criteria as specified in the NFESC Guidelines and the Quality Assurance Project Plan (QAPP)."

Tetra Tech NUS
Jennifer M. Malle
Environmental Scientist

Tetra Tech NUS
Joseph A. Samchuck
Quality Assurance Officer

Attachments:

1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as reported by the Laboratory
3. Appendix C - Support Documentation

Tetra Tech NUS **INTERNAL CORRESPONDENCE**

PITT-11-9-109

TO:	**G. LATULIPPE**	**DATE:**	**NOVEMBER 12, 1999**
FROM:	**TERRI L. SOLOMON**	**COPIES:**	**DV FILE**

SUBJECT: **ORGANIC DATA VALIDATION –PESTICIDES / PCBs**
CTO 245-NSWC INDIAN HEAD, MARYLAND
SDG – IH007

SAMPLES: 20/Solids/

S41SS0170006	S41SS0170106	S41SS0180006	S41SS0180106
S41SS0210006	S41SS0220006	S41SS0220106	S41SS0230006
S41SS0230106	S41SS0240006	S41SS0240106	S41SS0250006
S41SS0260006	S41SS0270006	S41SS0270106	S41SS0280006
S41SS0300006	S41SS0300106	S41SS0310006	S41SS0320006

Overview

The sample set for CTO 245, NSWC Indian Head, SDG IH007 consists of twenty (20) solid environmental samples. All samples were analyzed for Target Compound List (TCL) pesticides and polychlorinated biphenyls (PCBs). No field duplicate pairs were included within this SDG.

The samples were collected by Tetra Tech NUS on September 30 and October 1, 1999 and analyzed by Quanterra Laboratories under Naval Facilities Engineering Service Center (NFESC) Quality Assurance/Quality Control (QA/QC) criteria. All pesticide / PCB analyses were conducted using Contract Laboratory (CLP) Statement of Work (SOW) ILMO3.1 analytical and reporting protocols.

Summary

All analytes were successfully analyzed with the exception of those designated, "R". The findings offered in this report are based upon a general review of all available data including data completeness; holding times, initial / continuing calibration data, laboratory method blanks, surrogate spike recoveries and detection limits.

Areas of concern with respect to data quality are listed below.

Major Problems

- The following percent differences (%Ds) between columns for the pesticide analyses were > 100% quality control limit. Positive results were qualified as rejected, "R".

Sample	Compound	%D
S41SS0170006	Endrin	779.3
	Endosulfan sulfate	271.4
	Methoxychlor	844.4
	Endrin ketone	999.9
S41SS0170106	Aldrin	230.4
	Endrin	813.0
	4,4'-DDD	999.9
	4,4'-DDT	999.9
	Methoxychlor	677.8
	Endrin ketone	999.9
	Endrin aldehyde	166.7
S41SS0180006	Endrin	694.9
S41SS0180106	4,4'-DDT	144.4
	Endrin aldehyde	426.3
S41SS0210006	Endrin	999.9
S41SS0220006	Endrin	757.1
	Endrin ketone	999.9
S41SS0220106	Endrin aldehyde	999.9
S41SS0230006	Aldrin	136.8
S41SS0230106	Endrin	427.8
	Endrin aldehyde	555.2
S41SS0240006	4,4'-DDT	300.0
	Endrin aldehyde	195.4
S41SS0250006	4,4'-DDT	308.2
	Endrin aldehyde	999.9
S41SS0270006	4,4'-DDD	257.1
	Methoxychlor	995.2
	Endrin ketone	300.0
	4,4'-DDT	125.0
S41SS0270106	4,4'-DDT	225.6
S41SS0300106	4,4'-DDD	292.8
	Methoxychlor	860.0
	Endrin ketone	214.3
	alpha-Chlordane	102.6
	gamma-Chlordane	768.4
S41SS0310006	4,4'-DDT	761.1
	Endrin ketone	233.3
	Endrin aldehyde	500.0
S41SS0320006	Methoxychlor	999.9

Minor Problems

- The seven day holding time for the pesticide / PCB analyses was marginally exceeded affecting the original and re-extraction of samples S41SS0170006, S41SS0170106, S41SS0180006, S41SS0180106, S41SS0210006, S41SS0220006, S41SS0220106, S41SS0230006, S41SS0230106, S41SS0240006, S41SS0240106 and S41SS0250006 . The positive results and nondetects reported in the affected samples were qualified as estimated, "J" and "UJ", respectively

- The following percent differences (%Ds) between columns for the pesticide analyses were > 25% quality control but < 100%. The %Ds between columns for the PCB analyses were > 25% quality control limit. Positive results were qualified as estimated, "J". The direction of bias could not be determined.

Sample	Compound	%D
S41SS0170006	Endosulfan II	54.2
S41SS0170106	Endosulfan II	59.1
	Endosulfan sulfate	63.6
S41SS0180006	Dieldrin	52.9
	Endosulfan II	69.2
	Endosulfan sulfate	90.0
	Endrin aldehyde	90.5
S41SS0210006	Dieldrin	62.1
	Endosulfan II	58.3
	Endrin aldehyde	40.0
S41SS0220006	Endosulfan II	34.8
S41SS0220106	Endrin	57.1
	Endosulfan II	75.0
	4,4'-DDT	78.6
	Endrin ketone	36.7
	Aroclor-1260	52.8
S41SS0230006	Endosulfan II	33.3
	4,4'-DDD	64.2
	4,4'-DDT	39.1
	Endrin aldehyde	69.1
	Aroclor-1260	91.7
S41SS0230106	Aldrin	28.6
	Endrin ketone	96.4
S41SS0240006	Endosulfan II	44.8
S41SS0250006	Endosulfan II	35.7
S41SS0260006	Dieldrin	70.0
	Endrin aldehyde	34.0
S41SS0270006	Endrin aldehyde	37.5
S41SS0270106	Endrin ketone	88.0
S41SS0280006	Endrin aldehyde	55.0
	Aroclor-1254	77.4
S41SS0300006	4,4'-DDT	78.0
S41SS0300106	Endrin aldehyde	28.6
	Dieldrin	84.6
	4,4'-DDT	78.6
S41SS0320006	alpha-Chlordane	27.4

- Positive results below the Contract Required Detection Limit (CRQL) were qualified as estimated, "J", due to uncertainty near the detection limit. The direction of bias cannot be determined.

Notes

Several surrogate recoveries were < 10% quality control limit due to sample dilutions. No validation actions were warranted.

The original Form I for sample S41SS0300006 did not contain a result for Toxaphene. The laboratory was contacted and the Form I was resubmitted.

Positive results for Aroclor-1260, Endosulfan II and Endrin aldehyde exceeded the linear calibration range of the instrument for sample S41SS0170006. The sample was reanalyzed at a 50X dilution. The original data, with the exception of the results for the aforementioned compounds were used in validation. The diluted results for Aroclor-1260, Endosulfan II and Endrin aldehyde were transposed over the undiluted results and used in validation.

The positive result for Aroclor-1260 exceeded the linear calibration range of the instrument for sample S41SS0170106. The sample was reanalyzed at a 20X dilution. The original data, with the exception of the result for the aforementioned compound was used in validation. The diluted result for Aroclor-1260 was transposed over the undiluted result and used in validation.

The positive result for Aroclor-1260 exceeded the linear calibration range of the instrument for sample S41SS0210006. The sample was reanalyzed at a 50X dilution. The original data, with the exception of the result for the aforementioned compound was used in validation. The diluted result for Aroclor-1260 was transposed over the undiluted result and used in validation.

Positive results for Aroclor-1260 and Endrin aldehyde exceeded the linear calibration range of the instrument for samples S41SS0220006 and S41SS0260006. The samples were reanalyzed at a 100X dilution. The original data, with the exception of the results for the aforementioned compounds were used in validation. The diluted results for Aroclor-1260 and Endrin aldehyde were transposed over the undiluted results and used in validation.

Positive results for Aroclor-1260, Endosulfan II and Endrin aldehyde exceeded the linear calibration range of the instrument for sample S41SS0270006. The sample was reanalyzed at a 20X dilution. The original data, with the exception of the results for the aforementioned compounds were used in validation. The diluted results for Aroclor-1260, Endosulfan II and Endrin aldehyde were transposed over the undiluted results and used in validation.

Positive results for Aroclor-1260, 4,4'-DDT and Endrin aldehyde exceeded the linear calibration range of the instrument for sample S41SS0300106. The sample was reanalyzed at a 20X dilution. The original data, with the exception of the results for the aforementioned compounds were used in validation. The diluted results for Aroclor-1260, 4,4'-DDT and Endrin aldehyde were transposed over the undiluted results and used in validation.

Positive results for Aroclor-1260 and Endrin aldehyde exceeded the linear calibration range of the instrument for sample S41SS0320006. The sample was reanalyzed at a 200X dilution. The original data, with the exception of the results for the aforementioned compounds were used in validation. The diluted results for Aroclor-1260 and Endrin aldehyde were transposed over the undiluted results and used in validation.

Executive Summary

Laboratory Performance: Many %Ds between columns for the pesticide / PCB analyses were greater than the 25% and 100% quality control limits. The seven day holding time for the pesticide / PCB analyses was marginally exceeded affecting several samples.

Other Factors Affecting Data Quality: Positive results below the CRQL were qualified as estimated.

The data for these analyses were reviewed with reference to the EPA Functional Guidelines for Organic Data Validation (9/94) as modified by Region III, and the NFESC document entitled "Navy Installation Restoration Laboratory Quality Assurance Guide " (NFESC 2/96).

The text of this report has been formulated to address only those problem areas affecting data quality.

"I attest that the data referenced herein were validated according to the agreed upon validation criteria as specified in the NFESC Guidelines and the Quality Assurance Project Plan (QAPP)."

Terri L. Solomon

Tetra Tech NUS
Terri L. Solomon
Chemist

Tetra Tech NUS
Joseph A. Samchuck
Quality Assurance Officer

Attachments:

1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as reported by the Laboratory
3. Appendix C - Support Documentation.

DATA QUALIFIER TABLE:

U	-	Value is a nondetect as reported by the laboratory.
J	-	Positive result is considered estimated as a result of validation noncompliances.
UJ	-	Nondetected result is considered estimated as a result of validation noncompliances.
R	-	Positive result is considered rejected as a result of severe validation noncompliances.

Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration (i.e., % RSDs, %Ds, ICVs, CCVs, RPDs, RRFs, etc.) Noncompliance
D = MS/MSD Noncompliance
E = LCS/LCSD Noncompliance
F = Lab Duplicate Imprecision
G = Field Duplicate Imprecision
H = Holding Time Exceedance
I = ICP Serial Dilution Noncompliance
J = GFAA PDS - GFAA MSA's $r < 0.995$
K = ICP Interference - include ICSAB % R's
L = Instrument Calibration Range Exceedance
M = Sample Preservation
N = Internal Standard Noncompliance
O = Poor Instrument Performance (i.e., base-time drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT and Endrin
U = Pest/PCB D% between columns for positive results
V = Non-linear calibrations, tuning $r < 0.995$ (correlation coefficient)
W = EMPC result
X = Signal to noise response drop
Y = % Solid content is less than 30%

Tetra Tech NUS

INTERNAL CORRESPONDENCE

PITT-11-9-172

TO :	G. LATULIPPE	DATE:	DECEMBER 16, 1999
FROM:	GRETCHEN A. PHIPPS	COPIES:	DV FILE

SUBJECT: INORGANIC DATA VALIDATION –SELECT METALS
CTO 245- NSWC INDIAN HEAD, MARYLAND
SAMPLE DELIVERY GROUP SDG – IH008

SAMPLES: 1/Aqueous/

S41RB0060001

19/Soils/

S41SS0280106	S41SS0290006	S41SS0290106
S41SS0330006	S41SS0330106	S41SS0340006
S41SS0340106	S41SS0350006	S41SS0350106
S41SS0360006	S41SS0360106	S41SS0370006
S41SS0370106	S41SS0380006	S41SS0380106
S41SS0390006	S41SSDUP005	S41SSDUP006
S41SSDUP007		

Overview

The sample set for SDG IH008, NSWC Indian Head, consists of nineteen (19) soil environmental samples and one (1) rinsate blank (S41RB0060001). Two (2) field duplicate pairs (S41SS0340006 / S41SSDUP006 and S41SS038006 / S41SSDUP007) were included within this SDG.

All samples were analyzed for arsenic, cadmium, iron and lead. The samples were collected by Tetra Tech NUS on October 1, 1999 and analyzed by Quanterra Laboratories under Naval Facilities Engineering Service Center (NFESC) Quality Assurance / Quality Control (QA/QC) criteria. Metals analyses were conducted using Contract Laboratory Program (CLP) methodologies.

Summary

All analytes were successfully analyzed. The findings offered in this report are based upon a limited review of the following data including data completeness, holding times, calibration data, laboratory method/preparation blanks, field duplicate results, detection limits and analyte quantitation.

All metals analyses, with the exception of Mercury, were conducted using Inductively Coupled Plasma (ICP) methodologies. Mercury analyses were conducted using cold vapor AA.

Areas of concern with respect to data quality are listed below.

Major Problems - None.

Minor Problems

- The following contaminants were detected in the laboratory method / preparation blanks at the following maximum concentrations :

Samples Affected: All

Analyte	Maximum Concentration	Action Level
Cadmium	0.27µg/L	0.27 mg/kg
Iron	29.6µg/L	29.6 mg/kg
Lead[1]	0.47 mg/kg	2.35 mg/kg

[1] Maximum concentration found in a soil preparation blank.

An action level of 5x the maximum contaminant level has been used to evaluate sample data for blank contamination. Sample aliquot, percent solids and dilution factors were taken into consideration when evaluating for blank contamination. Positive results < the action level for cadmium were qualified, "B", as a result of blank contamination. It should be noted that field quality control blanks are not qualified for laboratory or field blank contamination.

- Field duplicate imprecision (>50%) was noted for cadmium and lead affecting the soil samples. The positive results reported for lead in the affected samples were qualified as estimated, "J". The direction of bias could not be determined.

Notes

The Contract Required Detection Limit (CRDL) Percent Recoveries (%Rs) for iron and lead were outside the 90-110% quality control limit. However, no validation actions were required as the results for iron and lead were greater than 2X CRDL.

A comparison of field duplicate pairs (S41SS0340006 / S41SSDUP006 and S41SS038006 / S41SSDUP007) is included in Appendix C.

Field duplicate sample S41SSDUP005 was included within this SDG. However, the original samples (S41SS028006) was not included within the SDG.

Executive Summary

Laboratory Performance: Several analytes were present in the laboratory method / preparation blanks.

Other Factors Affecting Data Quality: Field duplicate imprecision was noted for cadmium and lead affecting the soil matrix.

The data for these analyses were reviewed with reference to the "National Functional Guidelines for Inorganic Data Validation", April 1993 Revision as amended for use within USEPA Region III, and the NFESC document entitled "Navy Installation Restoration Laboratory Quality Assurance Guide" (NFESC 2/96).

The text of this report has been formulated to address only those problem areas affecting data quality.

"I attest that the data referenced herein were validated according to the agreed upon validation criteria as specified in the NFESC Guidelines and the Quality Assurance Project Plan (QAPP)."

Gretchen A. Phipps

Tetra Tech NUS
Gretchen A. Phipps
Chemist

Tetra Tech NUS
Joseph A. Samchuck
Quality Assurance Officer

Attachments:

1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as reported by the Laboratory
3. Appendix C - Support Documentation

Data Qualifier Key:

U - Value is a nondetect as reported by the laboratory.

B - Positive result is considered to be an artifact of blank contamination and should not be considered present.

J - Positive result is considered estimated, "J", as a result of validation noncompliances.

Tetra Tech NUS

INTERNAL CORRESPONDENCE

PITT 12-9-069

TO:	GEORGE LATULIPPE	DATE:	DECEMBER 16, 1999
FROM:	SEAN NIXON	COPIES:	DV FILE

SUBJECT: ORGANIC DATA VALIDATION – PESTICIDES/PCBS
CTO 245 NSWC INDIAN HEAD, MARYLAND
SDG – IH008

SAMPLES: 19/Solid

S41SS0280106	S41SS0290006	S41SS0290106	S41SS0330006
S41SS0330106	S41SS0340006	S41SS0340106	S41SS0350006
S41SS0350106	S41SS0360006	S41SS0360106	S41SS0370006
S41SS0370106	S41SS0380006	S41SS0380106	S41SS0390006
S41SSDUP005	S41SSDUP006	S41SSDUP007	

1/Aqueous
S41RB0060001

Overview

The Sample Delivery Group (SDG) for CTO 245 NSWC Indian Head, Maryland SDG IH008, consists of nineteen (19) solid environmental samples and one (1) aqueous rinse blank. Two field duplicate pairs, samples S41SS034006/S41SSDUP006 and S41SS038006/S41SSDUP007, were included in this SDG. The field duplicate sample S41SSDUP006 was included in this SDG, but its corresponding original sample was included in another SDG.

All of the soil samples were analyzed for Target Compound List (TCL) pesticide/PCBs. The rinse blank was analyzed for Low Concentration TCL pesticide/PCBs. The samples were collected by Tetra Tech NUS on October 1, 1999 and analyzed by Quanterra – Pittsburgh under Naval Facilities Engineering Service Center (NFESC) Quality Assurance/Quality Control (QA/QC) criteria. The pesticide/PCB analyses were conducted according to Contract Laboratory Procedure (CLP) OLM03.1 for soils, and CLP OLC02.1 for the rinse blank.

Summary

All analytes were successfully analyzed with the exception of those compounds that were rejected. The findings offered in this report were based upon a limited review of data including data completeness, holding times, calibration data, laboratory and field quality control blank results, surrogate spike recoveries, field duplicate results, compound identification and quantification, and detection limits.

Areas of concern with respect to data quality are listed below.

MAJOR PROBLEMS

Pesticides/PCBs

- The following samples contained positive results for the following compounds which were qualified as rejected, R, for gross analytical imprecision (Percent Difference between columns greater than 100%).

Sample	Rejected Compounds
S41SS0280106:	Endrin aldehyde
S41SS0290006:	4,4'-DDT, Endrin aldehyde
S41SS0290106:	Endrin aldehyde
S41SS0330006:	Endrin aldehyde, 4,4'-DDD, 4,4'-DDE, Endosulfan sulfate, Endrin, Methoxychlor
S41SS0330106:	Endrin aldehyde, Aldrin, Endrin ketone,
S41SS0340006:	Endosulfan II
S41SS0350006:	4,4'-DDD, Endrin, gamma-Chlordane
S41SS0350106:	4,4'-DDD, 4,4'-DDT, Endrin aldehyde
S41SS0360006:	Endrin aldehyde
S41SS0370006:	Endrin, Endosulfan sulfate
S41SS0380006:	Dieldrin, Endrin
S41SS0380106:	4,4'-DDT, Endosulfan sulfate, Endrin, Endrin aldehyde and ketone, Methoxychlor
S41SS0390006:	4,4'-DDE, Endosulfan sulfate, Endrin, Methoxychlor
S41SSDUP005:	4,4'-DDD, Endrin
S41SSDUP006:	Endosulfan II
S41SSDUP007:	4,4'-DDD, Dieldrin, Endrin

MINOR PROBLEMS

Pesticides/PCBs

- All of the soil samples were extracted 3 days in exceedance of the seven day holding time. The positive and nondetected results were qualified as estimated, J and UJ, in all of the soil samples.

NOTES

Positive results reported below the Contract Required Quantitation Limits were qualified as estimated, J.

Several samples required dilutions because of high concentrations of target analytes and elevated detection limits were reported for the nondetected results.

Several positive results in several samples were qualified as estimated, J, for Percent Differences (%Ds) above the 25% quality control limit

GC-MS confirmation was performed for the positive results of Aroclor 1260 in samples S41SS033006, S41SS0350006, S41SS0380006, S41SS0390006, and S41SSDUP007.

Executive Summary

Laboratory Performance: Positive results for several compounds were rejected for gross analytical imprecision. All of the soil samples were extracted in exceedance of the 7 day holding time.

Other Factors Affecting Data Quality: None.

The data for these analyses were reviewed with reference to the "National Functional Guidelines for Organic Data Validation", September 1996 Revision as amended for use within USEPA Region III, and the NFESC document entitled "Navy Installation Restoration Laboratory Quality Assurance Guide " (NFESC 2/96).

The text of this report has been formulated to address only those problem areas affecting data quality.

"I attest that the data referenced herein were validated according to the agreed upon validation criteria as specified in the NFESC Guidelines and the Quality Assurance Project Plan (QAPP)."

Sean T. Nixon
Environmental Scientist
Tetra Tech NUS

Joseph A. Samchuck
Data Validation Quality Assurance Officer
Tetra Tech NUS

Attachments:

1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as reported by the Laboratory
3. Appendix C - Support Documentation.

DATA QUALIFIER TABLE:

U	-	Value is a nondetected result as reported by the laboratory.
UJ	-	Nondetected result is considered estimated as a result of various technical noncompliances.
J	-	Positive result is considered estimated as a result of various technical noncompliances.
R	-	Positive result is rejected for gross technical noncompliances.

Tetra Tech NUS **INTERNAL CORRESPONDENCE**

PITT-11-9-102

TO :	**G. LATULIPPE**	**DATE:**	**NOVEMBER 23, 1999**
FROM:	**JENNIFER MALLE**	**COPIES:**	**DV FILE**

SUBJECT: **INORGANIC DATA VALIDATION –ARSENIC, CADMIUM, IRON AND LEAD**
CTO 245- NSWC INDIAN HEAD, MARYLAND
SAMPLE DELIVERY GROUP SDG – IH009

SAMPLES: 3/Soil/

S41SS039016 S41SS0400006 S41SS0400106

Overview

The sample set for SDG IH009, NSWC Indian Head, consists of three (3) soil environmental samples. No field duplicate pairs were included within this SDG.

All samples were analyzed for selected metals including arsenic, cadmium, iron and lead. The samples were collected by Tetra Tech NUS on October 1, 1999 and analyzed by Quanterra Laboratories under Naval Facilities Engineering Service Center (NFESC) Quality Assurance / Quality Control (QA/QC) criteria. Arsenic, cadmium, iron and lead analyses were conducted under CLP method ILM04.0.

Summary

All analytes were successfully analyzed. The findings offered in this report are based upon a general review of all available data including data completeness, holding times, calibration data, laboratory method/ preparation/ blanks, detection limits and analyte quantitation.

Areas of concern with respect to data quality are listed below.

Major Problems

None

Minor Problems

- The following contaminant was detected in the laboratory blanks at the following maximum concentration :

Samples Affected: All

Analyte	Maximum Concentration	Action Level (soil)
Iron	44.7 ug/L	44.7 mg/kg

An action level of 5x the maximum contaminant level has been used to evaluate sample data for blank contamination. Sample aliquot, percent solids and dilution factors were taken into consideration when evaluating for blank contamination. No validation action was taken for iron since all results reported were greater than the action level.

Notes

The Contract Required Detection Limit (CRDL) Percent Recovery (%R) for iron was less than the 90% quality control limits. However, validation action was not warranted since all results were positive and greater than 2x the CRDL.

The Contract Required Detection Limit (CRDL) Percent Recovery (%R) for lead was less than the 90% quality control limits. However, no validation action was required as no samples from this SDG were bracketed.

The laboratory has a preparation factor of 1g/200 mL.

Executive Summary

Laboratory Performance: Iron was found in the laboratory blanks.

Other Factors Affecting Data Quality: None

The data for these analyses were reviewed with reference to the "National Functional Guidelines for Inorganic Data Validation", April 1993 Revision as amended for use within USEPA Region III, and the NFESC document entitled "Navy Installation Restoration Laboratory Quality Assurance Guide" (NFESC 2/96).

The text of this report has been formulated to address only those problem areas affecting data quality.

"I attest that the data referenced herein were validated according to the agreed upon validation criteria as specified in the NFESC Guidelines and the Quality Assurance Project Plan (QAPP)."

Jennifer M Malle

Tetra Tech NUS
Jennifer M. Malle
Environmental Scientist

Tetra Tech NUS
Joseph A. Samchuck
Quality Assurance Officer

Attachments:

1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as reported by the Laboratory
3. Appendix C - Support Documentation

Tetra Tech NUS **INTERNAL CORRESPONDENCE**

PITT-11-9-121

TO: **G. LATULIPPE** **DATE:** **NOVEMBER 15, 1999**

FROM: **TERRI L. SOLOMON** **COPIES:** **DV FILE**

SUBJECT: **ORGANIC DATA VALIDATION –PESTICIDES / PCBs**
CTO 245-NSWC INDIAN HEAD, MARYLAND
SDG – IH009

SAMPLES: 3/Solids/

S41SS0390106 S41SS0400006 S41SS0400106

Overview

The sample set for CTO 245, NSWC Indian Head, SDG IH009 consists of three (3) solid environmental samples. All samples were analyzed for Target Compound List (TCL) pesticides and polychlorinated biphenyls (PCBs). No field duplicate pairs were included within this SDG.

The samples were collected by Tetra Tech NUS on October 1, 1999 and analyzed by Quanterra Laboratories under Naval Facilities Engineering Service Center (NFESC) Quality Assurance/Quality Control (QA/QC) criteria. All pesticide / PCB analyses were conducted using Contract Laboratory (CLP) Statement of Work (SOW) ILMO3.1 analytical and reporting protocols.

Summary

All analytes were successfully analyzed with the exception of those designated, "R". The findings offered in this report are based upon a general review of all available data including data completeness, holding times, initial / continuing calibration data, laboratory method blanks, surrogate spike recoveries and detection limits.

Areas of concern with respect to data quality are listed below.

Major Problems

- The following percent differences (%Ds) between columns for the pesticide analyses were > 100% quality control limit. Positive results were qualified as rejected, "R".

Sample	Compound	%D
S41SS0390106	Endosulfan II	112.5
S41SS0400006	Endosulfan II	114.3
	Endrin ketone	566.7
	Endrin aldehyde	210.7
S41SS0400106	Endrin aldehyde	240.0

Minor Problems

- The seven day holding time for the pesticide / PCB analyses was marginally exceeded affecting all samples. The positive results and nondetects reported in the affected samples were qualified as estimated, "J" and "UJ", respectively.
- The following percent differences (%Ds) between columns for the pesticide analyses were > 25% quality control but < 100%. Positive results were qualified as estimated, "J". The direction of bias could not be determined.

Sample	Compound	%D
S41SS0390106	4,4'-DDT	65.4
S41SS0400006	4,4'-DDT	63.6
S41SS0400106	4,4'-DDT	68.0

Notes – None.

Executive Summary

Laboratory Performance: Many %Ds between columns for the pesticide analyses were greater than the 25% and 100% quality control limits. The seven day holding time for the pesticide / PCB analyses was marginally exceeded affecting several samples.

Other Factors Affecting Data Quality: None.

The data for these analyses were reviewed with reference to the EPA Functional Guidelines for Organic Data Validation (9/94) as modified by Region III, and the NFESC document entitled "Navy Installation Restoration Laboratory Quality Assurance Guide " (NFESC 2/96).

The text of this report has been formulated to address only those problem areas affecting data quality.

"I attest that the data referenced herein were validated according to the agreed upon validation criteria as specified in the NFESC Guidelines and the Quality Assurance Project Plan (QAPP)."

Tetra Tech NUS
Terri L. Solomon
Chemist

Tetra Tech NUS
Joseph A. Samchuck
Quality Assurance Officer

Attachments:

1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as reported by the Laboratory
3. Appendix C - Support Documentation.

DATA QUALIFIER TABLE:

U	-	Value is a nondetect as reported by the laboratory.
J	-	Positive result is considered estimated as a result of validation noncompliances.
UJ	-	Nondetected result is considered estimated as a result of validation noncompliances.
R	-	Positive result is considered rejected as a result of severe validation noncompliances.

APPENDIX G

PRELIMINARY REMEDIATION GOALS CALCULATIONS

APPENDIX G.1

PRELIMINARY REMEDIATION GOAL SPREADSHEETS

Appendix Table A

Preliminary Remediation Goals Based on Remedial Investigation Methodology - Full Time Employee

Site 41 - Scrapyard

IHDIV - NSWC, Indian Head, Maryland

Chemical of Concern	EPA Region 3 Industrial PRG (mg/kg)	EPA Region 9 Industrial PRG (mg/kg)	Maximum Concentration (mg/kg)	Exposure Point Concentration (mg/kg)	Hazard Index	PRG: Target HI= 0.2 (mg/kg)	PRG: Target HI= 1 (mg/kg)	PRG: Target HI= 3 (mg/kg)	Cancer Risk Estimate	PRG: Target CR= 1.0E-06 (mg/kg)	PRG: Target CR= 1.0E-05 (mg/kg)	PRG: Target CR= 1.0E-04 (mg/kg)
Arsenic	3.8	2.7	328	144	1.2	2.5E+01	1.3E+02	3.8E+02	1.9E-04	7.8E-01	7.8E+00	7.8E+01
Cadmium	2000	810	45.6	45.6	0.4	2.1E+01	1.1E+02	3.2E+02	1.5E-08	3.0E+03	3.0E+04	3.0E+05
Chromium (1)	6100/3,100,000	64/450/100,000	88.2	54.8	0.6	2.0E+01	9.9E+01	3.0E+02	1.2E-07	4.6E+02	4.6E+03	4.6E+04
Aroclor 1260	2.9	1	180	180	NT	NA	NA	NA	4.5E-04	4.0E-01	4.0E+00	4.0E+01
Benzo(a)pyrene	0.78	0.29	2	2	NT	NA	NA	NA	5.1E-06	3.9E-01	3.9E+00	3.9E+01
Dibenzo(ah)anthracene	0.78	0.29	0.85	0.571	NT	NA	NA	NA	1.5E-06	3.9E-01	3.9E+00	3.9E+01

NT - No toxicity criteria available

NA - Not applicable because no toxicity criteria available

HI - Hazard Index

CR - Cancer Risk

RBC - Risk-based conentration

PRG - Preliminary Remediation Goal

1) Region 9 PRGs presented assume hex chrome only, a mixture of tri and hex chrome (1:6 ratio of Cr 6 to Cr 3), and trivalent chrome only, respectively. The Region 3 RBCs presented assume hex chrome only and trivalent chrome only, respectively.

Appendix Table B
Preliminary Remediation Goals Based on Remedial Investigation Methodology - Maintenance Worker
Site 41 - Scrapyard
IHDIV - NSWC, Indian Head, Maryland

Chemical of Concern	EPA Region 3 Industrial PRG (mg/kg)	EPA Region 9 Industrial PRG (mg/kg)	Maximum Concentration (mg/kg)	Exposure Point Concentration (mg/kg)	Hazard Index	PRG: Target HI= 0.2 (mg/kg)	PRG: Target HI= 1 (mg/kg)	PRG: Target HI= 3 (mg/kg)	Cancer Risk Estimate	PRG: Target CR= 1.0E-06 (mg/kg)	PRG: Target CR= 1.0E-05 (mg/kg)	PRG: Target CR= 1.0E-04 (mg/kg)
Arsenic	**3.8**	**2.7**	328	144	0.1	2.1E+02	**1.0E+03**	3.1E+03	2.22E-05	**6.5E+00**	6.5E+01	6.5E+02
Cadmium	**2000**	**810**	45.6	45.6	0.1	1.8E+02	**8.9E+02**	2.7E+03	1.83E-09	**2.5E+04**	2.5E+05	2.5E+06
Chromium (1)	**6100/3,100,000**	**64/450/100,000**	88.2	54.8	0.1	1.7E+02	**8.3E+02**	2.5E+03	1.43E-08	**3.8E+03**	3.8E+04	3.8E+05
Aroclor 1260	**2.9**	**1**	180	180	NT	NA	**NA**	NA	5.40E-05	**3.3E+00**	3.3E+01	3.3E+02
Benzo(a)pyrene	**0.78**	**0.29**	2	2	NT	NA	**NA**	NA	6.12E-07	**3.3E+00**	3.3E+01	3.3E+02
Dibenz(a,h)anthracene	**0.78**	**0.29**	0.85	0.571	NT	NA	**NA**	NA	1.75E-07	**3.3E+00**	3.3E+01	3.3E+02

NT - No toxicity criteria available
NA - Not applicable because no toxicity criteria available
HI - Hazard Index
CR - Cancer Risk
RBC - Risk-based conentration
PRG - Preliminary Remediation Goal

1) Region 9 PRGs presented assume hex chrome only, a mixture of tri and hex chrome (1:6 ratio of Cr 6 to Cr 3), and trivalent chrome only, respectively. The Region 3 RBCs presented assume hex chrome only and trivalent chrome only, respectively.

Appendix Table C
Preliminary Remediation Goals Based on Remedial Investigation Methodology - Construction Worker
Site 41 - Scrapyard
IHDIV - NSWC, Indian Head, Maryland

Chemical of Concern	EPA Region 3 Industrial PRG (mg/kg)	EPA Region 9 Industrial PRG (mg/kg)	Maximum Concentration (mg/kg)	Exposure Point Concentration (mg/kg)	Hazard Index	PRG: Target HI= 0.2 (mg/kg)	PRG: Target HI= 1 (mg/kg)	PRG: Target HI= 3 (mg/kg)	Cancer Risk Estimate	PRG: Target CR= 1.0E-06 (mg/kg)	PRG: Target CR= 1.0E-05 (mg/kg)	PRG: Target CR= 1.0E-04 (mg/kg)
Arsenic	3.8	2.7	328	328	6.4	1.0E+01	5.1E+01	1.5E+02	4.3E-05	7.7E+00	7.7E+01	7.7E+02
Cadmium	2000	810	45.6	8.59	0.1	1.4E+01	6.9E+01	2.1E+02	1.5E-08	5.7E+02	5.7E+03	5.7E+04
Chromium (1)	6100/3,100,000	64/450/100,000	88.2	31.8	0.4	1.7E+01	8.4E+01	2.5E+02	3.6E-07	8.7E+01	8.7E+02	8.7E+03
Aroclor 1260	2.9	1	180	180	NT	NA	NA	NA	3.7E-05	4.8E+00	4.8E+01	4.8E+02
Benzo(a)pyrene	0.78	0.29	2	0.509	NT	NA	NA	NA	2.2E-07	2.3E+00	2.3E+01	2.3E+02
Dibenz(a,h)anthracene	0.78	0.29	0.85	0.299	NT	NA	NA	NA	1.3E-07	2.3E+00	2.3E+01	2.3E+02

NT - No toxicity criteria available
NA - Not applicable because no toxicity criteria available
HI - Hazard Index
CR - Cancer Risk
RBC - Risk-based conentration
PRG - Preliminary Remediation Goal

1) Region 9 PRGs presented assume hex chrome only, a mixture of tri and hex chrome (1:6 ratio of Cr 6 to Cr 3), and trivalent chrome only, respectively. The Region 3 RBCs presented assume hex chrome only and trivalent chrome only, respectively.

APPENDIX G.2

EXAMPLE CALCULATIONS
FOR
PRELIMINARY REMEDIATION GOALS

TETRA TECH NUS, INC. **CALCULATION WORKSHEET** PAGE 1 OF

CLIENT: NSWC Indian Head	JOB NUMBER: 7129
SUBJECT: Calculation of PRGs for Surface Soils for the Site 41 Scrap Yard	
BASED ON: BAGS Methodology	DRAWING NUMBER:
BY: L.A. SINALOEA / CHECKED BY: R. Lupi	APPROVED BY: / DATE:

Purpose: Calculate PRGs for workers (full time employees, maintenance workers, construction workers) exposed to soils.

Step 1: Calculate cancer and non-cancer risks associated with chemical of potential concern (COPC) concentrations in surface soils. (See attached tables: K-3.3.1)

Step 2: Select Chemicals of Concern (COCs) for Feasibility Study (FS) based on baseline risk assessment results. Use an HI = 0.2 and a cancer risk estimate = 10^{-6} as selection criteria for COCs. Because all equations are linear, one can calculate PRGs for COCs based on results presented in baseline risk assessment and assumed target risk levels:

$$\frac{\text{Exposure Point Concentration}_{\text{chemical}_i}}{\text{Calculated Risk or HI}_{\text{chemical}_i}} = \frac{\text{Preliminary Remediation Goal}}{\text{Target Cancer Risk or HI}}$$

For example:

- the HI calculated for 54.8 mg/Kg of chromium at Site 41 for the full-time employee is 5.53E-01.
- Assuming a target HI = 1, the PRG may be calculated as follows:

$$\frac{54.8 \text{ mg/Kg}}{0.553} = \frac{?}{1}$$

$$? = \text{PRG} = 99.1 \text{ mg/Kg}$$

Table K-3.3.1

Estimated RME Cancer Risks and Noncarcinogenic Hazard Indices - Surface Soil
Site 41 - Scrap Yard
IHDIV - NSWC, Indian Head, Maryland

Representative Concentration	Substance	Estimated Hazard Index** Full-Time Employee					Estimated Hazard Index** Maintenance Worker					Estimated Hazard Index** Adolescent Trespasser				
		Ingestion	Dermal Contact	Inhalation of Volatiles	Inhalation of Dusts	Total	Ingestion	Dermal Contact	Inhalation of Volatiles	Inhalation of Dusts	Total	Ingestion	Dermal Contact	Inhalation of Volatiles	Inhalation of Dusts	Total
7.87	Antimony	1.93E-02	8.28E-02	NA	NT	1.02E-01	2.31E-03	9.93E-03	NA	NT	1.22E-02	2.01E-03	7.46E-03	NA	NT	9.47E-03
144	Arsenic	4.70E-01	6.80E-01	NA	NT	1.15E+00	5.64E-02	8.16E-02	NA	NT	1.38E-01	4.89E-02	6.13E-02	NA	NT	1.10E-01
45.6	Cadmium	4.46E-02	3.84E-01	NA	NT	4.28E-01	5.35E-03	4.60E-02	NA	NT	5.14E-02	4.65E-03	3.46E-02	NA	NT	3.92E-02
54.8	Chromium	1.07E-02	4.61E-01	NA	8.12E-02	5.53E-01	1.29E-03	5.53E-02	NA	9.75E-03	6.64E-02	1.12E-03	4.16E-02	NA	5.42E-03	4.81E-02
170	Copper	4.16E-03	2.98E-03	NA	NT	7.14E-03	4.99E-04	3.58E-04	NA	NT	8.57E-04	4.33E-04	2.69E-04	NA	NT	7.02E-04
36700	Iron	1.20E-01	5.15E-02	NA	NT	1.71E-01	1.44E-02	6.18E-03	NA	NT	2.05E-02	1.25E-02	4.64E-03	NA	NT	1.71E-02
3540	Lead	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT
1.64	Mercury	NT	NT	NA	2.83E-06	2.83E-06	NT	NT	NA	3.39E-07	3.39E-07	NT	NT	NA	1.89E-07	1.89E-07
180000	Aroclor-1260	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT
2800	Benz(a)anthracene	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT
2000	Benzo(a)pyrene	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT
3400	Benzo(b)fluoranthene	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
571	Dibenz(a,h)anthracene	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT
1600	Indeno(1,2,3-cd)pyrene	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT
	Total Risk:	6.68E-01	1.66E+00	NT	8.12E-02	2.41E+00	8.02E-02	1.99E-01	NT	9.75E-03	2.89E-01	6.96E-02	1.50E-01	NT	5.42E-03	2.25E-01

Notes:

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

NT -- No toxicity factor (slope factor or RfD) is applicable for the selected COPCs for this exposure route.
Risks due to lead are evaluated separately using the IEUBK or adult toxicity model.

NA -- Exposure route not applicable for that substance in that medium for that receptor.

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

Estimated cancer and noncancer risks assume a Reasonable Maximum Exposure (RME).

The representative concentration is selected as presented in a preceding data evaluation table.

Table K-3.3.1

Estimated RME Cancer Risks and Noncarcinogenic Hazard Indices - Surface Soil
Site 41 - Scrap Yard
IHDIV - NSWC, Indian Head, Maryland

Representative Concentration	Substance	Estimated Incremental Cancer Risk Full-Time Employee					Estimated Incremental Cancer Risk Maintenance Worker					Estimated Incremental Cancer Risk Adolescent Trespasser				
		Ingestion	Dermal Contact	Inhalation of Volatiles	Inhalation of Dusts	Total	Ingestion	Dermal Contact	Inhalation of Volatiles	Inhalation of Dusts	Total	Ingestion	Dermal Contact	Inhalation of Volatiles	Inhalation of Dusts	Total
7.87	Antimony	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT
144	Arsenic	7.55E-05	1.09E-04	NA	1.15E-07	1.85E-04	9.08E-06	1.31E-05	NA	1.38E-08	2.22E-05	3.15E-06	3.94E-06	NA	3.07E-09	7.09E-06
45.6	Cadmium	NT	NT	NA	1.52E-08	1.52E-08	NT	NT	NA	1.83E-09	1.83E-09	NT	NT	NA	4.06E-10	4.06E-10
54.8	Chromium	NT	NT	NA	1.19E-07	1.19E-07	NT	NT	NA	1.43E-08	1.43E-08	NT	NT	NA	3.17E-09	3.17E-09
170	Copper	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT
36700	Iron	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT
3540	Lead	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT
1.64	Mercury	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT
180000	Aroclor-1260	1.26E-04	3.25E-04	NA	1.91E-08	4.50E-04	1.51E-05	3.89E-05	NA	2.29E-09	5.40E-05	5.24E-06	1.17E-05	NA	5.08E-10	1.69E-05
2800	Benz(a)anthracene	7.14E-07	NT	NA	NT	7.14E-07	8.57E-08	NT	NA	NT	8.57E-08	2.98E-08	NT	NA	NT	2.98E-08
2000	Benzo(a)pyrene	5.10E-06	NT	NA	3.28E-10	5.10E-06	6.12E-07	NT	NA	3.94E-11	6.12E-07	2.13E-07	NT	NA	8.76E-12	2.13E-07
3400	Benzo(b)fluoranthene	8.67E-07	NT	NT	NT	8.67E-07	1.04E-07	NT	NT	NT	1.04E-07	3.61E-08	NT	NT	NT	3.61E-08
571	Dibenz(a,h)anthracene	1.46E-06	NT	NA	NT	1.46E-06	1.75E-07	NT	NA	NT	1.75E-07	6.07E-08	NT	NA	NT	6.07E-08
1600	Indeno(1,2,3-cd)pyrene	4.08E-07	NT	NA	NT	4.08E-07	4.90E-08	NT	NA	NT	4.90E-08	1.70E-08	NT	NA	NT	1.70E-08
	Total Risk:	2.10E-04	4.34E-04	NT	2.69E-07	6.44E-04	2.52E-05	5.21E-05	NT	3.22E-08	7.73E-05	8.74E-06	1.56E-05	NT	7.17E-09	2.44E-05

Notes:

Units are ug/kg for organics, mg/kg for inorganics.
NT -- No toxicity factor (slope factor or RfD) is applicable for the selected COPCs for this exposure route.
Risks due to lead are evaluated separately using the IEUBK or adult toxicity model.
NA -- Exposure route not applicable for that substance in that medium for that receptor.
Hazard Indices (i.e., summation of the hazard quotients) are used only for comparison purposes and do not reflect actual additive noncarcinogenic effects.
Estimated cancer and noncancer risks assume a Reasonable Maximum Exposure (RME).
The representative concentration is selected as presented in a preceding data evaluation table.

Table K-3.3.2

Estimated CTE Cancer Risks and Noncarcinogenic Hazard Indices - Surface Soil
Site 41 - Scrap Yard
IHDIV - NSWC, Indian Head, Maryland

Representative Concentration	Substance	Estimated Hazard Index** Full-Time Employee					Estimated Hazard Index** Maintenance Worker					Estimated Hazard Index** Adolescent Trespasser				
		Ingestion	Dermal Contact	Inhalation of Volatiles	Inhalation of Dusts	Total	Ingestion	Dermal Contact	Inhalation of Volatiles	Inhalation of Dusts	Total	Ingestion	Dermal Contact	Inhalation of Volatiles	Inhalation of Dusts	Total
2.38	Antimony	2.55E-03	4.39E-03	NA	NT	6.94E-03	1.75E-04	3.00E-04	NA	NT	4.75E-04	1.52E-04	2.26E-04	NA	NT	3.77E-04
108	Arsenic	1.54E-01	8.94E-02	NA	NT	2.44E-01	1.06E-02	6.12E-03	NA	NT	1.67E-02	9.17E-03	4.60E-03	NA	NT	1.38E-02
9.69	Cadmium	4.15E-03	1.43E-02	NA	NT	1.84E-02	2.84E-04	9.78E-04	NA	NT	1.26E-03	2.47E-04	7.35E-04	NA	NT	9.82E-04
26.2	Chromium	2.25E-03	3.66E-02	NA	1.70E-02	5.79E-02	1.54E-04	2.65E-03	NA	1.17E-03	3.96E-03	1.34E-04	1.99E-03	NA	6.47E-04	2.77E-03
59.1	Copper	6.33E-04	1.82E-04	NA	NT	8.15E-04	4.34E-05	1.24E-05	NA	NT	5.58E-05	3.77E-05	9.34E-06	NA	NT	4.70E-05
28300	Iron	4.04E-02	6.95E-03	NA	NT	4.74E-02	2.77E-03	4.76E-04	NA	NT	3.25E-03	2.40E-03	3.58E-04	NA	NT	2.76E-03
476	Lead	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT
0.773	Mercury	NT	NT	NA	5.84E-07	5.84E-07	NT	NT	NA	4.00E-08	4.00E-08	NT	NT	NA	2.22E-08	2.22E-08
23000	Aroclor-1260	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT
791	Benz(a)anthracene	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT
604	Benzo(a)pyrene	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT
1250	Benzo(b)fluoranthene	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
316	Dibenz(a,h)anthracene	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT
557	Indeno(1,2,3-cd)pyrene	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT
	Total Risk:	2.04E-01	1.54E-01	NT	1.70E-02	3.75E-01	1.40E-02	1.05E-02	NT	1.17E-03	2.57E-02	1.21E-02	7.91E-03	NT	6.48E-04	2.07E-02

Notes:

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

NT – No toxicity factor (slope factor or RfD) is applicable for the selected COPCs for this exposure route.
Risks due to lead are evaluated separately using the IEUBK or adult toxicity model.

NA – Exposure route not applicable for that substance in that medium for that receptor.

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

Estimated cancer and noncancer risks assume a Central Tendency Exposure (CTE).

The representative concentration is selected as presented in a preceding data evaluation table.

Table K-3.3.2

Estimated CTE Cancer Risks and Noncarcinogenic Hazard Indices - Surface Soil
Site 41 - Scrap Yard
IHDIV - NSWC, Indian Head, Maryland

Representative Concentration	Substance	Estimated Incremental Cancer Risk Full-Time Employee					Estimated Incremental Cancer Risk Maintenance Worker					Estimated Incremental Cancer Risk Adolescent Trespasser				
		Ingestion	Dermal Contact	Inhalation of Volatiles	Inhalation of Dusts	Total	Ingestion	Dermal Contact	Inhalation of Volatiles	Inhalation of Dusts	Total	Ingestion	Dermal Contact	Inhalation of Volatiles	Inhalation of Dusts	Total
2.38	Antimony	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT
108	Arsenic	4.96E-06	2.87E-06	NA	7.56E-09	7.84E-06	3.40E-07	1.97E-07	NA	5.18E-10	5.37E-07	5.90E-07	2.96E-07	NA	5.76E-10	8.86E-07
9.69	Cadmium	NT	NT	NA	2.83E-10	2.83E-10	NT	NT	NA	1.94E-11	1.94E-11	NT	NT	NA	2.16E-11	2.16E-11
26.2	Chromium	NT	NT	NA	4.98E-09	4.98E-09	NT	NT	NA	3.41E-10	3.41E-10	NT	NT	NA	3.79E-10	3.79E-10
59.1	Copper	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT
28300	Iron	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT
476	Lead	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT
0.773	Mercury	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT
23000	Aroclor-1260	1.41E-06	1.45E-06	NA	2.13E-10	2.86E-06	9.64E-08	9.95E-08	NA	1.46E-11	1.96E-07	1.67E-07	1.50E-07	NA	1.62E-11	3.17E-07
791	Benz(a)anthracene	1.77E-08	NT	NA	NT	1.77E-08	1.21E-09	NT	NA	NT	1.21E-09	2.10E-09	NT	NA	NT	2.10E-09
604	Benzo(a)pyrene	1.35E-07	NT	NA	8.68E-12	1.35E-07	9.24E-09	NT	NA	5.95E-13	9.25E-09	1.61E-08	NT	NA	6.61E-13	1.61E-08
1250	Benzo(b)fluoranthene	2.79E-08	NT	NT	NT	2.79E-08	1.91E-09	NT	NT	NT	1.91E-09	3.32E-09	NT	NT	NT	3.32E-09
318	Dibenz(a,h)anthracene	7.06E-08	NT	NA	NT	7.06E-08	4.84E-09	NT	NA	NT	4.84E-09	8.40E-09	NT	NA	NT	8.40E-09
557	Indeno(1,2,3-cd)pyrene	1.24E-08	NT	NA	NT	1.24E-08	8.53E-10	NT	NA	NT	8.53E-10	1.48E-09	NT	NA	NT	1.48E-09
	Total Risk:	**6.63E-06**	**4.33E-06**	**NT**	**1.31E-08**	**1.10E-05**	**4.54E-07**	**2.96E-07**	**NT**	**8.94E-10**	**7.51E-07**	**7.89E-07**	**4.45E-07**	**NT**	**9.93E-10**	**1.23E-06**

Notes:

Units are ug/kg for organics, mg/kg for inorganics.
NT -- No toxicity factor (slope factor or RfD) is applicable for the selected COPCs for this exposure route.
Risks due to lead are evaluated separately using the IEUBK or adult toxicity model.
NA -- Exposure route not applicable for that substance in that medium for that receptor.
Hazard indices (i.e., summation of the hazard quotients) are used only for comparison purposes and do not reflect actual additive noncarcinogenic effects.
Estimated cancer and noncancer risks assume a Central Tendency Exposure (CTE).
The representative concentration is selected as presented in a preceding data evaluation table.

Table K-3.3.3

Estimated RME Cancer Risks and Noncarcinogenic Hazard Indices - All Soils
Site 41 - Scrap Yard
IHDIV - NSWC, Indian Head, Maryland

Representative Concentration	Substance	Estimated Hazard Index** Construction Worker					Estimated Hazard Index** Residential Child					Estimated Hazard Index** Residential Adult					Estimated Incremental Cancer Risk Construction Worker				
		Ingestion	Dermal Contact	Inhalation of Volatiles	Inhalation of Dusts	Total	Ingestion	Dermal Contact	Inhalation of Volatiles	Inhalation of Dusts	Total	Ingestion	Dermal Contact	Inhalation of Volatiles	Inhalation of Dusts	Total	Ingestion	Dermal Contact	Inhalation of Volatiles	Inhalation of Dusts	Total
33200	Nitrocellulose	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT
4.35	Antimony	4.49E-02	5.64E-02	NA	NT	1.01E-01	1.39E-01	1.21E-01	NA	NT	2.60E-01	1.49E-02	7.45E-02	NA	NT	8.94E-02	NT	NT	NA	NT	NT
328	Arsenic	4.52E+00	1.91E+00	NA	NT	6.43E+00	1.40E+01	4.10E+00	NA	NT	1.81E+01	1.50E+00	2.52E+00	NA	NT	4.02E+00	2.90E-05	1.23E-05	NA	1.38E-06	4.27E-05
8.59	Cadmium	3.55E-02	8.91E-02	NA	NT	1.25E-01	1.10E-01	1.91E-01	NA	NT	3.01E-01	1.18E-02	1.18E-01	NA	NT	1.29E-01	NT	NT	NA	1.51E-08	1.51E-08
31.8	Chromium	2.63E-02	3.30E-01	NA	6.22E+00	6.58E+00	8.13E-02	7.09E-01	NA	1.85E-01	9.75E-01	8.71E-03	4.36E-01	NA	6.60E-02	5.10E-01	NT	NT	NA	3.64E-07	3.64E-07
66.3	Copper	6.85E-03	1.43E-03	NA	NT	8.28E-03	2.12E-02	3.08E-03	NA	NT	2.43E-02	2.27E-03	1.89E-03	NA	NT	4.16E-03	NT	NT	NA	NT	NT
51100	Iron	7.04E-01	8.83E-02	NA	NT	7.92E-01	2.18E+00	1.90E-01	NA	NT	2.37E+00	2.33E-01	1.17E-01	NA	NT	3.50E-01	NT	NT	NA	NT	NT
942	Lead	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT
0.622	Mercury	NT	NT	NA	1.42E-04	1.42E-04	NT	NT	NA	4.20E-06	4.20E-06	NT	NT	NA	1.50E-06	1.50E-06	NT	NT	NA	NT	NT
180000	Aroclor-1260	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT	2.13E-05	1.60E-05	NA	1.01E-07	3.74E-05
643	Benz(a)anthracene	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT	2.77E-08	NT	NA	NT	2.77E-08
509	Benzo(a)pyrene	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT	2.19E-07	NT	NA	4.41E-10	2.20E-07
1060	Benzo(b)fluoranthene	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	4.57E-08	NT	NT	NT	4.57E-08
299	Dibenz(a,h)anthracene	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT	1.29E-07	NT	NA	NT	1.29E-07
483	Indeno(1,2,3-cd)pyrene	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT	2.08E-08	NT	NA	NT	2.08E-08
	Total Risk:	**5.34E+00**	**2.47E+00**	**NT**	**6.22E+00**	**1.40E+01**	**1.65E+01**	**5.32E+00**	**NT**	**1.85E-01**	**2.20E+01**	**1.77E+00**	**3.27E+00**	**NT**	**6.60E-02**	**5.10E+00**	**5.07E-05**	**2.83E-05**	**NT**	**1.87E-06**	**8.09E-05**

Notes:

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

NT -- No toxicity factor (slope factor or RfD) is applicable for the selected COPCs for this exposure route. Risks due to lead are evaluated separately using the IEUBK or adult toxicity model.

NA -- Exposure route not applicable for that substance in that medium for that receptor.

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

Estimated cancer and noncancer risks assume a Reasonable Maximum Exposure (RME).

The representative concentration is selected as presented in a preceding data evaluation table.

Table K-3.3.3

Estimated RME Cancer Risks and Noncarcinogenic Hazard Indices - All Soils
Site 41 - Scrap Yard
IHDIV - NSWC, Indian Head, Maryland

Representative Concentration	Substance	Estimated Incremental Cancer Risk Residential Child					Estimated Incremental Cancer Risk Residential Adult					Estimated Incremental Cancer Risk Lifetime Resident				
		Ingestion	Dermal Contact	Inhalation of Volatiles	Inhalation of Dusts	Total	Ingestion	Dermal Contact	Inhalation of Volatiles	Inhalation of Dusts	Total	Ingestion	Dermal Contact	Inhalation of Volatiles	Inhalation of Dusts	Total
33200	Nitrocellulose	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT
4.35	Antimony	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT
328	Arsenic	5.39E-04	1.58E-04	NA	2.47E-07	6.98E-04	2.31E-04	3.89E-04	NA	3.52E-07	6.21E-04	7.70E-04	5.47E-04	NA	5.99E-07	1.32E-03
8.59	Cadmium	NT	NT	NA	2.70E-09	2.70E-09	NT	NT	NA	3.85E-09	3.85E-09	NT	NT	NA	6.55E-09	6.55E-09
31.8	Chromium	NT	NT	NA	6.49E-08	6.49E-08	NT	NT	NA	9.27E-08	9.27E-08	NT	NT	NA	1.58E-07	1.58E-07
66.3	Copper	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT
51100	Iron	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT
942	Lead	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT
0.622	Mercury	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT
180000	Aroclor-1260	3.95E-04	2.06E-04	NA	1.79E-08	6.01E-04	1.69E-04	5.07E-04	NA	2.56E-08	6.76E-04	5.64E-04	7.14E-04	NA	4.35E-08	1.28E-03
643	Benz(a)anthracene	5.14E-07	NT	NA	NT	5.14E-07	2.20E-07	NT	NA	NT	2.20E-07	7.35E-07	NT	NA	NT	7.35E-07
509	Benzo(a)pyrene	4.07E-06	NT	NA	7.86E-11	4.07E-06	1.75E-06	NT	NA	1.12E-10	1.75E-06	5.82E-06	NT	NA	1.91E-10	5.82E-06
1060	Benzo(b)fluoranthene	8.48E-07	NT	NT	NT	8.48E-07	3.63E-07	NT	NT	NT	3.63E-07	1.21E-06	NT	NT	NT	1.21E-06
299	Dibenz(a,h)anthracene	2.39E-06	NT	NA	NT	2.39E-06	1.03E-06	NT	NA	NT	1.03E-06	3.42E-06	NT	NA	NT	3.42E-06
483	Indeno(1,2,3-cd)pyrene	3.86E-07	NT	NA	NT	3.86E-07	1.66E-07	NT	NA	NT	1.66E-07	5.52E-07	NT	NA	NT	5.52E-07
	Total Risk:	9.42E-04	3.65E-04	NT	3.32E-07	1.31E-03	4.04E-04	8.96E-04	NT	4.75E-07	1.30E-03	1.35E-03	1.26E-03	NT	8.07E-07	2.61E-03

Notes:

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

NT -- No toxicity factor (slope factor or RfD) is applicable for the selected COPCs for this exposure route.
Risks due to lead are evaluated separately using the IEUBK or adult toxicity model.

NA -- Exposure route not applicable for that substance in that medium for that receptor.

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

Estimated cancer and noncancer risks assume a Reasonable Maximum Exposure (RME).

The representative concentration is selected as presented in a preceding data evaluation table.

Table K-3.3.4

Estimated CTE Cancer Risks and Noncarcinogenic Hazard Indices - All Soils
Site 41 - Scrap Yard
IHDIV - NSWC, Indian Head, Maryland

Representative Concentration	Substance	Estimated Hazard Index** Construction Worker					Estimated Hazard Index** Residential Child					Estimated Hazard Index** Residential Adult					Estimated Incremental Cancer Risk Construction Worker				
		Ingestion	Dermal Contact	Inhalation of Volatiles	Inhalation of Dusts	Total	Ingestion	Dermal Contact	Inhalation of Volatiles	Inhalation of Dusts	Total	Ingestion	Dermal Contact	Inhalation of Volatiles	Inhalation of Dusts	Total	Ingestion	Dermal Contact	Inhalation of Volatiles	Inhalation of Dusts	Total
19100	Nitrocellulose	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT
2.77	Antimony	1.42E-02	6.29E-03	NA	NT	2.05E-02	2.96E-02	1.03E-02	NA	NT	3.99E-02	3.17E-03	6.34E-03	NA	NT	9.51E-03	NT	NT	NA	NT	NT
63.1	Arsenic	4.33E-01	6.44E-02	NA	NT	4.97E-01	8.99E-01	1.06E-01	NA	NT	1.00E+00	9.63E-02	6.49E-02	NA	NT	1.61E-01	2.78E-06	4.14E-07	NA	2.33E-07	3.43E-06
4.65	Cadmium	9.57E-03	8.45E-03	NA	NT	1.80E-02	1.99E-02	1.39E-02	NA	NT	3.37E-02	2.13E-03	8.52E-03	NA	NT	1.06E-02	NT	NT	NA	7.17E-09	7.17E-09
13.9	Chromium	5.72E-03	2.53E-02	NA	2.38E+00	2.41E+00	1.19E-02	4.14E-02	NA	5.40E-02	1.07E-01	1.27E-03	2.55E-02	NA	1.93E-02	4.60E-02	NT	NT	NA	1.40E-07	1.40E-07
29.9	Copper	1.54E-03	1.13E-04	NA	NT	1.65E-03	3.19E-03	1.86E-04	NA	NT	3.38E-03	3.42E-04	1.14E-04	NA	NT	4.56E-04	NT	NT	NA	NT	NT
17200	Iron	1.18E-01	5.21E-03	NA	NT	1.23E-01	2.45E-01	8.54E-03	NA	NT	2.54E-01	2.63E-02	5.25E-03	NA	NT	3.15E-02	NT	NT	NA	NT	NT
212	Lead	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT
0.385	Mercury	NT	NT	NA	7.67E-05	7.67E-05	NT	NT	NA	1.74E-06	1.74E-06	NT	NT	NA	6.21E-07	6.21E-07	NT	NT	NA	NT	NT
10000	Aroclor-1260	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT	5.88E-07	1.56E-07	NA	4.90E-09	7.48E-07
465	Benz(a)anthracene	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT	9.98E-09	NT	NA	NT	9.98E-09
374	Benzo(a)pyrene	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT	8.02E-08	NT	NA	2.84E-10	8.05E-08
674	Benzo(b)fluoranthene	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	1.45E-08	NT	NT	NT	1.45E-08
252	Dibenz(a,h)anthracene	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT	5.41E-08	NT	NA	NT	5.41E-08
354	Indeno(1,2,3-cd)pyrene	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT	7.59E-09	NT	NA	NT	7.59E-09
	Total Risk:	**5.82E-01**	**1.10E-01**	**NT**	**2.38E+00**	**3.07E+00**	**1.21E+00**	**1.80E-01**	**NT**	**5.40E-02**	**1.44E+00**	**1.29E-01**	**1.11E-01**	**NT**	**1.93E-02**	**2.59E-01**	**3.54E-06**	**5.70E-07**	**NT**	**3.85E-07**	**4.49E-06**

Notes:

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

NT -- No toxicity factor (slope factor or RfD) is applicable for the selected COPCs for this exposure route.
Risks due to lead are evaluated separately using the IEUBK or adult toxicity model.

NA -- Exposure route not applicable for that substance in that medium for that receptor.

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

Estimated cancer and noncancer risks assume a Central Tendency Exposure (CTE).

The representative concentration is selected as presented in a preceding data evaluation table.

Table K-3.3.4

Estimated CTE Cancer Risks and Noncarcinogenic Hazard Indices - All Soils
Site 41 - Scrap Yard
IHDIV - NSWC, Indian Head, Maryland

Representative Concentration	Substance	Estimated Incremental Cancer Risk Residential Child					Estimated Incremental Cancer Risk Residential Adult					Estimated Incremental Cancer Risk Lifetime Resident				
		Ingestion	Dermal Contact	Inhalation of Volatiles	Inhalation of Dusts	Total	Ingestion	Dermal Contact	Inhalation of Volatiles	Inhalation of Dusts	Total	Ingestion	Dermal Contact	Inhalation of Volatiles	Inhalation of Dusts	Total
19100	Nitrocellulose	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT
2.77	Antimony	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT
63.1	Arsenic	1.16E-05	1.36E-06	NA	1.06E-08	1.29E-05	4.33E-06	2.92E-06	NA	1.32E-08	7.27E-06	1.59E-05	4.28E-06	NA	2.38E-08	2.02E-05
4.85	Cadmium	NT	NT	NA	3.25E-10	3.25E-10	NT	NT	NA	4.06E-10	4.06E-10	NT	NT	NA	7.32E-10	7.32E-10
13.9	Chromium	NT	NT	NA	6.33E-09	6.33E-09	NT	NT	NA	7.91E-09	7.91E-09	NT	NT	NA	1.42E-08	1.42E-08
29.9	Copper	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT
17200	Iron	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT
212	Lead	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT
0.385	Mercury	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT	NT	NT	NA	NT	NT
10000	Aroclor-1260	2.44E-06	5.11E-07	NA	2.22E-10	2.95E-06	9.16E-07	1.10E-06	NA	2.77E-10	2.02E-06	3.36E-06	1.61E-06	NA	4.99E-10	4.97E-06
465	Benz(a)anthracene	4.15E-08	NT	NA	NT	4.15E-08	1.55E-08	NT	NA	NT	1.55E-08	5.70E-08	NT	NA	NT	5.70E-08
374	Benzo(a)pyrene	3.33E-07	NT	NA	1.29E-11	3.33E-07	1.25E-07	NT	NA	1.61E-11	1.25E-07	4.58E-07	NT	NA	2.90E-11	4.58E-07
674	Benzo(b)fluoranthene	6.01E-08	NT	NT	NT	6.01E-08	2.25E-08	NT	NT	NT	2.25E-08	8.26E-08	NT	NT	NT	8.26E-08
252	Dibenz(a,h)anthracene	2.25E-07	NT	NA	NT	2.25E-07	8.42E-08	NT	NA	NT	8.42E-08	3.09E-07	NT	NA	NT	3.09E-07
354	Indeno(1,2,3-cd)pyrene	3.16E-08	NT	NA	NT	3.16E-08	1.18E-08	NT	NA	NT	1.18E-08	4.34E-08	NT	NA	NT	4.34E-08
	Total Risk:	**1.47E-05**	**1.87E-06**	**NT**	**1.75E-08**	**1.66E-05**	**5.51E-06**	**4.02E-06**	**NT**	**2.18E-08**	**9.55E-06**	**2.02E-05**	**5.89E-06**	**NT**	**3.93E-08**	**2.61E-05**

Notes:

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

NT -- No toxicity factor (slope factor or RfD) is applicable for the selected COPCs for this exposure route. Risks due to lead are evaluated separately using the IEUBK or adult toxicity model.

NA -- Exposure route not applicable for that substance in that medium for that receptor.

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

Estimated cancer and noncancer risks assume a Central Tendency Exposure (CTE).

The representative concentration is selected as presented in a preceding data evaluation table.

APPENDIX G.3

PRELIMINARY REMEDIATION GOAL FOR LEAD IN SOILS

TETRA TECH NUS, INC. CALCULATION WORKSHEET PAGE ____ OF ____

CLIENT: NSWC Indian Head	JOB NUMBER: 7129
SUBJECT: Calculation of PRGs for Lead in Soils	
BASED ON: EPA Technical Review Workgroup for Lead	DRAWING NUMBER:
BY: L.A. Sinagoga / CHECKED BY: R Jupin	APPROVED BY: / DATE:

Purpose: Calculate PRG for Lead in Soils - Assume construction worker is the receptor of concern.

Relevant Equation:

$$RBRG = PbS = \frac{(PbB_{adult,central,goal} - PbB_{adult,o}) \cdot AT}{(BKSF \cdot IR_s \cdot AF_s \cdot EF_s)}$$

where:

RBRG = Risk-based remediation goal (ug/g)
PBS = Soil lead concentration (ug/g)
$PbB_{adult,central,goal}$ = Goal for central estimate of blood lead concentration in adults (ug/dL)
$PbB_{adult,o}$ = Typical blood lead concentration = 2.0 ug/dL
AT = Averaging time (days/year) = 365 days/year
BKSF = Biokinetic slope factor = 0.4 ug/dL / ug/d
IRS = Intake rate of soil = 0.1 g/day
AF_s = Absolute gastrointestinal absorption fraction = 0.12
EF_s = Exposure frequency (days of exposure during averaging period) = 250 d/yr

$$PbB_{adult,central,goal} = \frac{PbB_{fetal,0.95,goal}}{GSD_{i,adult}^{1.645} \cdot R_{fetal/maternal}}$$

$PbB_{fetal,0.95,goal}$ = 10 ug/dL
$GSD_{i,adult}$ = Estimated value of individual geometric standard deviation = 2.0
$R_{fetal/maternal}$ = Constant of proportionality = 0.9

$$RBRG_{ug/gm} = PbS_{ug/gm} = \frac{\left(\left(\frac{10\ ug/dL}{2.0^{1.645} \times 0.9}\right) - 2.0\ ug/dL\right) \times 365\ d/yr}{(0.4\ ug/dL/ug/d \times 0.1\ g/d \times 0.12 \times 250\ d/yr)} = 478\ \frac{ug}{g}$$

APPENDIX G.4

PRELIMINARY REMEDIATION GOALS DEVELOPED PER NEW DERMAL GUIDANCE

TETRA TECH NUS, INC. CALCULATION WORKSHEET PAGE ____ OF ____

CLIENT: NSWC Indian Head - CTO 245	JOB NUMBER:
SUBJECT: Calculation of Preliminary Remediation Goal for Arsenic	
BASED ON: RAGS A/EPA Dermal Guidance	DRAWING NUMBER:
BY: LAS / CHECKED BY: RJB	APPROVED BY: / DATE:

Purpose: Calculation of Preliminary Remediation Goal (PRG) for typical worker exposure to soils. Assume exposure via ingestion and dermal contact routes of exposure

Relevant equations (dermal route of exposure):

Cancer risk estimate = Absorbed dose (mg/Kg/d) × Cancer slope factor $(mg/Kg/d)^{-1}$

$$\text{Absorbed Dose} = \frac{C_s \otimes CF \otimes SA \otimes AF \otimes ABS \otimes EF \otimes ED \otimes EV}{BW \otimes AT}$$

where:

C_s = Chemical concentration in soil - Assume 1mg/Kg
CF = Conversion Factor - 1E-06 Kg/mg
SA = Skin surface area - 2,500 cm^2
AF = Adherence factor - 0.2 mg/cm^2-event
ABS = Dermal absorption fraction - Assume 0.03 for arsenic
EF = Exposure frequency - 250 days/year
ED = Exposure duration - 25 yrs
EV = Events/day - 1 event/day
BW = Body weight - 70 Kg
Averaging Time = AT - 25550 days

$$\text{Intake (mg/Kg/day)} = \frac{1mg/Kg \otimes 1E\text{-}6\ Kg/mg \otimes 2500\ cm^2 \otimes 0.2\ mg/cm^2\text{-event} \otimes 0.03 \otimes 250\ d/yr \otimes 25\ yrs \otimes 1\ ev/d}{\underbrace{70Kg \otimes 25550\ days}_{1788500}}$$

$\underbrace{\qquad\qquad}_{0.9375}$

= 5.2 E-08 (mg/Kg/d) ✓

Cancer risk estimate = 5.2 E-08 (mg/Kg/d) × 1.5 $(mg/Kg/d)^{-1}$ ← $CSF_{oral/dermal}$

= 7.8 E-08 ✓

TETRA TECH NUS, INC. CALCULATION WORKSHEET PAGE ____ OF ____

CLIENT NSWC - Indian Head - CTO 245	JOB NUMBER
SUBJECT Calculation of Preliminary Remediation Goal for Arsenic	
BASED ON RAGS A/EPA Dermal Guidance	DRAWING NUMBER
BY LAS / CHECKED BY RJD	APPROVED BY / DATE

Relevant Equations (ingestion route of exposure):

Cancer risk estimate = Intake (mg/Kg/d) ⊗ Cancer Slope Factor (mg/Kg/d)$^{-1}$

$$\text{Intake (mg/Kg/d)} = \frac{C_s \otimes IR \otimes CF \otimes FI \otimes EF \otimes ED}{BW \otimes AT}$$

where:

C_s = Chemical concentration in soil - Assume 1 mg/Kg
IR = Ingestion rate - 100 mg/d
CF = Conversion factor = 1E-6 Kg/mg
FI = Fraction ingested - 0.5 (unitless)
EF = Exposure frequency - 250 days/year
ED = Exposure duration - 25 years
BW = Body weight - 70 Kg
AT = Averaging time (carcinogens) - 25,550 days

$$\text{Intake} = \frac{\overbrace{1\,mg/\cancel{Kg} \otimes 100\,\cancel{mg}/\cancel{d} \otimes 0.5 \otimes 1E\text{-}6\,\cancel{Kg}/\cancel{mg} \otimes 250\,\cancel{d}/\cancel{yr} \otimes 25\,\cancel{yrs}}^{0.3125}}{\underbrace{70\,Kg \otimes 25{,}550\,days}_{1788500}}$$

$= 1.8 \otimes 10^{-7}$ mg/Kg/d ✓

Cancer risk estimate (unitless) = 1.8E-07 × 1.5 = 2.7E-07 ✓

Risk (ingestion + dermal) = 2.7E-07 + 7.8E-08 = 3.5E-07

PRG ⇒ IF: $\frac{1\,mg/Kg}{?} = \frac{3.5E\text{-}07}{1E\text{-}06}$? = 2.9 ✓

[the 1E-06 Risk level]

TETRA TECH NUS, INC. CALCULATION WORKSHEET PAGE ____ OF ____

CLIENT: NSWC Indian Head - CTO 245	JOB NUMBER
SUBJECT: Calculation of Preliminary Remediation Goal for ~~Arsenic~~ ~~PCBs~~ PAHs	
BASED ON: RAGS A/EPA Dermal Guidance	DRAWING NUMBER
BY: LAS / CHECKED BY: RJP	APPROVED BY / DATE

Purpose: Calculation of Preliminary Remediation Goal (PRG) for typical worker exposure to soils. Assume exposure via ingestion and dermal contact routes of exposure

Relevant equations (dermal route of exposure):

Cancer risk estimate = Absorbed dose (mg/Kg/d) × Cancer slope factor $(mg/Kg/d)^{-1}$

$$\text{Absorbed Dose} = \frac{C_s \otimes CF \otimes SA \otimes AF \otimes ABS \otimes EF \otimes ED \otimes EV}{BW \otimes AT}$$

where:

C_s = Chemical concentration in soil - Assume 1mg/Kg
CF = Conversion Factor - 1E-06 Kg/mg
SA = Skin surface area - 2,500 cm^2
AF = Adherence factor - 0.2 mg/cm^2-event
ABS = Dermal absorption fraction - Assume ~~0.03~~ 0.13 for ~~arsenic~~ PAHs
EF = Exposure frequency - 250 days/year
ED = Exposure duration - 25 yrs
EV = Events/day - 1 event/day
BW = Body weight - 70 Kg
Averaging Time = AT - 25550 days

$$\text{Intake (mg/Kg/day)} = \frac{1mg/Kg \otimes 1E\text{-}6\ Kg/mg \otimes 2500\ cm^2 \otimes 0.2\ mg/cm^2\text{-event} \otimes 0.13 \otimes 250\ d/yr \otimes 25\ yrs \otimes 1\ ev/d}{\underbrace{70Kg \otimes 25550\ days}_{1788500}}$$

$$= \cancel{5.2E\text{-}08}\ 2.3E\text{-}07\ (mg/Kg/d)$$

$$\text{Cancer risk estimate} = \cancel{5.2E\text{-}08}\ 2.3E\text{-}07\ (mg/Kg/d) \times \cancel{1.5}\ 7.3\ (mg/Kg/d)^{-1}$$

CSF oral/dermal

$$= \cancel{7.8E\text{-}08}\ 1.7E\text{-}06$$

TETRA TECH NUS, INC. **CALCULATION WORKSHEET** PAGE ____ OF ____

CLIENT: NSWC - Indian Head - CTO 245		JOB NUMBER	
SUBJECT: Calculation of Preliminary Remediation Goal for ~~Arsenic~~ PAHs			
BASED ON: RAGS A/EPA Dermal Guidance		DRAWING NUMBER	
BY: LAS	CHECKED BY: RJA	APPROVED BY	DATE

Relevant Equations (ingestion route of exposure):

$$\text{Cancer risk estimate} = \underset{(mg/Kg/d)}{\text{Intake}} \otimes \underset{(mg/Kg/d)^{-1}}{\text{Cancer Slope Factor}}$$

$$\underset{(mg/Kg/d)}{\text{Intake}} = \frac{C_s \otimes IR \otimes CF \otimes FI \otimes EF \otimes ED}{BW \otimes AT}$$

where:

C_s = Chemical concentration in soil - Assume 1 mg/Kg
IR = Ingestion rate - 100 mg/d
CF = Conversion factor = 1E-6 Kg/mg
FI = Fraction ingested - 0.5 (unitless)
EF = Exposure frequency - 250 days/year
ED = Exposure duration - 25 years
BW = Body weight - 70 Kg
AT = Averaging time (carcinogens) - 25,550 days

$$\text{Intake} = \frac{\overbrace{1\,mg/Kg \otimes 100\,mg/d \otimes 0.5 \otimes 1E\text{-}6\,Kg/mg \otimes 250\,d/yr \otimes 25\,yrs}^{0.3125}}{\underbrace{70\,Kg \otimes 25{,}550\,days}_{1788500}}$$

$$= 1.8 \otimes 10^{-7}\ mg/Kg/d$$ ✓

Cancer risk estimate (unitless) = 1.8E-07 × ~~1.5~~ 7.3 = ~~2.7E-07~~ 1.3E-06 ✓

Risk (ingestion + dermal) = ~~2.7E-07~~ 1.3E-06 + ~~7.8E-08~~ 1.7E-06 = ~~3.5E-07~~ 3E-06

PRG ⇒ IF: $\frac{1\ mg/Kg}{?} = \frac{\cancel{3.5E\text{-}07}}{1E\text{-}06}$? = ~~2.9~~ 0.33 ✓

[the 1E-06 Risk level]

TETRA TECH NUS, INC. CALCULATION WORKSHEET PAGE ____ OF ____

CLIENT: NSWC Indian Head - CTO 245	JOB NUMBER:
SUBJECT: Calculation of Preliminary Remediation Goal for ~~Arsenic~~ PCBs	
BASED ON: RAGS A / EPA Dermal Guidance	DRAWING NUMBER:
BY: LAS / CHECKED BY: RJF	APPROVED BY: / DATE:

Purpose: Calculation of Preliminary Remediation Goal (PRG) for typical worker exposure to soils. Assume exposure via ingestion and dermal contact routes of exposure

Relevant equations (dermal route of exposure):

Cancer risk estimate = Absorbed dose (mg/Kg/d) × Cancer slope factor $(mg/Kg/d)^{-1}$

$$\text{Absorbed Dose} = \frac{C_s \otimes CF \otimes SA \otimes AF \otimes ABS \otimes EF \otimes ED \otimes EV}{BW \otimes AT}$$

where:

C_s = Chemical concentration in soil - Assume 1mg/Kg
CF = Conversion Factor - 1E-06 Kg/mg
SA = Skin surface area - 2,500 cm^2
AF = Adherence factor - 0.2 mg/cm^2-event
ABS = Dermal absorption fraction - Assume ~~0.03~~ 0.14 for ~~arsenic~~ PCBs
EF = Exposure frequency - 250 days/year
ED = Exposure duration - 25 yrs
EV = Events/day - 1 event/day
BW = Body weight - 70 Kg
Averaging Time = AT - 25550 days ~~0.0375~~ 0.44

$$\text{Intake (mg/Kg/day)} = \frac{1mg/Kg \otimes 1E\text{-}6\ Kg/mg \otimes 2500\ cm^2 \otimes 0.2\ mg/cm^2\text{-event} \otimes \cancel{0.03}\ 0.14 \otimes 250\ d/yr \otimes 25\ yrs \otimes 1\ event/d}{70Kg \otimes 25550\ days}$$

1788500

= ~~5.2E-08~~ 2.5E-07 (mg/Kg/d)

Cancer risk estimate = ~~5.2E-08~~ 2.5E-07 (mg/Kg/d) × ~~1.5~~ 2.0 $(mg/Kg/d)^{-1}$ CSF oral/dermal

= ~~7.8E-08~~ ~~4.9E-07~~ 4.9E-07 ✓

TETRA TECH NUS, INC. CALCULATION WORKSHEET PAGE ____ OF ____

CLIENT NSWC - Indian Head - CTO 245		JOB NUMBER	
SUBJECT Calculation of Preliminary Remediation Goal for ~~Arsenic~~ PCBs			
BASED ON RAGS A/EPA Dermal Guidance		DRAWING NUMBER	
BY LAS	CHECKED BY RJP	APPROVED BY	DATE

Relevant Equations (ingestion route of exposure):

Cancer risk estimate = Intake (mg/Kg/d) ⊗ Cancer Slope Factor $(mg/Kg/d)^{-1}$

$$\text{Intake } (mg/Kg/d) = \frac{C_s \otimes IR \otimes CF \otimes FI \otimes EF \otimes ED}{BW \otimes AT}$$

where:

C_s = Chemical concentration in soil - Assume 1 mg/Kg
IR = Ingestion rate - 100 mg/d
CF = Conversion factor = 1E-6 Kg/mg
FI = Fraction ingested - 0.5 (unitless)
EF = Exposure frequency - 250 days/year
ED = Exposure duration - 25 years
BW = Body weight - 70 Kg
AT = Averaging time (carcinogens) - 25,550 days

$$\text{Intake} = \frac{\overbrace{1 mg/\cancel{Kg} \otimes 100 \cancel{mg}/\cancel{d} \otimes 0.5 \otimes 1E\text{-}6 \cancel{Kg}/\cancel{mg} \otimes 250 \cancel{d}/\cancel{yr} \otimes 25 \cancel{yrs}}^{0.3125}}{\underbrace{70 Kg \otimes 25{,}550 \text{ days}}_{1708500}}$$

$= 1.8 \otimes 10^{-7}$ mg/Kg/d ✓

Cancer risk estimate (unitless) = 1.8E-07 × ~~1.5~~ 2.0 = ~~2.7E-07~~ 3.6E-07 ✓

Risk (ingestion + dermal) = ~~2.7E-07~~ 3.6E-07 + ~~7.8E-08~~ 4.9E-07 = ~~3.5E-07~~ 8.5E-07

PRG ⇒ IF: $\frac{1 \text{ mg/Kg}}{?} = \frac{\text{~~3.5E-07~~ } 8.5E\text{-}07}{1E\text{-}06}$? = ~~2.9~~ 1.2 ✓

[the 1E-06 Risk level]

United States
Environmental Protection
Agency

Office of Research and
Development
Washington DC 20460

EPA/600/P-95/002Fa
August 1997

EPA

Exposure Factors Handbook Volume I

General Factors

Table 6-12. Geometric Mean and Geometric Standard Deviations of Soil Adherence by Activity and Body Region (continued)

Activity	N[a]	Post-activity Dermal Soil Loadings (mg/cm2)				
		Hands	Arms	Legs	Faces	Feet
Gardeners No. 2	7	0.18 3.4	0.054 2.9	0.022 2.0	0.047 1.6	0.26 --
Rugby No. 1	8	0.40 1.7	0.27 1.6	0.36 1.7	0.059 2.7	
Rugby No. 2	8	0.14 1.4	0.11 1.6	0.15 1.6	0.046 1.4	
Rugby No. 3	7	0.049 1.7	0.031 1.3	0.057 1.2	0.020 1.5	
Archeologists	7	0.14 1.3	0.041 1.9	0.028 4.1	0.050 1.8	0.24 1.4
Construction Workers	8	0.24 1.5	0.098 1.5	0.066 1.4	0.029 0.1 1.6	
Utility Workers No.1	5	0.32 1.7	0.20 2.7		0.10 1.5	
Utility Workers No. 2	6	0.27 2.1	0.30 1.8		0.10 1.5	
Equip. Operators No. 1	4	0.26 2.5	0.089 1.6		0.10 1.4	
Equip. Operators No. 2	4	0.32 1.6	0.27 1.4		0.23 1.7	
Farmers No. 1	4	0.41 1.6	0.059 3.2	0.0058 2.7	0.018 1.4	
Farmers No. 2	6	0.47 1.4	0.13 2.2	0.037 3.9	0.041 3.0	
Reed Gatherers	4	0.66 1.8	0.036 2.1	0.16 9.2		0.63 7.1
Kids-in-mud No. 1	6	35 2.3	11 6.1	36 2.0		24 3.6
Kids-in-mud No. 2	6	58 2.3	11 3.8	9.5 2.3		6.7 12.4

[a] Number of subjects.
Sources: Kissel et al., 1996b; Holmes et al., 1996 (submitted for publication).

0.2

AVG ≅ 0.2

Table 6-2. Surface Area of Adult Males in Square Meters

Body part	Percentile 5	10	15	25	50	75	85	90	95	S.E.[a]
Total	1.66	1.72	1.76	1.82	1.94	2.07	2.14	2.20	2.28	0.00374
Head	0.119	0.121	0.123	0.124	0.130	0.135	0.138	0.140	0.143	0.0202
Trunk[b]	0.591	0.622	0.643	0.674	0.739	0.807	0.851	0.883	0.935[c]	0.0118
Upper extremities	0.321	0.332	0.340	0.350	0.372	0.395	0.408	0.418	0.432[c]	0.00101
Arms	0.241	0.252	0.259	0.270	0.291	0.314[c]	0.328[c]	0.339[c]	0.354[c]	0.00387
Forearms	0.106	0.111	0.115	0.121	0.131	0.144[c]	0.151[c]	0.157[c]	0.166[c]	0.0207
Hands	0.085	0.088	0.090	0.093	0.099	0.105	0.109	0.112	0.117	0.0187
Lower extremities	0.653	0.676	0.692	0.715	0.761	0.810	0.838	0.858	0.888[c]	0.00633
Legs	0.539	0.561	0.576	0.597	0.640	0.686[c]	0.714[c]	0.734[c]	0.762[c]	0.0130
Thighs	0.318	0.331	0.341	0.354	0.382	0.411[c]	0.429[c]	0.443[c]	0.463[c]	0.0149
Lower legs	0.218	0.226	0.232	0.240	0.256	0.272	0.282	0.288	0.299	0.0149
Feet	0.114	0.118	0.120	0.124	0.131	0.138	0.142	0.145	0.149	0.0147

[a] Standard error for the 5-95 percentile of each body part.
[b] Trunk includes neck.
[c] Percentile estimates exceed the maximum measured values upon which the equations are based.
Source: U.S. EPA. 1985.

Table 6-3. Surface Area of Adult Females in Square Meters

Body part	Percentile 5	10	15	25	50	75	85	90	95	S.E.[a]
Total	1.45	1.49	1.53	1.58	1.69[c]	1.82	1.91	1.98	2.09	0.00374
Head	0.106	0.107	0.108	0.109	0.111	0.113	0.114	0.115	0.117	0.00678
Trunk[b]	0.490	0.507	0.518	0.538	0.579	0.636	0.677	0.704	0.752	0.00567
Upper extremities	0.260	0.265	0.269	0.274	0.287	0.301	0.311	0.318	0.329	0.00833
Arms	0.210	0.214	0.217	0.221	0.230	0.238[c]	0.243[c]	0.247[c]	0.253[c]	0.00996
Hands	0.0730	0.0746	0.0757	0.0777	0.0817	0.0868[c]	0.0903[c]	0.0927[c]	0.0966[c]	0.0172
Lower extremities	0.564	0.582	0.595	0.615	0.657	0.704	0.736	0.757	0.796	0.00633
Legs	0.460	0.477	0.488	0.507	0.546	0.592	0.623	0.645	0.683[c]	0.0130
Thighs	0.271	0.281	0.289	0.300	0.326	0.357	0.379	0.394	0.421[c]	0.0149
Lower legs	0.186	0.192	0.197	0.204	0.218	0.233	0.243	0.249	0.261	0.0149
Feet	0.100	0.103	0.105	0.108	0.114	0.121	0.126	0.129	0.134	0.0147

[a] Standard error for the 5-95 percentile of each body part.
[b] Trunk includes neck.
[c] Percentile estimates exceed the maximum measured values upon which the equations are based.
Source: U.S. EPA. 1985.

ADULT

Surface Area of Adults (cm² & 50th %tile)[8]

Body Part	Male	Female	Average
Total	19400	16900	18150
Face[3]	433 ✓	370	402
Forearms[4]	1310 ✓	1035	1173
Hands	990	817	904
Lower legs[4]	2560	2180	2370
Feet	1310	1140	1225

≅ 2500cm²

1. Taken from Exposure Factors Handbook 1997, Table 6-8.
2. Taken from Exposure Factors Handbook 1997, Table 6-6 (male) and Table 6-7 (female).
3. Face SA assumed to be 1/3 of head SA.
4. Assumed forearm-to-arm ratio (0.45) and lowerleg-to-leg ratio (0.4) equivalent to an adult.
5. Due to lack of data for the indicated ages, assumed <1 and 1<2 yr olds had te same total SA as 2>3 yr olds.
6. Due to lack of data for the indicated ages, assumed the body-part-specific fraction of total SA was equal to next oldest age that had data.
7. Body-part weighted SA for children calculated by multiplying body-part-specificfraction of total SA by total SA (avg. of male and female).
   Adult body-part SA taken from 50%tile body-part SA (avg. of male/female). All areas reported to two significant digits.
8. Taken from Exposure Factors Handbook 1997, Tables 6-2 (male) and 6-3(female).

EPA Supplemental Guidance - Dermal Risk Assessment
Peer Consultation Workshop Draft - Nov 1998

November 6, 1998
Peer Consultation Workshop Draft

RISK ASSESSMENT GUIDANCE FOR SUPERFUND

VOLUME I: HUMAN HEALTH EVALUATION MANUAL

SUPPLEMENTAL GUIDANCE

DERMAL RISK ASSESSMENT

INTERIM GUIDANCE

NOTICE

The policies in this document do not represent final Agency action, but are intended solely as interim guidance. They are not intended, nor can they be relied upon, to create any rights enforceable by any party in litigation with the United States. EPA officials may decide to follow the guidance provided in this document, or to act at variance with the guidance, according to site-specific circumstances. The Agency also reserves the right to modify this guidance at any time without public notice.

Office of Emergency and Remedial Response
U.S. Environmental Protection Agency
Washington, D.C. 20460

3.2.2.2.2 Adult commercial/industrial

The adult commercial/industrial receptor was assumed to wear a short-sleeved shirt, long pants, and shoes; therefore, the exposed skin surface was limited to the face, hands, and forearms. The weighted AFs for adult commercial/industrial activities (e.g., groundskeepers, landscapers, irrigation installers, gardeners, construction workers, equipment operators, and utility workers) were calculated, using Equation 3.18, and documented in Appendix E.

$$Weighted\ AF_{adult\ commercial} = \frac{(AF_{face})(SA_{face}) + (AF_{forearms})(SA_{forearms}) + (AF_{hands})(SA_{hands})}{SA_{face} + SA_{forearms} + SA_{hands}} \quad (3.18)$$

3.2.2.2.3 Child resident

The child resident (<1 to <6 year old) was assumed to wear a short-sleeved shirt and shorts (no shoes); therefore, the exposed skin was limited to face, hands, forearms, lower legs, and feet. Weighted AFs for daycare kids and "staged" children playing in dry and wet soil activities were calculated, using Equation 3.19, and documented in Appendix E.

$$Weighted\ AF_{child} = \frac{(AF_{face})(SA_{face}) + (AF_{forearms})(SA_{forearms}) + (AF_{hands})(SA_{hands}) + (AF_{lowerlegs})(SA_{lowerlegs}) + (AF_{feet})(SA_{feet})}{SA_{face} + SA_{forearms} + SA_{hands} + SA_{lowerlegs} + SA_{feet}} \quad (3.19)$$

As noted in Appendix E, body part-specific AFs for child and adult resident receptors were not always available for all body parts assumed to be exposed. Weighted adherence factors for residential receptors were calculated, using only those body parts for which AFs were available because of the difficulty in trying to assign an AF for one body part to another body part. For example, the weighted AF for the daycare kids was based on the forearms, hands, lower legs, and feet (AFs for the face were not available). However, the surface area for all exposed body parts was used in calculating the dermally absorbed dose. For the daycare kid example, the surface area used in estimating the DAD included the whole head, forearms, hands, lower legs and feet.

1.5 mg/cm^2; U.S. EPA, 1995). Table E-4 contains data used to calculate the central tendency and high end AFs for children.

3.2.2.3.3 Commercial/industrial adult worker

Given that there were data available for a wide variety of activities that a commercial/industrial adult worker may engage in, a high-end (reasonable worst-case) soil contact activity was selected and the central tendency weighted AF (50th percentile) derived for that activity. In so doing, the recommended weighted AF for a commercial/industrial adult worker is 0.2 mg/cm^2 and is based on the 50th percentile weighted AF for utility workers (the activity determined to represent a reasonable worst-case activity). The bases for this recommendation are as follows: (1) although no single activity would be representative of activities a commercial/industrial adult worker engages in, a comparison of the utility worker 50th percentile weighted AF with other commercial/industrial-type activities (Table 3.3) shows that the utility worker represents a high-end soil contact activities (i.e., groundskeepers, landscaper/rockery, irrigation installers, gardeners, construction workers; (2) a combination of common sense and data on the weighted AFs supports the assumption that utility worker activities represent a high-end soil contact activity, whereas, determining which of other equipment operators might represent a reasonable, central tendency (i.e., typical) soil contact activity would be difficult; and (3) selecting the central tendency weighted AF (i.e., 50th percentile) of a high-end soil contact activity is consistent with recommending a high-end of a mean for contact rates.

Table 4.1 Summary of Gastrointestinal Absorption Efficiencies and Recommendations for Adjustment of Oral Slope Factors for Specific Compounds

Compound	GI Absorption	Reference	Adjustment Required?
Organics			
Chlordane	80%	Ohno, 1986 Ewing, 1985	No
2,4-Dichlorophen-oxyacetic acid	>90%	Pelletier, 1989 Knopp, 1992	No
DDT	70-90% (oil)	Keller, 1980	No
Pentachlorophenol	76% (diet) 100% (water)	Korte, 1978 Meerman, 1983	No
Polychlorinated biphenyls (PCBs)	96%(squalene) 80%(emulsion) 81%(corn oil)	Albro, 1972 Muhlebach, 1981 Tanabe, 1981	No
Polycyclic aromatic hydrocarbons(PAH)	58% (starch solt'n) 89% (diet)	Chang, 1943 Hecht, 1979	No
TCDD	50-60% (diet) 70% (diet) 70-83%(corn oil)	Fries, 1975 Piper, 1973 Rose, 1976	No
Other Dioxins/ Dibenzofurans	>50%	ATSDR, 1994	No
All other organic compounds	generally >50%	multiple references	No
Inorganics			
Antimony	15% (aqueous)	Waitz, 1965	Yes
Arsenic	95%	Bettley 1975	No
Barium	7% (aqueous)	Taylor, 1962; Cuddihy and Griffith, 1972	Yes
Beryllium	0.7% (water)	Reeves, 1965	Yes
Cadmium	3-5% (food) 5% (water)	Ellis, 1979 Morgan, 1984 McLellan, 1978	Yes Yes

Table 3.5 Recommended Dermal Exposure Values for Central Tendency and RME Residential and Industrial Scenarios - Soil Contact

Exposure parameters		Central Tendency		RME Scenario	
		Residential	Industrial	Residential	Industrial
Concentration- C_{soil} (mg/kg)		site-specific	site-specific	site-specific	site-specific
Event frequency (events/day)		1	1	1	1
Exposure frequency (days/yr)		site-specific	219	350	250
Exposure duration (yr)		9	9	30	25
Skin surface area (cm^2)	Adult	5,700	2,500	5,700	2,500
	Child	2,900	-	2,900	-
Soil adherence factor (mg/cm^2)	Adult	0.01	0.02	0.07	0.2
	Child	0.06	-	0.2	-
Dermal absorption fraction		chemical-specific	chemical-specific	chemical-specific	chemical-specific

Table 3.4 Recommended Dermal Absorption Factor from Soil

Compound	Dermal Absorption Factor	Reference
Arsenic	0.03	Wester, *et al.* (1993a)
Cadmium	0.01	Wester, *et al.* (1992a) U.S. EPA (1992a)
Chlordane	0.04	Wester, *et al.* (1992b)
2,4-Dichlorophenoxyacetic acid	0.05	Wester, *et al.* (1996)
DDT	0.03	Wester, *et al.* (1990)
TCDD and other dioxins <10% organic soil >10% organic soil	 0.03 0.001	 U.S. EPA (1992a)
Lindane	0.04	Duff & Kissel (1996)
PAHs Benzo(a)pyrene	 0.13	 Wester, *et al.* (1990)
PCBs Aroclor 1254 and 1242	 0.14	 Wester, *et al.*(1993b)
Pentachlorophenol	0.25	Wester, *et al.* (1993c)
Generic defaults *for screening*		
Semivolatile organic compounds	0.1	
Inorganics	0.01	

APPENDIX H

REMEDIAL ALTERNATIVE COST ESTIMATES

COST SUMMARY

Indian Head Division – NSWC

Site/Alternative	Capital Cost	Annual Cost	Present Worth
Site 12/Alt. 2, Soil Cover	$938,600	$24,300	$1,262,000
Site 12/Alt. 3, Soil Cap	$1,902,400	$24,300	$2,226,000
Site 12/Alt. 4, Engineered Cap	$3,266,100	$24,300	$3,590,000
Site 12/Alt. 5, Landfill Removal	$4,657,600	$15,300	$4,868,000
Site 41/Alt. 2, Removal	$750,600	$15,000	$1,076,000

Annual Cost includes sampling and yearly maintenance cost and does not include 5-year reviews or major repairs to sites.

INDIAN HEAD DIVISION - NAVAL SURFACE WARFARE CENTER
INDIAN HEAD, MARYLAND
SITE 12 - TOWN GUT LANDFILL

COMPARISON OF REMEDIAL ACTION COST

Alternative	Captial Cost	Annual	Present Worth
#2 Soil Cover	$938,600	$24,300	$1,262,000
#3 Soil Cap	$1,902,400	$24,300	$2,226,000
#4 Engineered Cap	$3,266,100	$24,300	$3,590,000
#5 Landfill Removal	$4,657,600	$15,300	$4,868,000

INDIAN HEAD DIVISION - NAVAL SURFACE WARFARE CENTER
Indian Head, Maryland
Site 12 - Town Gut Landfill
Alternative 2: Soil Cover with Institutional Controls
Capital Cost

Item	Quantity	Unit	Unit Cost Subcontract	Unit Cost Material	Unit Cost Labor	Unit Cost Equipment	Total Cost Subcontract	Total Cost Material	Total Cost Labor	Total Cost Equipment	Total Direct Cost
1 PROJECT DOCUMENTS											
1.1 Prepare Documents & Plans including Permits	100	hr			$40.00		$0	$0	$4,000	$0	$4,000
2 MOBILIZATION/DEMOBILIZATION											
2.1 Office Trailer (2)	6	mo	$194.00				$1,164	$0	$0	$0	$1,164
2.2 Storage Trailer (1)	3	mo	$85.00				$255	$0	$0	$0	$255
2.3 Construction Survey	1	ls	$1,000.00				$1,000	$0	$0	$0	$1,000
2.4 Equipment Mobilization/Demobilization	1	ls			$100.00	$500.00	$0	$0	$100	$500	$600
2.5 Site Utilities	3	mo	$1,000.00				$3,000	$0	$0	$0	$3,000
3 DECONTAMINATION											
3.1 Decontamination Trailer	3	mo	$2,200.00				$6,600	$0	$0	$0	$6,600
3.2 Equipment Decon Pad	1	ls		$500.00	$450.00	$155.00	$0	$500	$450	$155	$1,105
3.3 Decon Water	3,000	gal	$0.20				$600	$0	$0	$0	$600
3.4 Decon Water Storage Tank, 6,000 gallon	3	mo	$577.50				$1,733	$0	$0	$0	$1,733
3.5 Clean Water Storage Tank, 4,000 gallon	3	mo	$472.50				$1,418	$0	$0	$0	$1,418
3.6 PPE (6 p * 5 days * 12 weeks)	360	day		$30.00			$0	$10,800	$0	$0	$10,800
3.7 Disposal of Decon Waste (liquid & solid)	3	mo	$900.00				$2,700	$0	$0	$0	$2,700
4 SITE PREPARATION AND SOIL COVER											
4.1 Site Clearing (level D)	4.3	acre			$324.00	$560.00	$0	$0	$1,393	$2,408	$3,801
4.2 Common Earth (fill) 18" thick	5,200	cy		$5.05	$0.38	$0.76	$0	$26,260	$1,976	$3,952	$32,188
4.3 Confirmation Sampling of Fill	1	ea	$875.00	$20.00	$50.00	$15.00	$875	$20	$50	$15	$960
4.4 Haul Earth (16 cy/truck,10 mile R/T)	5,200	cy			$2.21	$7.00	$0	$0	$11,492	$36,400	$47,892
4.5 Grade Earth	5,200	cy			$0.31	$0.84	$0	$0	$1,612	$4,368	$5,980
4.6 Compact Earth (12" lifts)	5,200	cy			$0.06	$0.11	$0	$0	$312	$572	$884
5 WETLAND AND LANDFILL MATERIAL REMOVAL											
5.1 Exposed Material Excavation, 1 cy backhoe (level D)	5	day			$521.00	$547.60	$0	$0	$2,605	$2,738	$5,343
5.2 Haul Material to County Landfill	1	ls			$65.00	$185.00	$0	$0	$65	$185	$250
5.3 Disposal Fee	30	ton	$57.00				$1,710	$0	$0	$0	$1,710
5.4 Turbidity Curtain	650	lf		$8.22	$1.04		$0	$5,343	$676	$0	$6,019
5.5 Excavate & Load (2 cy bucket, level D)	960	cy			$0.86	$1.50	$0	$0	$826	$1,440	$2,266
5.6 Haul Material to Dewatering Pad, 2 trucks for 30 days	60	day			$176.80	$364.30	$0	$0	$10,608	$21,858	$32,466
5.7 Construct & Remove Dewatering Pad (50' * 50')	2,500	sf	$0.97	$6.83	$0.94	$0.96	$2,425	$17,075	$2,350	$2,400	$24,250
5.8 Spread/Mix/Load Material on Dewatering Pad	30	day			$398.80	$290.10	$0	$0	$11,964	$8,703	$20,667
5.9 Dewatering Pad Pumps, Piping & Misc Equipment	30	day			$78.00	$46.10	$0	$0	$2,340	$1,383	$3,723
5.10 Haul & Dispose at Landfill (20 cy/load)	48	load	$260.00				$12,480	$0	$0	$0	$12,480
5.11 Disposal Testing (TCLP)	2	ea	$785.00	$20.00	$50.00	$15.00	$1,570	$40	$100	$30	$1,740
6 SITE RESTORATION											
6.1 Common Earth (fill)	198	cy		$5.05	$0.38	$0.76	$0	$1,000	$75	$150	$1,226
6.2 Confirmation Sampling of Fill	1	ea	$875.00	$20.00	$50.00	$15.00	$875	$20	$50	$15	$960
6.3 Haul Earth (16 cy/truck,10 mile R/T)	198	cy			$2.21	$7.00	$0	$0	$438	$1,386	$1,824
6.4 Grade Earth	198	cy			$0.31	$0.84	$0	$0	$61	$166	$228
6.5 Compact Earth (12" lifts)	198	cy			$0.06	$0.11	$0	$0	$12	$22	$34
6.6 Topsoil Cover, 6" thick	1,800	cy		$14.15	$0.38	$0.76	$0	$25,470	$684	$1,368	$27,522
6.7 Confirmation Sampling of Topsoil	1	ea	$875.00	$20.00	$50.00	$15.00	$875	$20	$50	$15	$960
6.8 Haul Topsoil Cover (16 cy/truck,10 mile R/T)	1,800	cy			$2.21	$7.00	$0	$0	$3,978	$12,600	$16,578
6.9 Till Existing Surface	10,475	cy			$0.24	$0.09	$0	$0	$2,514	$943	$3,457

INDIAN HEAD DIVISION - NAVAL SURFACE WARFARE CENTER
Indian Head, Maryland
Site 12 - Town Gut Landfill
Alternative 2: Soil Cover with Institutional Controls
Capital Cost

Item	Quantity	Unit	Unit Cost Subcontract	Unit Cost Material	Unit Cost Labor	Unit Cost Equipment	Total Cost Subcontract	Total Cost Material	Total Cost Labor	Total Cost Equipment	Total Direct Cost
6.10 "Wetlands Soil"	696	cy		$14.15	$0.38	$0.76	$0	$9,848	$264	$529	$10,642
6.11 Confirmation Sampling of "Wetlands Soil"	1	ea	$875.00	$20.00	$50.00	$15.00	$875	$20	$50	$15	$960
6.12 Haul "Wetlands Soil" (16 cy/truck,10 mile R/T)	696	cy			$2.21	$7.00	$0	$0	$1,538	$4,872	$6,410
6.13 Wetlands Soil Placement, 1 cy backhoe	3	day			$521.00	$547.60	$0	$0	$1,563	$1,643	$3,206
6.14 Fine Grade & Seed Topsoil	20,980	sy		$0.30	$1.09	$0.22	$0	$6,294	$22,868	$4,616	$33,778
6.15 Wetlands Vegetation Planting	93	csf		$15.33	$8.34		$0	$1,426	$776	$0	$2,201
7 MONITORING WELLS											
7.1 Rig Mob/Demob	1	ls	$2,500.00				$2,500	$0	$0	$0	$2,500
7.2 Abandon Existing Wells (6 @ 15')	90	lf	$12.00				$1,080	$0	$0	$0	$1,080
7.3 Install Monitoring Wells (6 @ 15')	90	lf	$18.00				$1,620	$0	$0	$0	$1,620
7.4 Well Outer Casing	6	ea	$200.00				$1,200	$0	$0	$0	$1,200
7.5 Well Development (4 hours each well)	24	hr	$30.00				$720	$0	$0	$0	$720
7.6 Collect/Containerize IDW (1 drum per well)	6	ea	$50.00				$300	$0	$0	$0	$300
7.7 Transport/Dispose IDW Off Site	6	ea	$150.00				$900	$0	$0	$0	$900
7.8 Survey Well Locations	1	ls	$700.00				$700	$0	$0	$0	$700
8 CONSTRUCTION OVERSIGHT											
8.1 Professional Oversight (5p * 12 weeks)	12	mwk			$5,200.00		$0	$0	$62,400	$0	$62,400
Subtotal							$49,174	$104,136	$150,240	$115,447	$418,997
Local Area Adjustments							100.0%	83.4%	98.2%	98.2%	
Subtotal							$49,174	$86,849	$147,536	$113,369	$396,928
Overhead on Labor Cost @ 30%									$44,261		$44,261
G & A on Labor Cost @ 10%									$14,754		$14,754
G & A on Material Cost @ 10%								$8,685			$8,685
G & A on Subcontract Cost @ 10%							$4,917				$4,917
Total Direct Cost							$54,091	$95,534	$206,550	$113,369	$469,545
Indirects on Total Direct Labor Cost @ 50%									$103,275		$103,275
Profit on Total Direct Cost @ 10%											$46,954
Subtotal 3											$619,775
Health & Safety Monitoring @ 2%											$12,395
Total Field Cost											$632,170
Contingency on Total Field Cost @ 20%											$126,434
Engineering on Total Field Cost @ $180,000											$180,000
TOTAL COST											$938,604

INDIAN HEAD DIVISION - NAVAL SURFACE WARFARE CENTER
Indian Head, Maryland
Site 12 - Town Gut Landfill
Alternative 2: Soil Cover with Institutional Controls
Annual Cost

Item	Item Cost Annually	Item Cost per 5 Years	Notes
Site Maintenance	$6,480		1 Laborer / 2 Days per Month for 12 Months
	$2,000		Mobilization & Demobilization (pickup truck)
	$100		Misc. Materials (seed, gravel, soil)
	$500		Misc. Equipment (mowers, hand tools)
Sampling	$5,260		Collect six groundwater and six surface water samples, per sampling period (once per year), plus travel and living
Analysis/Water	$6,000		Water samples, per sampling period, (including blanks & duplicates for each medium) SVOCs and inorganics
Report	$4,000		Obtain lab, prepare sampling plan, document sampling events and results
Site Review	$0	$10,000	Review of documents and data evaluation/recommendations
TOTALS	$24,340	$10,000	

INDIAN HEAD DIVISION - NAVAL SURFACE WARFARE CENTER
Indian Head, Maryland
Site 12 - Town Gut Landfill
Alternative 2: Soil Cover with Institutional Controls
Present Worth Analysis

Year	Capital Cost	Annual Cost	Total Year Cost	Annual Discount Rate at 7%	Present Worth
0	$938,604		$938,604	1.000	$938,604
1		$24,340	$24,340	0.935	$22,758
2		$24,340	$24,340	0.873	$21,249
3		$24,340	$24,340	0.816	$19,861
4		$24,340	$24,340	0.763	$18,571
5		$34,340	$34,340	0.713	$24,484
6		$24,340	$24,340	0.666	$16,210
7		$24,340	$24,340	0.623	$15,164
8		$24,340	$24,340	0.582	$14,166
9		$24,340	$24,340	0.544	$13,241
10		$34,340	$34,340	0.508	$17,445
11		$24,340	$24,340	0.475	$11,562
12		$24,340	$24,340	0.444	$10,807
13		$24,340	$24,340	0.415	$10,101
14		$24,340	$24,340	0.388	$9,444
15		$34,340	$34,340	0.362	$12,431
16		$24,340	$24,340	0.339	$8,251
17		$24,340	$24,340	0.317	$7,716
18		$24,340	$24,340	0.296	$7,205
19		$24,340	$24,340	0.277	$6,742
20		$34,340	$34,340	0.258	$8,860
21		$24,340	$24,340	0.242	$5,890
22		$24,340	$24,340	0.226	$5,501
23		$24,340	$24,340	0.211	$5,136
24		$24,340	$24,340	0.197	$4,795
25		$34,340	$34,340	0.184	$6,319
26		$24,340	$24,340	0.172	$4,186
27		$24,340	$24,340	0.161	$3,919
28		$24,340	$24,340	0.150	$3,651
29		$24,340	$24,340	0.141	$3,432
30		$34,340	$34,340	0.131	$4,499
				TOTAL PRESENT WORTH	**$1,262,199**

INDIAN HEAD DIVISION - NAVAL SURFACE WARFARE CENTER
Indian Head, Maryland
Site 12 - Town Gut Landfill
Alternative 3: Soil Cap with Institutional Controls
Capital Cost

Item	Quantity	Unit	Unit Cost Subcontract	Unit Cost Material	Unit Cost Labor	Unit Cost Equipment	Total Cost Subcontract	Total Cost Material	Total Cost Labor	Total Cost Equipment	Total Direct Cost
1 PROJECT DOCUMENTS											
1.1 Prepare Documents & Plans including Permits	150	hr			$40.00		$0	$0	$6,000	$0	$6,000
2 MOBILIZATION/DEMOBILIZATION											
2.1 Office Trailer (2)	8	mo	$194.00				$1,552	$0	$0	$0	$1,552
2.2 Storage Trailer (1)	4	mo	$85.00				$340	$0	$0	$0	$340
2.3 Construction Survey	1	ls	$1,000.00				$1,000	$0	$0	$0	$1,000
2.4 Equipment Mobilization/Demobilization	1	ls			$100.00	$500.00	$0	$0	$100	$500	$600
2.5 Site Utilities	4	mo	$1,000.00				$4,000	$0	$0	$0	$4,000
3 DECONTAMINATION											
3.1 Decontamination Trailer	4	mo	$2,200.00				$8,800	$0	$0	$0	$8,800
3.2 Equipment Decon Pad	1	ls		$500.00	$450.00	$155.00	$0	$500	$450	$155	$1,105
3.3 Decon Water	4,000	gal	$0.20				$800	$0	$0	$0	$800
3.4 Decon Water Storage Tank, 6,000 gallon	4	mo	$577.50				$2,310	$0	$0	$0	$2,310
3.5 Clean Water Storage Tank, 4,000 gallon	4	mo	$472.50				$1,890	$0	$0	$0	$1,890
3.6 PPE (6 p * 5 days * 17 weeks)	510	day		$30.00			$0	$15,300	$0	$0	$15,300
3.7 Disposal of Decon Waste (liquid & solid)	4	mo	$900.00				$3,600	$0	$0	$0	$3,600
4 SITE PREPARATION AND LANDFILL REGRADING											
4.1 Site Clearing (level D)	4.3	acre			$324.00	$560.00	$0	$0	$1,393	$2,408	$3,801
4.2 Regrade Landfill Material, Excavate (level D)	17,500	cy			$2.24	$2.46	$0	$0	$39,200	$43,050	$82,250
4.3 Regrade & Compact Landfill Material (level D)	17,500	cy			$0.49	$1.00	$0	$0	$8,575	$17,500	$26,075
4.4 Common Earth (fill) 12" thick	7,000	cy		$5.05	$0.38	$0.76	$0	$35,350	$2,660	$5,320	$43,330
4.5 Confirmation Sampling of Fill	1	ea	$875.00	$20.00	$50.00	$15.00	$875	$20	$50	$15	$960
4.6 Haul Fill (16 cy/truck,10 mile R/T)	7,000	cy			$2.21	$7.00	$0	$0	$15,470	$49,000	$64,470
4.7 Grade Fill	7,000	cy			$0.31	$0.84	$0	$0	$2,170	$5,880	$8,050
4.8 Compact Fill (6" lifts)	7,000	cy			$0.24	$0.43	$0	$0	$1,680	$3,010	$4,690
5 WETLAND AND LANDFILL MATERIAL REMOVAL											
5.1 Exposed Material Excavation, 1 cy backhoe (level D)	5	day			$521.00	$547.60	$0	$0	$2,605	$2,738	$5,343
5.2 Haul Material to County Landfill	1	ls			$65.00	$185.00	$0	$0	$65	$185	$250
5.3 Disposal Fee	30	ton	$57.00				$1,710	$0	$0	$0	$1,710
5.4 Turbidity Curtain	1,330	lf		$8.22	$1.04		$0	$10,933	$1,383	$0	$12,316
5.5 Excavate & Load (2 cy bucket, level D)	2,447	cy			$0.86	$1.50	$0	$0	$2,104	$3,671	$5,775
5.6 Haul Material to Dewatering Pad, 2 trucks for 30 days	60	day			$176.80	$364.30	$0	$0	$10,608	$21,858	$32,466
5.7 Construct & Remove Dewatering Pad (100' * 50')	5,000	sf	$0.97	$6.83	$0.94	$0.96	$4,850	$34,150	$4,700	$4,800	$48,500
5.8 Spread/Mix/Load Material on Dewatering Pad	30	day			$398.80	$290.10	$0	$0	$11,964	$8,703	$20,667
5.9 Dewatering Pad Pumps, Piping & Misc. Equipment	30	day			$78.00	$46.10	$0	$0	$2,340	$1,383	$3,723
5.10 Haul & Dispose at Landfill, 1224 cy (20 cy/load)	62	load	$260.00				$16,120	$0	$0	$0	$16,120
5.11 Disposal Testing (TCLP)	2	ea	$785.00	$20.00	$50.00	$15.00	$1,570	$40	$100	$30	$1,740
5.12 Regrade & Compact Landfill Material (level D)	1,224	cy			$0.49	$1.00	$0	$0	$600	$1,224	$1,824
6 SOIL CAP											
6.1 Geotextile, 8 oz., nonwoven	20,950	sy		$0.62	$0.35	$0.03	$0	$12,989	$7,333	$629	$20,950
6.2 Common Earth (fill) 18" thick	10,500	cy		$5.05	$0.38	$0.76	$0	$53,025	$3,990	$7,980	$64,995
6.3 Confirmation Sampling of Fill	1	ea	$875.00	$20.00	$50.00	$15.00	$875	$20	$50	$15	$960
6.4 Haul Earth (16 cy/truck,10 mile R/T)	10,500	cy			$2.21	$7.00	$0	$0	$23,205	$73,500	$96,705
6.5 Grade Earth	10,500	cy			$0.31	$0.84	$0	$0	$3,255	$8,820	$12,075
6.6 Compact Earth (12" lifts)	10,500	cy			$0.06	$0.11	$0	$0	$630	$1,155	$1,785

INDIAN HEAD DIVISION - NAVAL SURFACE WARFARE CENTER
Indian Head, Maryland
Site 12 - Town Gut Landfill
Alternative 3: Soil Cap with Institutional Controls
Capital Cost

Item	Quantity	Unit	Unit Cost Subcontract	Unit Cost Material	Unit Cost Labor	Unit Cost Equipment	Total Cost Subcontract	Total Cost Material	Total Cost Labor	Total Cost Equipment	Total Direct Cost
7 SITE RESTORATION											
7.1 Topsoil Cover, 6" thick	3,500	cy		$14.15	$0.38	$0.76	$0	$49,525	$1,330	$2,660	$53,515
7.2 Confirmation Sampling of Topsoil	1	ea	$875.00	$20.00	$50.00	$15.00	$875	$20	$50	$15	$960
7.3 Haul Topsoil Cover (16 cy/truck,10 mile R/T)	3,500	cy			$2.21	$7.00	$0	$0	$7,735	$24,500	$32,235
7.4 Fine Grade & Seed Topsoil	20,950	sy		$0.30	$1.09	$0.22	$0	$6,285	$22,836	$4,609	$33,730
7.5 "Wetlands Soil"	1,392	cy		$14.15	$0.38	$0.76	$0	$19,697	$529	$1,058	$21,284
7.6 Confirmation Sampling of "Wetlands Soil"	1	ea	$875.00	$20.00	$50.00	$15.00	$875	$20	$50	$15	$960
7.7 Haul "Wetlands Soil" (16 cy/truck,10 mile R/T)	1,392	cy			$2.21	$7.00	$0	$0	$3,076	$9,744	$12,820
7.8 Wetlands Soil Placement, 1 cy backhoe	5	day			$521.00	$547.60	$0	$0	$2,605	$2,738	$5,343
7.9 Wetlands Vegetation Planting	188	csf		$15.33	$8.34		$0	$2,882	$1,568	$0	$4,450
8 MONITORING WELLS											
8.1 Rig Mob/Demob	1	ls	$2,500.00				$2,500	$0	$0	$0	$2,500
8.2 Abandon Existing Wells (6 @ 15')	90	lf	$12.00				$1,080	$0	$0	$0	$1,080
8.3 Install Monitoring Wells (6 @ 15')	90	lf	$18.00				$1,620	$0	$0	$0	$1,620
8.4 Well Outer Casing	6	ea	$200.00				$1,200	$0	$0	$0	$1,200
8.5 Well Development (4 hours each well)	24	hr	$30.00				$720	$0	$0	$0	$720
8.6 Collect/Containerize IDW (1 drum per well)	6	ea	$50.00				$300	$0	$0	$0	$300
8.7 Transport/Dispose IDW Off Site	6	ea	$150.00				$900	$0	$0	$0	$900
8.8 Survey Well Locations	1	ls	$700.00				$700	$0	$0	$0	$700
9 CONSTRUCTION OVERSIGHT											
9.1 Professional Oversight (5p * 17 weeks)	17	mwk			$5,200.00		$0	$0	$88,400	$0	$88,400
Subtotal							$61,062	$240,755	$280,859	$308,867	$891,543
Local Area Adjustments							100.0%	83.4%	98.2%	98.2%	
Subtotal							$61,062	$200,790	$275,803	$303,307	$840,963
Overhead on Labor Cost @ 30%									$82,741		$82,741
G & A on Labor Cost @ 10%									$27,580		$27,580
G & A on Material Cost @ 10%								$20,079			$20,079
G & A on Subcontract Cost @ 10%							$6,106				$6,106
Total Direct Cost							$67,168	$220,869	$386,125	$303,307	$977,469
Indirects on Total Direct Labor Cost @ 50%									$193,062		$193,062
Profit on Total Direct Cost @ 10%											$97,747
Subtotal 3											$1,268,278
Health & Safety Monitoring @ 2%											$25,366
Total Field Cost											$1,293,644
Contingency on Total Field Cost @ 20%											$258,729
Engineering on Total Field Cost @ $350,000											$350,000
TOTAL COST											**$1,902,373**

INDIAN HEAD DIVISION - NAVAL SURFACE WARFARE CENTER
Indian Head, Maryland
Site 12 - Town Gut Landfill
Alternative 3: Soil Cap with Institutional Controls
Annual Cost

Item	Item Cost Annually	Item Cost per 5 Years	Notes
Site Maintenance	$6,480		1 Laborer / 2 Days per Month for 12 Months
	$2,000		Mobilization & Demobilization (pickup truck)
	$100		Misc. Materials (seed, gravel, soil)
	$500		Misc. Equipment (mowers, hand tools)
Sampling	$5,260		Collect six groundwater and six surface water samples, per sampling period (once per year), plus travel and living
Analysis/Water	$6,000		Water samples, per sampling period, (including blanks & duplicates for each medium) SVOCs and inorganics
Report	$4,000		Obtain lab, prepare sampling plan, document sampling events and results
Site Review	$0	$10,000	Review of documents and data evaluation/recommendations
TOTALS	$24,340	$10,000	

INDIAN HEAD DIVISION - NAVAL SURFACE WARFARE CENTER
Indian Head, Maryland
Site 12 - Town Gut Landfill
Alternative 3: Soil Cap with Institutional Controls
Present Worth Analysis

Year	Capital Cost	Annual Cost	Total Year Cost	Annual Discount Rate at 7%	Present Worth
0	$1,902,373		$1,902,373	1.000	$1,902,373
1		$24,340	$24,340	0.935	$22,758
2		$24,340	$24,340	0.873	$21,249
3		$24,340	$24,340	0.816	$19,861
4		$24,340	$24,340	0.763	$18,571
5		$34,340	$34,340	0.713	$24,484
6		$24,340	$24,340	0.666	$16,210
7		$24,340	$24,340	0.623	$15,164
8		$24,340	$24,340	0.582	$14,166
9		$24,340	$24,340	0.544	$13,241
10		$34,340	$34,340	0.508	$17,445
11		$24,340	$24,340	0.475	$11,562
12		$24,340	$24,340	0.444	$10,807
13		$24,340	$24,340	0.415	$10,101
14		$24,340	$24,340	0.388	$9,444
15		$34,340	$34,340	0.362	$12,431
16		$24,340	$24,340	0.339	$8,251
17		$24,340	$24,340	0.317	$7,716
18		$24,340	$24,340	0.296	$7,205
19		$24,340	$24,340	0.277	$6,742
20		$34,340	$34,340	0.258	$8,860
21		$24,340	$24,340	0.242	$5,890
22		$24,340	$24,340	0.226	$5,501
23		$24,340	$24,340	0.211	$5,136
24		$24,340	$24,340	0.197	$4,795
25		$34,340	$34,340	0.184	$6,319
26		$24,340	$24,340	0.172	$4,186
27		$24,340	$24,340	0.161	$3,919
28		$24,340	$24,340	0.150	$3,651
29		$24,340	$24,340	0.141	$3,432
30		$34,340	$34,340	0.131	$4,499
				TOTAL PRESENT WORTH	**$2,225,968**

INDIAN HEAD DIVISION - NAVAL SURFACE WARFARE CENTER
Indian Head, Maryland
Site 12 - Town Gut Landfill
Alternative 4: Engineered Cap with Institutional Controls
Capital Cost

Item	Quantity	Unit	Unit Cost Subcontract	Unit Cost Material	Unit Cost Labor	Unit Cost Equipment	Total Cost Subcontract	Total Cost Material	Total Cost Labor	Total Cost Equipment	Total Direct Cost
1 PROJECT DOCUMENTS											
1.1 Prepare Documents & Plans including Permits	150	hr			$40.00		$0	$0	$6,000	$0	$6,000
2 MOBILIZATION/DEMOBILIZATION											
2.1 Office Trailer (2)	8	mo	$194.00				$1,552	$0	$0	$0	$1,552
2.2 Storage Trailer (1)	4	mo	$85.00				$340	$0	$0	$0	$340
2.3 Construction Survey	1	ls	$1,000.00				$1,000	$0	$0	$0	$1,000
2.4 Equipment Mobilization/Demobilization	1	ls			$100.00	$500.00	$0	$0	$100	$500	$600
2.5 Site Utilities	4	mo	$1,000.00				$4,000	$0	$0	$0	$4,000
3 DECONTAMINATION											
3.1 Decontamination Trailer	4	mo	$2,200.00				$8,800	$0	$0	$0	$8,800
3.2 Equipment Decon Pad	1	ls		$500.00	$450.00	$155.00	$0	$500	$450	$155	$1,105
3.3 Decon Water	4,000	gal	$0.20				$800	$0	$0	$0	$800
3.4 Decon Water Storage Tank, 6,000 gallon	4	mo	$577.50				$2,310	$0	$0	$0	$2,310
3.5 Clean Water Storage Tank, 4,000 gallon	4	mo	$472.50				$1,890	$0	$0	$0	$1,890
3.6 PPE (6 p * 5 days * 17 weeks)	510	day		$30.00			$0	$15,300	$0	$0	$15,300
3.7 Disposal of Decon Waste (liquid & solid)	4	mo	$900.00				$3,600	$0	$0	$0	$3,600
4 SITE PREPARATION AND LANDFILL REGRADING											
4.1 Site Clearing (level D)	4.3	acre			$324.00	$560.00	$0	$0	$1,393	$2,408	$3,801
4.2 RegradeLandfill Material, Excavate (level D)	17,500	cy			$2.24	$2.46	$0	$0	$39,200	$43,050	$82,250
4.3 Regrade & Compact Landfill Material (level D)	17,500	cy			$0.49	$1.00	$0	$0	$8,575	$17,500	$26,075
4.4 Common Earth (fill) 6" thick	3,500	cy		$5.05	$0.38	$0.76	$0	$17,675	$1,330	$2,660	$21,665
4.5 Confirmation Sampling of Fill	1	ea	$875.00	$20.00	$50.00	$15.00	$875	$20	$50	$15	$960
4.6 Haul Fill (16 cy/truck,10 mile R/T)	3,500	cy			$2.21	$7.00	$0	$0	$7,735	$24,500	$32,235
4.7 Grade Fill	3,500	cy			$0.31	$0.84	$0	$0	$1,085	$2,940	$4,025
4.8 Compact Fill (6" lifts)	3,500	cy			$0.24	$0.43	$0	$0	$840	$1,505	$2,345
4.9 Subgrade Soil Fill, 6" thick	3,500	cy		$5.50	$0.38	$0.76	$0	$19,250	$1,330	$2,660	$23,240
4.10 Confirmation Sampling of Fill	1	ea	$875.00	$20.00	$50.00	$15.00	$875	$20	$50	$15	$960
4.11 Haul Fill (16 cy/truck,10 mile R/T)	3,500	cy			$2.21	$7.00	$0	$0	$7,735	$24,500	$32,235
4.12 Grade Fill	3,500	cy			$0.31	$0.84	$0	$0	$1,085	$2,940	$4,025
4.13 Compact Fill (6" lifts)	3,500	cy			$0.24	$0.43	$0	$0	$840	$1,505	$2,345
5 WETLAND AND LANDFILL MATERIAL REMOVAL											
5.1 Exposed Material Excavation, 1 cy backhoe (level D)	5	day			$521.00	$547.60	$0	$0	$2,605	$2,738	$5,343
5.2 Haul Material to County Landfill	1	ls			$65.00	$185.00	$0	$0	$65	$185	$250
5.3 Disposal Fee	30	ton	$57.00				$1,710	$0	$0	$0	$1,710
5.4 Turbidity Curtain	1,330	lf		$8.22	$1.04		$0	$10,933	$1,383	$0	$12,316
5.5 Excavate & Load (2 cy bucket, level D)	2,447	cy			$0.86	$1.50	$0	$0	$2,104	$3,671	$5,775
5.6 Haul Material to Dewatering Pad, 2 trucks for 30 days	60	day			$176.80	$364.30	$0	$0	$10,608	$21,858	$32,466
5.7 Construct & Remove Dewatering Pad (100' * 50')	5,000	sf	$0.97	$6.83	$0.94	$0.96	$4,850	$34,150	$4,700	$4,800	$48,500
5.8 Spread/Mix/Load Material on Dewatering Pad	30	day			$398.80	$290.10	$0	$0	$11,964	$8,703	$20,667
5.9 Dewatering Pad Pumps, Piping & Misc. Equipment	30	day			$78.00	$46.10	$0	$0	$2,340	$1,383	$3,723
5.10 Haul & Dispose at Landfill, 1224 cy (20 cy/load)	62	load	$260.00				$16,120	$0	$0	$0	$16,120
5.11 Disposal Testing (TCLP)	2	ea	$785.00	$20.00	$50.00	$15.00	$1,570	$40	$100	$30	$1,740
5.12 Regrade & Compact Landfill Material (level D)	1,224	cy			$0.49	$1.00	$0	$0	$600	$1,224	$1,824

INDIAN HEAD DIVISION - NAVAL SURFACE WARFARE CENTER
Indian Head, Maryland
Site 12 - Town Gut Landfill
Alternative 4: Engineered Cap with Institutional Controls
Capital Cost

Item	Quantity	Unit	Unit Cost Subcontract	Unit Cost Material	Unit Cost Labor	Unit Cost Equipment	Total Cost Subcontract	Total Cost Material	Total Cost Labor	Total Cost Equipment	Total Direct Cost
6 CAPPING AND VERTICAL CONTAINMENT											
6.1 HDPE Liner, 40 mil	188,500	sf		$0.10	$0.32	$0.08	$0	$18,850	$60,320	$15,080	$94,250
6.2 Geo-composite (net with fabric on both sides)	188,500	sf		$0.46	$0.06	$0.03	$0	$86,710	$11,310	$5,655	$103,675
6.3 Common Earth (fill) 18" thick	10,500	cy		$5.05	$0.38	$0.76	$0	$53,025	$3,990	$7,980	$64,995
6.4 Confirmation Sampling of Fill	1	ea	$875.00	$20.00	$50.00	$15.00	$875	$20	$50	$15	$960
6.5 Haul Earth (16 cy/truck,10 mile R/T)	10,500	cy			$2.21	$7.00	$0	$0	$23,205	$73,500	$96,705
6.6 Grade Earth	10,500	cy			$0.31	$0.84	$0	$0	$3,255	$8,820	$12,075
6.7 Compact Earth (12" lifts)	10,500	cy			$0.06	$0.11	$0	$0	$630	$1,155	$1,785
6.9 Preconstruction Test for Slurry Wall	1	ls	$10,000.00				$10,000	$0	$0	$0	$10,000
6.10 Install Slurry Wall	78,000	sf	$7.50				$585,000	$0	$0	$0	$585,000
7 SITE RESTORATION											
7.1 Topsoil Cover	3,500	cy		$14.15	$0.38	$0.76	$0	$49,525	$1,330	$2,660	$53,515
7.2 Confirmation Sampling of Topsoil	1	ea	$875.00	$20.00	$50.00	$15.00	$875	$20	$50	$15	$960
7.3 Haul Topsoil Cover (16 cy/truck,10 mile R/T)	3,500	cy			$2.21	$7.00	$0	$0	$7,735	$24,500	$32,235
7.4 Fine Grade & Seed Topsoil	20,950	sy		$0.30	$1.09	$0.22	$0	$6,285	$22,836	$4,609	$33,730
7.5 "Wetlands Soil"	1,392	cy		$14.15	$0.38	$0.76	$0	$19,697	$529	$1,058	$21,284
7.6 Confirmation Sampling of "Wetlands Soil"	1	ea	$875.00	$20.00	$50.00	$15.00	$875	$20	$50	$15	$960
7.7 Haul "Wetlands Soil" (16 cy/truck,10 mile R/T)	1,392	cy			$2.21	$7.00	$0	$0	$3,076	$9,744	$12,820
7.8 Wetlands Soil Placement, 1 cy backhoe	5	day			$521.00	$547.60	$0	$0	$2,605	$2,738	$5,343
7.9 Wetlands Vegetation Planting	188	csf		$15.33	$8.34		$0	$2,882	$1,568	$0	$4,450
7.10 Atkins Road Ext. Geotextile, 24 oz., woven	70	sy		$1.60	$0.80	$0.10	$0	$112	$56	$7	$175
7.11 Atkins Road Ext. Gravel, 6" thick	70	sy		$5.80	$0.30	$0.60	$0	$406	$21	$42	$469
7.12 Atkins Road Ext. Binder Course, 4" thick	70	sy		$5.40	$0.50	$0.43	$0	$378	$35	$30	$443
7.13 Atkins Road Ext. Wearing Course, 2" thick	70	sy		$3.20	$0.36	$0.32	$0	$224	$25	$22	$272
8 MONITORING WELLS											
8.1 Rig Mob/Demob	1	ls	$2,500.00				$2,500	$0	$0	$0	$2,500
8.2 Abandon Existing Wells (6 @ 15')	90	lf	$12.00				$1,080	$0	$0	$0	$1,080
8.3 Install Monitoring Wells (6 @ 15')	90	lf	$18.00				$1,620	$0	$0	$0	$1,620
8.4 Well Outer Casing	6	ea	$200.00				$1,200	$0	$0	$0	$1,200
8.5 Well Development (4 hours each well)	24	hr	$30.00				$720	$0	$0	$0	$720
8.6 Collect/Containerize IDW (1 drum per well)	6	ea	$50.00				$300	$0	$0	$0	$300
8.7 Transport/Dispose IDW Off Site	6	ea	$150.00				$900	$0	$0	$0	$900
8.8 Survey Well Locations	1	ls	$700.00				$700	$0	$0	$0	$700
9 WATER LINE RELOCATION											
9.1 Excavation/Backfill (4' wide x 6' deep)	480	lf			$6.55	$3.85	$0	$0	$3,144	$1,848	$4,992
9.2 Pipe Bedding	480	lf		$1.49	$2.00	$0.58	$0	$715	$960	$278	$1,954
9.3 Ductile Iron Pipe (18" dia.)	480	lf		$31.50	$26.00	$9.55	$0	$15,120	$12,480	$4,584	$32,184
9.4 Pipe Elbow (90 degree)	4	ea		$1,225.00	$80.00	$29.50	$0	$4,900	$320	$118	$5,338
9.5 Pipe Caps	2	ea		$125.00	$75.00		$0	$250	$150	$0	$400
9.6 Surge Blocks	4	ea		$200.00	$75.00		$0	$800	$300	$0	$1,100
9.7 Atkins Road Geotextile, 24 oz., woven	18	sy		$1.60	$0.80	$0.10	$0	$29	$14	$2	$45
9.8 Atkins Road Gravel, 6" thick	18	sy		$5.80	$0.30	$0.60	$0	$104	$5	$11	$121
9.9 Atkins Road Binder Course, 4" thick	18	sy		$5.40	$0.50	$0.43	$0	$97	$9	$8	$114
9.10 Atkins Road Wearing Course, 2" thick	18	sy		$3.20	$0.36	$0.32	$0	$58	$6	$6	$70
10 CONSTRUCTION OVERSIGHT											
10.1 Professional Oversight (5p * 17 weeks)	17	mwk			$5,200.00		$0	$0	$88,400	$0	$88,400

INDIAN HEAD DIVISION - NAVAL SURFACE WARFARE CENTER
Indian Head, Maryland
Site 12 - Town Gut Landfill
Alternative 4: Engineered Cap with Institutional Controls
Capital Cost

Item	Quantity	Unit	Unit Cost Subcontract	Unit Cost Material	Unit Cost Labor	Unit Cost Equipment	Total Cost Subcontract	Total Cost Material	Total Cost Labor	Total Cost Equipment	Total Direct Cost
Subtotal							$656,937	$358,115	$362,733	$335,944	$1,713,729
Local Area Adjustments							100.0%	83.4%	98.2%	98.2%	
Subtotal							$656,937	$298,668	$356,204	$329,897	$1,641,706
Overhead on Labor Cost @	30%								$106,861		$106,861
G & A on Labor Cost @	10%								$35,620		$35,620
G & A on Material Cost @	10%							$29,867			$29,867
G & A on Subcontract Cost @	10%						$65,694				$65,694
Total Direct Cost							$722,631	$328,534	$498,685	$329,897	$1,879,747
Indirects on Total Direct Labor Cost @	50%								$249,342		$249,342
Profit on Total Direct Cost @	10%										$187,975
Subtotal 3											$2,317,065
Health & Safety Monitoring @	2%										$46,341
Total Field Cost											$2,363,406
Contingency on Total Field Cost @	20%										$472,681
Engineering on Total Field Cost @	$430,000										$430,000
TOTAL COST											$3,266,087

INDIAN HEAD DIVISION - NAVAL SURFACE WARFARE CENTER
Indian Head, Maryland
Site 12 - Town Gut Landfill
Alternative 4: Engineered Cap with Institutional Controls
Annual Cost

Item	Item Cost Annually	Item Cost per 5 Years	Notes
Site Maintenance	$6,480		1 Laborer / 2 Days per Month for 12 Months
	$2,000		Mobilization & Demobilization (pickup truck)
	$100		Misc. Materials (seed, gravel, soil)
	$500		Misc. Equipment (mowers, hand tools)
Sampling	$5,260		Collect six groundwater and six surface water samples, per sampling period (once per year), plus travel and living
Analysis/Water	$6,000		Water samples, per sampling period, (including blanks & duplicates for each medium) SVOCs and inorganics
Report	$4,000		Obtain lab, prepare sampling plan, document sampling events and results
Site Review	$0	$10,000	Review of documents and data evaluation/recommendations
TOTALS	$24,340	$10,000	

INDIAN HEAD DIVISION - NAVAL SURFACE WARFARE CENTER
Indian Head, Maryland
Site 12 - Town Gut Landfill
Alternative 4: Engineered Cap with Institutional Controls
Present Worth Analysis

Year	Capital Cost	Annual Cost	Total Year Cost	Annual Discount Rate at 7%	Present Worth
0	$3,266,087		$3,266,087	1.000	$3,266,087
1		$24,340	$24,340	0.935	$22,758
2		$24,340	$24,340	0.873	$21,249
3		$24,340	$24,340	0.816	$19,861
4		$24,340	$24,340	0.763	$18,571
5		$34,340	$34,340	0.713	$24,484
6		$24,340	$24,340	0.666	$16,210
7		$24,340	$24,340	0.623	$15,164
8		$24,340	$24,340	0.582	$14,166
9		$24,340	$24,340	0.544	$13,241
10		$34,340	$34,340	0.508	$17,445
11		$24,340	$24,340	0.475	$11,562
12		$24,340	$24,340	0.444	$10,807
13		$24,340	$24,340	0.415	$10,101
14		$24,340	$24,340	0.388	$9,444
15		$34,340	$34,340	0.362	$12,431
16		$24,340	$24,340	0.339	$8,251
17		$24,340	$24,340	0.317	$7,716
18		$24,340	$24,340	0.296	$7,205
19		$24,340	$24,340	0.277	$6,742
20		$34,340	$34,340	0.258	$8,860
21		$24,340	$24,340	0.242	$5,890
22		$24,340	$24,340	0.226	$5,501
23		$24,340	$24,340	0.211	$5,136
24		$24,340	$24,340	0.197	$4,795
25		$34,340	$34,340	0.184	$6,319
26		$24,340	$24,340	0.172	$4,186
27		$24,340	$24,340	0.161	$3,919
28		$24,340	$24,340	0.150	$3,651
29		$24,340	$24,340	0.141	$3,432
30		$34,340	$34,340	0.131	$4,499
				TOTAL PRESENT WORTH	**$3,589,682**

INDIAN HEAD DIVISION - NAVAL SURFACE WARFARE CENTER
Indian Head, Maryland
Site 12 - Town Gut Landfill
Alternative 5: Landfill Removal
Capital Cost

Item	Quantity	Unit	Unit Cost Subcontract	Unit Cost Material	Unit Cost Labor	Unit Cost Equipment	Total Cost Subcontract	Total Cost Material	Total Cost Labor	Total Cost Equipment	Total Direct Cost
1 PROJECT DOCUMENTS											
1.1 Prepare Documents & Plans including Permits	150	hr			$40.00		$0	$0	$6,000	$0	$6,000
2 MOBILIZATION/DEMOBILIZATION											
2.1 Office Trailer (2)	12	mo	$194.00				$2,328	$0	$0	$0	$2,328
2.2 Storage Trailer (1)	6	mo	$85.00				$510	$0	$0	$0	$510
2.3 Construction Survey	1	ls	$1,000.00				$1,000	$0	$0	$0	$1,000
2.4 Equipment Mobilization/Demobilization	1	ls			$100.00	$500.00	$0	$0	$100	$500	$600
2.5 Site Utilities	6	mo	$1,000.00				$6,000	$0	$0	$0	$6,000
3 DECONTAMINATION											
3.1 Decontamination Trailer	6	mo	$2,200.00				$13,200	$0	$0	$0	$13,200
3.2 Equipment Decon Pad	1	ls		$500.00	$450.00	$155.00	$0	$500	$450	$155	$1,105
3.3 Decon Water	6,000	gal	$0.20				$1,200	$0	$0	$0	$1,200
3.4 Decon Water Storage Tank, 6,000 gallon	6	mo	$577.50				$3,465	$0	$0	$0	$3,465
3.5 Clean Water Storage Tank, 4,000 gallon	6	mo	$472.50				$2,835	$0	$0	$0	$2,835
3.6 PPE (6 p * 5 days * 26 weeks)	780	day		$30.00			$0	$23,400	$0	$0	$23,400
3.7 Disposal of Decon Waste (liquid & solid)	6	mo	$900.00				$5,400	$0	$0	$0	$5,400
4 LANDFILL EXCAVATION AND DISPOSAL											
4.1 Site Clearing (level D)	4.3	acre			$324.00	$560.00	$0	$0	$1,393	$2,408	$3,801
4.2 Turbidity Curtain	1,300	lf		$8.22	$1.04		$0	$10,686	$1,352	$0	$12,038
4.3 Excavate & Load (2 cy bucket, level D)	70,000	cy			$0.86	$1.50	$0	$0	$60,200	$105,000	$165,200
4.4 Haul Material to Dewatering Pad (2 trucks for 80 days	160	day			$176.80	$364.30	$0	$0	$28,288	$58,288	$86,576
4.5 Construct & Remove Dewatering Pad #1 (50' * 50')	2,500	sf	$0.97	$6.83	$0.94	$0.96	$2,425	$17,075	$2,350	$2,400	$24,250
4.6 Construct & Remove Dewatering Pad #2 (100' * 100')	10,000	sf	$0.97	$6.83	$0.94	$0.96	$9,700	$68,300	$9,400	$9,600	$97,000
4.7 Spread/Mix/Load Material on Dewatering Pad	80	day			$398.80	$290.10	$0	$0	$31,904	$23,208	$55,112
4.8 Dewatering Pad Pumps, Piping & Misc Equipment	80	day			$78.00	$46.10	$0	$0	$6,240	$3,688	$9,928
4.9 Haul & Dispose at Landfill (20 cy/load)	3,563	load	$260.00				$926,380	$0	$0	$0	$926,380
4.10 Disposal Testing (TCLP)	10	ea	$785.00	$20.00	$50.00	$15.00	$7,850	$200	$500	$150	$8,700
5 BACKFILL EXCAVATION											
5.1 Common Earth Fill	66,500	cy		$5.05	$0.38	$0.76	$0	$335,825	$25,270	$50,540	$411,635
5.2 Confirmation Sampling of Fill	6	ea	$875.00	$20.00	$50.00	$15.00	$5,250	$120	$300	$90	$5,760
5.3 Haul Earth (16 cy/truck,10 mile R/T)	66,500	cy			$2.21	$7.00	$0	$0	$146,965	$465,500	$612,465
5.4 Grade Earth	66,500	cy			$0.31	$0.84	$0	$0	$20,615	$55,860	$76,475
5.5 Compact Earth (12" lifts)	66,500	cy			$0.09	$0.16	$0	$0	$5,985	$10,640	$16,625
6 SITE RESTORATION											
6.1 Topsoil, 6" thick	3,500	cy		$14.15	$0.38	$0.76	$0	$49,525	$1,330	$2,660	$53,515
6.2 Confirmation Sampling of Topsoil	1	ea	$875.00	$20.00	$50.00	$15.00	$875	$20	$50	$15	$960
6.3 Haul Topsoil (16 cy/truck,10 mile R/T)	3,500	cy			$2.21	$7.00	$0	$0	$7,735	$24,500	$32,235
6.4 Fine Grade & Seed Topsoil	20,950	sy		$0.30	$1.09	$0.22	$0	$6,285	$22,836	$4,609	$33,730
6.5 "Wetlands Soil"	1,392	cy		$14.15	$0.38	$0.76	$0	$19,697	$529	$1,058	$21,284
6.6 Confirmation Sampling of "Wetlands Soil"	1	ea	$875.00	$20.00	$50.00	$15.00	$875	$20	$50	$15	$960
6.7 Haul "Wetlands Soil" (16 cy/truck,10 mile R/T)	1,392	cy			$2.21	$7.00	$0	$0	$3,076	$9,744	$12,820
6.8 Wetlands Soil Placement, 1 cy backhoe	5	day			$521.00	$547.60	$0	$0	$2,605	$2,738	$5,343
6.9 Wetlands Vegetation Planting	188	csf		$15.33	$8.34		$0	$2,882	$1,568	$0	$4,450

INDIAN HEAD DIVISION - NAVAL SURFACE WARFARE CENTER
Indian Head, Maryland
Site 12 - Town Gut Landfill
Alternative 5: Landfill Removal
Capital Cost

Item	Quantity	Unit	Unit Cost Subcontract	Unit Cost Material	Unit Cost Labor	Unit Cost Equipment	Total Cost Subcontract	Total Cost Material	Total Cost Labor	Total Cost Equipment	Total Direct Cost
6.10 Atkins Road Ext. Geotextile, 24 oz., woven	70	sy		$1.60	$0.80	$0.10	$0	$112	$56	$7	$175
6.11 Atkins Road Ext. Gravel, 6" thick	70	sy		$5.80	$0.30	$0.60	$0	$406	$21	$42	$469
6.12 Atkins Road Ext. Binder Course, 4" thick	70	sy		$5.40	$0.50	$0.43	$0	$378	$35	$30	$443
6.13 Atkins Road Ext. Wearing Course, 2" thick	70	sy		$3.20	$0.36	$0.32	$0	$224	$25	$22	$272
7 WATER LINE RELOCATION											
7.1 Excavation/Backfill (4' wide x 6' deep)	480	lf			$6.55	$3.85	$0	$0	$3,144	$1,848	$4,992
7.2 Pipe Bedding	480	lf		$1.49	$2.00	$0.58	$0	$715	$960	$278	$1,954
7.3 Ductile Iron Pipe (18" dia.)	480	lf		$31.50	$26.00	$9.55	$0	$15,120	$12,480	$4,584	$32,184
7.4 Pipe Elbow (90 degree)	4	ea		$1,225.00	$80.00	$29.50	$0	$4,900	$320	$118	$5,338
7.5 Pipe Caps	2	ea		$125.00	$75.00		$0	$250	$150	$0	$400
7.6 Surge Blocks	4	ea		$200.00	$75.00		$0	$800	$300	$0	$1,100
7.7 Atkins Road Geotextile, 24 oz., woven	18	sy		$1.60	$0.80	$0.10	$0	$29	$14	$2	$45
7.8 Atkins Road Gravel, 6" thick	18	sy		$5.80	$0.30	$0.60	$0	$104	$5	$11	$121
7.9 Atkins Road Binder Course, 4" thick	18	sy		$5.40	$0.50	$0.43	$0	$97	$9	$8	$114
7.10 Atkins Road Wearing Course, 2" thick	18	sy		$3.20	$0.36	$0.32	$0	$58	$6	$6	$70
8 MONITORING WELLS											
8.1 Rig Mob/Demob	1	ls	$2,500.00				$2,500	$0	$0	$0	$2,500
8.2 Abandon Existing Wells (6 @ 15')	90	lf	$12.00				$1,080	$0	$0	$0	$1,080
8.3 Install Monitoring Wells (6 @ 15')	90	lf	$18.00				$1,620	$0	$0	$0	$1,620
8.4 Well Outer Casing	6	ea	$200.00				$1,200	$0	$0	$0	$1,200
8.5 Well Development (4 hours each well)	24	hr	$30.00				$720	$0	$0	$0	$720
8.6 Collect/Containerize IDW (1 drum per well)	6	ea	$50.00				$300	$0	$0	$0	$300
8.7 Transport/Dispose IDW Off Site	6	ea	$150.00				$900	$0	$0	$0	$900
8.8 Survey Well Locations	1	ls	$700.00				$700	$0	$0	$0	$700
9 CONSTRUCTION OVERSIGHT											
9.1 Professional Oversight (5p * 26 weeks)	26	mwk			$5,200.00		$0	$0	$135,200	$0	$135,200
Subtotal							$998,313	$557,728	$539,817	$840,322	$2,936,180
Local Area Adjustments							100.0%	83.4%	98.2%	98.2%	
Subtotal							$998,313	$465,145	$530,101	$825,196	$2,818,755
Overhead on Labor Cost @ 30%									$159,030		$159,030
G & A on Labor Cost @ 10%									$53,010		$53,010
G & A on Material Cost @ 10%								$46,515			$46,515
G & A on Subcontract Cost @ 10%							$99,831				$99,831
Total Direct Cost							$1,098,144	$511,660	$742,141	$825,196	$3,177,141
Indirects on Total Direct Labor Cost @ 50%									$371,070		$371,070
Profit on Total Direct Cost @ 10%											$317,714
Subtotal 3											$3,865,926
Health & Safety Monitoring @ 2%											$77,319

INDIAN HEAD DIVISION - NAVAL SURFACE WARFARE CENTER
Indian Head, Maryland
Site 12 - Town Gut Landfill
Alternative 5: Landfill Removal
Capital Cost

Item	Quantity	Unit	Unit Cost Subcontract	Unit Cost Material	Unit Cost Labor	Unit Cost Equipment	Total Cost Subcontract	Total Cost Material	Total Cost Labor	Total Cost Equipment	Total Direct Cost
Total Field Cost											$3,943,244
Contingency on Total Field Cost @ 10%											$394,324
Engineering on Total Field Cost @ $320,000											$320,000
TOTAL COST											**$4,657,569**

INDIAN HEAD DIVISION - NAVAL SURFACE WARFARE CENTER
Indian Head, Maryland
Site 12 - Town Gut Landfill
Alternative 5: Landfill Removal
Annual Cost

Item	Item Cost Annually	Item Cost per 5 Years	Notes
Sampling	$5,260		Collect six groundwater and six surface water samples, per sampling period (once per year), plus travel and living
Analysis/Water	$6,000		Water samples, per sampling period, (including blanks & duplicates for each medium) SVOCs and inorganics
Report	$4,000		Obtain lab, prepare sampling plan, document sampling events and results
Site Review	$0	$10,000	Review of documents and data evaluation/recommendations
TOTALS	$15,260	$10,000	

INDIAN HEAD DIVISION - NAVAL SURFACE WARFARE CENTER
Indian Head, Maryland
Site 12 - Town Gut Landfill
Alternative 5: Landfill Removal
Present Worth Analysis

Year	Capital Cost	Annual Cost	Total Year Cost	Annual Discount Rate at 7%	Present Worth
0	$4,657,569		$4,657,569	1.000	$4,657,569
1		$15,260	$15,260	0.935	$14,268
2		$15,260	$15,260	0.873	$13,322
3		$15,260	$15,260	0.816	$12,452
4		$15,260	$15,260	0.763	$11,643
5		$25,260	$25,260	0.713	$18,010
6		$15,260	$15,260	0.666	$10,163
7		$15,260	$15,260	0.623	$9,507
8		$15,260	$15,260	0.582	$8,881
9		$15,260	$15,260	0.544	$8,301
10		$25,260	$25,260	0.508	$12,832
11		$15,260	$15,260	0.475	$7,249
12		$15,260	$15,260	0.444	$6,775
13		$15,260	$15,260	0.415	$6,333
14		$15,260	$15,260	0.388	$5,921
15		$25,260	$25,260	0.362	$9,144
16		$15,260	$15,260	0.339	$5,173
17		$15,260	$15,260	0.317	$4,837
18		$15,260	$15,260	0.296	$4,517
19		$15,260	$15,260	0.277	$4,227
20		$25,260	$25,260	0.258	$6,517
21		$15,260	$15,260	0.242	$3,693
22		$15,260	$15,260	0.226	$3,449
23		$15,260	$15,260	0.211	$3,220
24		$15,260	$15,260	0.197	$3,006
25		$25,260	$25,260	0.184	$4,648
26		$15,260	$15,260	0.172	$2,625
27		$15,260	$15,260	0.161	$2,457
28		$15,260	$15,260	0.150	$2,289
29		$15,260	$15,260	0.141	$2,152
30		$25,260	$25,260	0.131	$3,309
				TOTAL PRESENT WORTH	**$4,868,490**

INDIAN HEAD DIVISION - NAVAL SURFACE WARFARE CENTER
INDIAN HEAD, MARYLAND
SITE 41 - SCRAP YARD

COMPARISON OF REMEDIAL ACTION COST

Alternative	Captial Cost	Annual	Present Worth
#2 Soil Removal	$750,600	$15,000	$1,076,000

INDIAN HEAD DIVISION - NAVAL SURFACE WARFARE CENTER
Indian Head, Maryland
Site 41 - Scrap Yard
Alternative 2: Soil Removal
Capital Cost

Item	Quantity	Unit	Unit Cost Subcontract	Unit Cost Material	Unit Cost Labor	Unit Cost Equipment	Total Cost Subcontract	Total Cost Material	Total Cost Labor	Total Cost Equipment	Total Direct Cost
1 PROJECT DOCUMENTS											
1.1 Prepare Documents & Plans including Permits	250	hr			$40.00		$0	$0	$10,000	$0	$10,000
2 MOBILIZATION/DEMOBILIZATION											
2.1 Office Trailer (2)	4	mo	$194.00				$776	$0	$0	$0	$776
2.2 Storage Trailer (1)	2	mo	$85.00				$170	$0	$0	$0	$170
2.3 Construction Survey	1	ls	$1,000.00				$1,000	$0	$0	$0	$1,000
2.4 Equipment Mobilization/Demobilization	1	ea			$100.00	$500.00	$0	$0	$100	$500	$600
2.5 Site Utilities	2	mo	$1,000.00				$2,000	$0	$0	$0	$2,000
3 DECONTAMINATION											
3.1 Decontamination Trailer	2	mo	$2,200.00				$4,400	$0	$0	$0	$4,400
3.2 Equipment Decon Pad	1	ls		$500.00	$450.00	$155.00	$0	$500	$450	$155	$1,105
3.3 Decon Water	2,000	gal	$0.20				$400	$0	$0	$0	$400
3.4 Decon Water Storage Tank, 6,000 gallon	2	mo	$577.50				$1,155	$0	$0	$0	$1,155
3.5 Clean Water Storage Tank, 4,000 gallon	2	mo	$472.50				$945	$0	$0	$0	$945
3.6 PPE (6 p * 5 days * 6 weeks)	180	day		$30.00			$0	$5,400	$0	$0	$5,400
3.7 Disposal of Decon Waste (liquid & solid)	2	mo	$900.00				$1,800	$0	$0	$0	$1,800
4 SITE PREPARATION											
4.1 Clear & Grub (light trees)	3	day			$1,100.00	$1,175.00	$0	$0	$3,300	$3,525	$6,825
4.2 Fence Removal	1,710	lf			$1.26	$0.49	$0	$0	$2,155	$838	$2,993
4.3 Fence Disposal	20	cy			$2.33	$7.40	$0	$0	$47	$148	$195
4.4 Staging Area, install & remove (100' by 100')	10,000	sf		$1.73	$0.41	$0.49	$0	$17,300	$4,100	$4,900	$26,300
4.5 Railroad Track Removal	500	lf		$3.94	$1.66	$5.60	$0	$1,970	$830	$2,800	$5,600
4.6 Railroad Tie Disposal (250 ties)	100	cy			$2.33	$7.40	$0	$0	$233	$740	$973
5 SCRAP YARD											
5.1 Concrete Surface Excavation (skid loader w/broom)	5	day			$398.80	$295.55	$0	$0	$1,994	$1,478	$3,472
5.2 Steam Clean Concrete	5	day			$342.20	$40.60	$0	$0	$1,711	$203	$1,914
5.3 Verify Clean Surface	50	ea	$200.00	$20.00	$50.00	$15.00	$10,000	$1,000	$2,500	$750	$14,250
5.4 Asphalt Topcoat, 2" thick	73,000	sf	$0.47				$34,310	$0	$0	$0	$34,310
6 EXCAVATION OFF CONCRETE											
6.1 Soil Excavation (3/4 cy backhoe)	7	day			$313.00	$218.80	$0	$0	$2,191	$1,532	$3,723
6.2 Confirmation Sampling (excavation)	112	ea	$600.00	$20.00	$50.00	$15.00	$67,200	$2,240	$5,600	$1,680	$76,720
6.3 Common Earth (fill)	72	cy		$5.05	$0.38	$0.76	$0	$364	$27	$55	$446
6.4 Confirmation Sampling of Fill	1	ea	$875.00	$20.00	$50.00	$15.00	$875	$20	$50	$15	$960
6.5 Haul Earth (16 cy/truck,10 mile R/T)	72	cy			$2.21	$7.00	$0	$0	$159	$504	$663
6.6 Grade Earth	3	day			$234.80	$218.80	$0	$0	$704	$656	$1,361
6.7 Compact Earth (6" lifts)	3	day			$227.20	$93.05	$0	$0	$682	$279	$961
6.8 Topsoil Cover, 6" thick	53	cy		$14.15	$0.38	$0.76	$0	$750	$20	$40	$810
6.9 Confirmation Sampling of Topsoil	1	ea	$875.00	$20.00	$50.00	$15.00	$875	$20	$50	$15	$960
6.10 Haul Topsoil Cover (16 cy/truck,10 mile R/T)	53	cy			$2.21	$7.00	$0	$0	$117	$371	$488
6.11 Fine Grade & Seed Topsoil	310	sy		$0.30	$1.09	$0.22	$0	$93	$338	$68	$499
7 OFF-SITE DISPOSAL											
7.1 Waste Characterization	3	ea	$1,000.00				$3,000	$0	$0	$0	$3,000
7.2 Liquid Disposal (1,000 gal in drums)	20	drum	$325.00	$50.00			$6,500	$1,000	$0	$0	$7,500
7.3 Nonhazardous Landfill (1,413 cy @ 20 cy/load)	71	load	$260.00				$18,460	$0	$0	$0	$18,460
7.4 Hazardous Landfill (PCB soils, haul & dispose, 48 cy)	72	ton	$195.00				$14,040	$0	$0	$0	$14,040
7.5 Incineration (PCB soils, haul & dispose, 16 cy)	24	ton	$850.00				$20,400	$0	$0	$0	$20,400
8 MISC. SITE WORK											
8.1 Chain Link Fence, 8' high with barb wire	1,710	lf		$17.95	$4.17	$3.00	$0	$30,695	$7,131	$5,130	$42,955
8.2 Fence Double Swing Gate, 12' wide	1	ea		$700.00	$350.00	$253.00	$0	$700	$350	$253	$1,303
8.3 Retaining Wall, 4' high, concrete	65	lf		$23.50	$46.00	$10.00	$0	$1,528	$2,990	$650	$5,168

INDIAN HEAD DIVISION - NAVAL SURFACE WARFARE CENTER
Indian Head, Maryland
Site 41 - Scrap Yard
Alternative 2: Soil Removal
Capital Cost

Item	Quantity	Unit	Unit Cost Subcontract	Unit Cost Material	Unit Cost Labor	Unit Cost Equipment	Total Cost Subcontract	Total Cost Material	Total Cost Labor	Total Cost Equipment	Total Direct Cost
8.4 Eroded Area Topsoil Cover, 6" thick	93	cy		$14.15	$0.38	$0.76	$0	$1,316	$35	$71	$1,422
8.5 Confirmation Sampling of Topsoil	1	ea	$875.00	$20.00	$50.00	$15.00	$875	$20	$50	$15	$960
8.6 Haul Topsoil Cover (16 cy/truck,10 mile R/T)	93	cy			$2.21	$7.00	$0	$0	$206	$651	$857
8.7 Jute Mesh	555	sy		$0.72	$0.21	$0.07	$0	$400	$117	$39	$555
8.8 Fine Grade & Seed Topsoil	555	sy		$0.30	$1.09	$0.22	$0	$167	$605	$122	$894
9 MONITORING WELLS											
9.1 Rig Mob/Demob	1	ls	$2,500.00				$2,500	$0	$0	$0	$2,500
9.2 Abandon Existing Wells (3 @ 15')	45	lf	$12.00				$540	$0	$0	$0	$540
9.3 Install Monitoring Wells (3 @ 15')	45	lf	$18.00				$810	$0	$0	$0	$810
9.4 Well Outer Casing	3	ea	$200.00				$600	$0	$0	$0	$600
9.5 Well Development (4 hours each well)	12	hr	$30.00				$360	$0	$0	$0	$360
9.6 Collect/Containerize IDW (1 drum per well)	3	ea	$50.00				$150	$0	$0	$0	$150
9.7 Transport/Dispose IDW Off Site	3	ea	$150.00				$450	$0	$0	$0	$450
9.8 Survey Well Locations	1	ls	$500.00				$500	$0	$0	$0	$500
10 CONSTRUCTION OVERSIGHT											
10.1 Professional Oversight (5p * 8 weeks)	8	mwk			$5,200.00		$0	$0	$41,600	$0	$41,600
Subtotal							$195,091	$65,481	$90,441	$28,183	$379,195
Local Area Adjustments							100.0%	83.4%	98.2%	98.2%	
Subtotal							$195,091	$54,611	$88,813	$27,675	$366,190
Overhead on Labor Cost @ 30%									$26,644		$26,644
G & A on Labor Cost @ 10%									$8,881		$8,881
G & A on Material Cost @ 10%								$5,461			$5,461
G & A on Subcontract Cost @ 10%							$19,509				$19,509
Total Direct Cost							$214,600	$60,072	$124,338	$27,675	$426,686
Indirects on Total Direct Labor Cost @ 50%									$62,169		$62,169
Profit on Total Direct Cost @ 10%											$42,669
Subtotal 3											$531,523
Health & Safety Monitoring @ 2%											$10,630
Total Field Cost											$542,154
Contingency on Total Field Cost @ 20%											$108,431
Engineering on Total Field Cost @ $100,000											$100,000
TOTAL COST											**$750,584**

INDIAN HEAD DIVISION - NAVAL SURFACE WARFARE CENTER
Indian Head, Maryland
Site 41 - Scrap Yard
Alternative 2: Soil Removal
Annual Cost

Item	Item Cost Annually	Item Cost per 5 Years	Item Cost per 10 Years	Notes
Site Maintenance	$1,000			Repair Asphalt (patch holes)
		$34,310		Seal Asphalt (clean & seal)
			$68,600	Repave Asphalt (2" thick)
Sampling	$5,260			Collect four groundwater samples, per sampling period (once per year), plus travel and living
Analysis/Water	$4,725			Water samples, per sampling period, (including blanks & duplicates for each medium) VOCs, SVOCs, Pesticides/PCBs, and inorganics
Report	$4,000			Obtain lab, prepare sampling plan, document sampling events and results
Site Review		$10,000		Review of documents and data evaluation/recommendations
TOTALS	$14,985	$44,310	$68,600	

INDIAN HEAD DIVISION - NAVAL SURFACE WARFARE CENTER
Indian Head, Maryland
Site 41 - Scrap Yard
Alternative 2: Soil Removal
Present Worth Analysis

Year	Capital Cost	Annual Cost	Total Year Cost	Annual Discount Rate at 7%	Present Worth
0	$750,584		$750,584	1.000	$750,584
1		$14,985	$14,985	0.935	$14,011
2		$14,985	$14,985	0.873	$13,082
3		$14,985	$14,985	0.816	$12,228
4		$14,985	$14,985	0.763	$11,434
5		$59,295	$59,295	0.713	$42,277
6		$14,985	$14,985	0.666	$9,980
7		$14,985	$14,985	0.623	$9,336
8		$14,985	$14,985	0.582	$8,721
9		$14,985	$14,985	0.544	$8,152
10		$93,585	$93,585	0.508	$47,541
11		$14,985	$14,985	0.475	$7,118
12		$14,985	$14,985	0.444	$6,653
13		$14,985	$14,985	0.415	$6,219
14		$14,985	$14,985	0.388	$5,814
15		$83,585	$83,585	0.362	$30,258
16		$14,985	$14,985	0.339	$5,080
17		$14,985	$14,985	0.317	$4,750
18		$14,985	$14,985	0.296	$4,436
19		$14,985	$14,985	0.277	$4,151
20		$93,585	$93,585	0.258	$24,145
21		$14,985	$14,985	0.242	$3,626
22		$14,985	$14,985	0.226	$3,387
23		$14,985	$14,985	0.211	$3,162
24		$14,985	$14,985	0.197	$2,952
25		$83,585	$83,585	0.184	$15,380
26		$14,985	$14,985	0.172	$2,577
27		$14,985	$14,985	0.161	$2,413
28		$14,985	$14,985	0.150	$2,248
29		$14,985	$14,985	0.141	$2,113
30		$93,585	$93,585	0.131	$12,260
				TOTAL PRESENT WORTH	**$1,076,086**

APPENDIX I

CONCEPTUAL DESIGN CALCULATIONS

CLIENT: INDIAN HEAD		JOB NUMBER: N7129-1440	
SUBJECT: Site 12 - Town Gut Landfill - Area and Volume Calculations			
BASED ON:		DRAWING NUMBER:	
BY: T.J.R. Date: 7/18/00	CHECKED BY: Date: 7/18/00	APPROVED BY:	DATE:

Objective:

Calculate the area of landfill for the purpose of calculating material volumes.

Calculations:

Area of Site 12 - Town Gut Landfill

A planimeter and the drawing found on page 4 of 4 was used to calculate the area of landfill.

Planimetered Area (si)	Drawing Scale (ft/in)	Area of Landfill (sf)	Area of Landfill (acres)
2.39475	150	53882	1.2
5.98301	150	134618	3.1
	Total Area	**188500**	**4.3**

ESTIMATED AREA OF WETLANDS DISTURBED UNDER THE ALTERNATIVES

From Drawing 3-1 (Appendix A), areas of the wetland disturbed are:

Planimetered Area (si)	Drawing Scale (ft/in)	Area of Wetlands (sf)	Area of Wetlands (acres)
7.515	50	18788	0.43
	Total Area	**18788**	**0.43**
Assume for Alt. 2 area is 50% of above		**9394**	**0.22**

Volume of "Wetland Soil"

soil 2' thick = 18,788 sf * 2' 1,392 cy
Assume for Alt. 2 is 50% of above 696 cy

Length of "Shore Line" Disturbed
measured from drawing 3-1 (Appendix A) 1,425 lf
Assume for Alt. 2 is 50% of above 713 lf

ALTERNATIVE 2 (SOIL COVER) QUANTITY CALCULATIONS

Area of Soil Cover
Assume 1/2 of landfill covered with 2' of soil (18" common fill & 6" vegetative fill)
Common Fill: (2.15 acre)(43560 sf/acre)(1.5 ft)/(27 cf/acre) = 5,203 cy use 5200 cy
Vegetative Fill: (2.15 acre)(43560 sf/acre)(0.5 ft)/(27 cf/acre) = 1,734 cy
Add 66 cy (1/4 of landfill material removed) use 1800 cy

CLIENT: INDIAN HEAD		JOB NUMBER: N7129-1440	
SUBJECT: Site 12 - Town Gut Landfill - Area and Volume Calculations			
BASED ON:		DRAWING NUMBER:	
BY: T.J.R. Date: 7/18/00	CHECKED BY: TMD Date: 7/18/00	APPROVED BY:	DATE:

Area & Volume of Landfilled Material to be Removed

Assume material is removed along the "shore line" to a depth of 2 feet by 5 feet wide

Area: 5' * 713' = 3,565 sf

Volume: 3,565 sf * 2 feet = 7,130 cf or 264 cy

Volume of Material for "Dewatering" and Off Site Disposal

Landfilled Material Removed		264 cy
Wetland Soil Removed		696 cy
	Total	960 cy

ALTERNATIVE 3 (SOIL CAP) QUANTITY CALCULATIONS

Using the area calculation the following volumes were calculated.

Area & Volume of Landfilled Material to be Removed

Assume material is removed all along the "shore line" to a depth of 4 feet by 5 feet wide

Area: 5' * 1,425' = 7,125 sf

Volume: 7,125 sf * 4 feet = 28,500 cf or 1,055 cy

Volume of Material for "Dewatering"

Landfilled Material		1055 cy
Wetland Soil		1392 cy
	Total	2447 cy
One half to be placed under cap		1224 cy
One half to be disposed off site		1224 cy

Volume of Fill Material for Final Landfill Soil Layer

Additional Thickness of Layer	12 inches	1 ft
Area		188500 sf
Volume of Final Landfill Soil Layer		**6981 cy**
Use		**7000 cy**

Area of Geotextile Material Between Existing Surface & Cap

Number of Geotextile Layers	1 layer
Area	188500 sf
Required Squarefootage of Geotextile	**188500 sf**

Volume of Common Fill Required For Soil Cover

Thickness of Layer	18 inches	1.5 ft
Area		188500 sf
Volume of Common Fill for Soil Cover		**10472 cy**
Use		**10500 cy**

CLIENT: INDIAN HEAD		JOB NUMBER: N7129-1440	
SUBJECT: Site 12 - Town Gut Landfill - Area and Volume Calculations			
BASED ON:		DRAWING NUMBER:	
BY: T.J.R. Date: 7/18/00	CHECKED BY: TMS Date: 7/18/00	APPROVED BY:	DATE:

Volume of Vegetative Fill for Soil Cover

Thickness of Layer	6 inches	0.5 ft
Area		188500 sf
Volume of Vegetative Fill for Soil Cover		**3491 cy**
Use		**3500 cy**

ALTERNATIVE 4 (ENGINEERED CAP) QUANTITY CALCULATIONS

Area of Geomembrane Material

Number of Geomembrane Layers	1 layer
Area	188500 sf
Required Squarefootage of Geomembrane	**188500 sf**

Area of Geo-composite Net

Number of Layers	1 layer
Area	188500 sf
Required Squarefootage of Geo-composite	**188500 sf**

Volume for Vertical Containment

Length of wall (perimeter around landfill)	2,600 lf
Assumed depth to low permability layer	30 ft
Required Squarefootage of Vertical Containment Wall	**78000 sf**

For the following Quantities Refer to Alternative 3 Calculations:

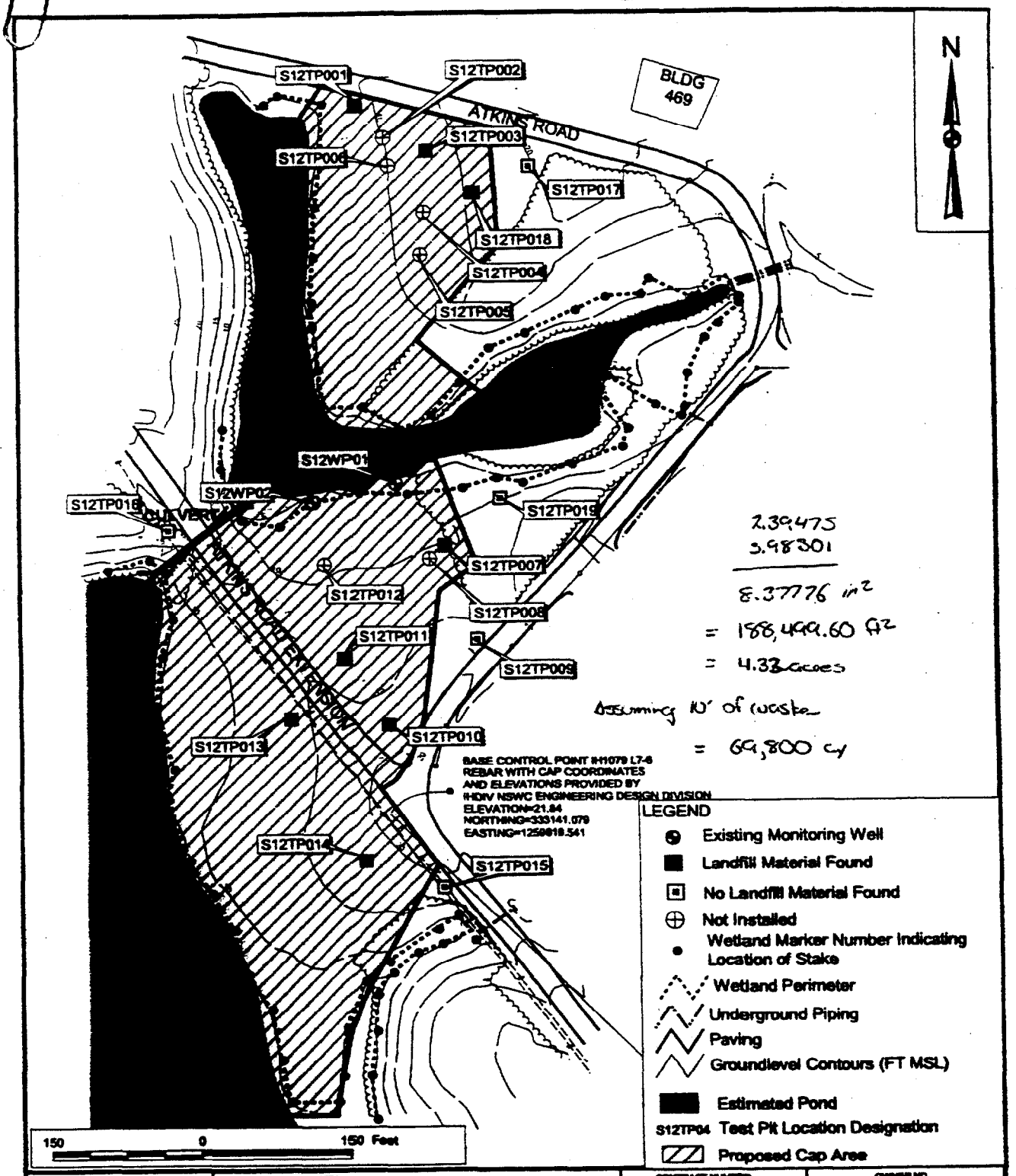
Volume of Fill to complete final landfill soil layer	**7000 cy**
Volume of Material Excavated	**2447 cy**
Volume of Material to be placed under the cap	**1224 cy**
Volume of Material to be disposed off site	**1224 cy**
Volume of Clean Common Fill for 18-inch Cover Layer	**10500 cy**
Volume of Vegetative Fill for 6-inch Cover Layer	**3500 cy**

ALTERNATIVE 5 (LANDFILL REMOVAL) QUANTITY CALCULATIONS

Volume of Debris/fill in Site 12 Landfill

Average Depth of Debris/Fill	10 ft
Area of Landfill	188500 sf
Volume of Debris/Fill In Site 12 Landfill	**69815 cy**
Use	**70000 cy**

DISTURBED ~~landfill~~ wetland AREA .75501 .39



DRAWN BY J. BELLONE	DATE 11/22/99	Tetra Tech NUS, Inc.	CONTRACT NUMBER 7129 / OWNER NO. —
CHECKED BY —	DATE —	PRE-FEASIBILITY STUDY INVESTIGATION SITE 12 - TOWN GUT LANDFILL IHDIV-NSWC, INDIAN HEAD, MARYLAND	APPROVED BY — / DATE —
COST/SCHEDULE-AREA			APPROVED BY — / DATE —
SCALE AS NOTED			DRAWING NO. / REV 0

CLIENT: INDIAN HEAD		JOB NUMBER: N7129-1440	
SUBJECT: Site 12 - Town Gut Landfill - Quantity Calculations for Pipe Realignment			
BASED ON:		DRAWING NUMBER:	
BY: T.W.S. Date: 07/14/00	CHECKED BY: TJR Date: 7/18/00	APPROVED BY:	DATE:

Objective:

Calculate the quantity of materials needed to realign the 18" water line located along Atkins Road North of Site 12.

Assumptions:

1) The pipeline is 18" ductile iron pipe, there are no valves, junctions or fire hydrants along the stretch of pipe needing relocated.
2) The existing pipe is located below grade with 4-feet of cover over the pipe. The pipe is located on the southern side of Tisdale Road, as indicated in the figure provided on page 3 of 3.
3) The present depth is adequate for loads that will be exerted on the new pipe that will be located under Atkins Road.
4) After realignment, the abandoned portion of the existing pipe will be plug at both ends and left in place.

Calculations:

Length of Pipe Required for Realignment

Width of Atkins Road at Crossing =	20 ft
Length of pipe to extend on each side of Atkins Road =	5 ft
Total length to cross Atkins Road =	30 ft
Number of Road Crossings =	2
Length of pipe along Atkins Road =	420 ft
Required amount of 18" Ductile Iron Pipe for realignment =	480 ft
Required number of 18" Ductile Iron 90° Elbows =	4
Required number of surge blocks =	4
Required number of caps for abandoned pipe =	2

Length of Trenching Required for Realignment

Length of Trenching = Required length of Pipe =	480 ft
Required length of trenching across roadway =	40 ft

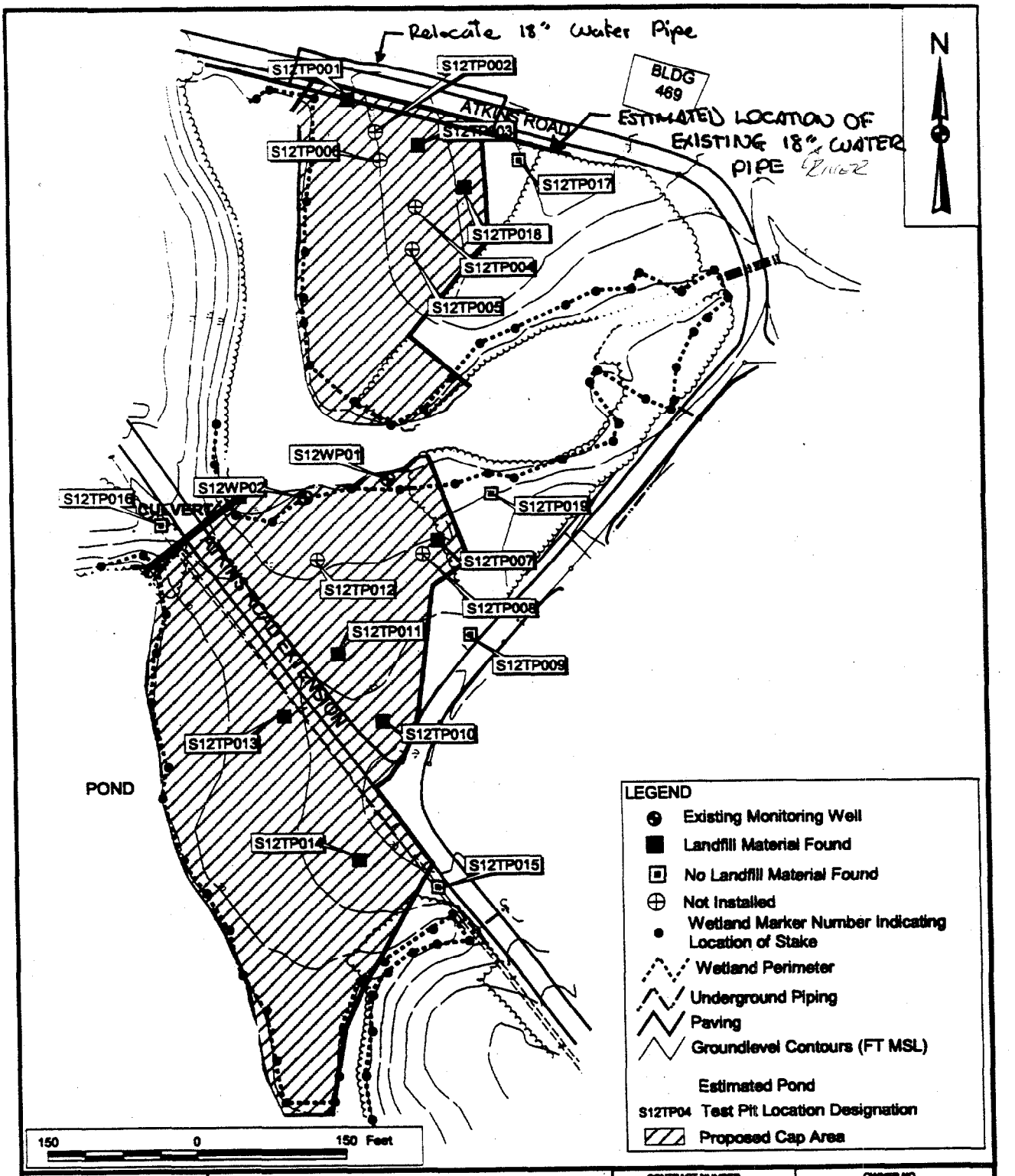
CLIENT: INDIAN HEAD		JOB NUMBER: N7129-1440	
SUBJECT: Site 12 - Town Gut Landfill - Quantity Calculations for Pipe Realignment			
BASED ON:		DRAWING NUMBER:	
BY: T.W.S. Date: 07/14/00	CHECKED BY: TJR Date: 7/18/00	APPROVED BY:	DATE:

Fill Material

The trench will be backfilled with the same material that was excavated with the exception of the pipe bedding material. The pipe will be placed on 6-inches of gravel.

Area of Pavement material Required*:	Length of Excavation in Road =	40 ft
	Thickness of Pavement Section =	1 ft
	Width of Excavation =	4 ft
	Area of Pavement Material Required =	18 sy

* Pavement section is assumed to be the same as the section assumed for Atkins Road Extension in the cost estimate for Alternative 4; 2-inch bituminous wearing course, 4-inch base or binder course, and 6-inch sub-base course.



DRAWN BY J. BELLONE	DATE 1/10/99	Tetra Tech NUS, Inc.	CONTRACT NUMBER 7129 / OWNER NO. —
CHECKED BY GJL	DATE 2/9/00	EXTENT OF LANDFILL SITE 12 - TOWN GUT LANDFILL IHDIV-NSWC, INDIAN HEAD, MARYLAND	APPROVED BY GJL / DATE 2/9/00
COST/SCHEDULE-AREA			APPROVED BY — / DATE —
SCALE AS NOTED			DRAWING NO. FIGURE 6-1 / REV 0

P:\GIS\NSWC_INDIAN_HEAD\7129_PRESENTATION.APR\SITE 12 - EXTENT OF LANDFILL LAYOUT JCB 1/10/99

CLIENT INDIAN HEAD DIV, INDIAN HEAD MD		7129-1440	
SUBJECT SITE 41 – SCRAP YARD – ALTERNATIVE 2 – SOIL REMOVAL			
BASED ON		DRAWING NUMBER	
BY LMY	CHECKED BY 7/19/00	APPROVED BY	7/19/00

OBJECTIVE

To provide support for the quantities used in the IHDIV-NSWC Site 41 Feasibility Study cost estimate (Alternative 2).

8' Chain Link Fence:

Remove and Replace 1,710 linear feet (scrap yard perimeter)
Assume one truckload of construction/demolition waste for disposal purposes

Railroad Track Removal (no replacement):

500 linear feet (scaled off Figure 7-1)

Clear and grub:

Isolated areas around excavation points – see Figure 7-1
Assume 2 laborers, backhoe, and chipper for 3 days

Soil Removal (within yard):

395 feet x 80 feet + 360 feet x 115 feet = 73,000 square feet
Assume average of 6" soil across yard (on top of concrete)
Volume = 73,000 square feet x 0.5 feet = 1,352 cubic yards

Soil Removal (outside yard):

15 isolated locations require removal to 6 inches (see Figure 7-1)

15 x (10 feet x 10 feet) x (0.5 feet) = 28 cubic yards

12 isolated locations require removal to 18 inches (see Figure 7-1)

12 x (10 feet x 10 feet) x (1.5 feet) = 67 cubic yards

1 isolated location requires removal to 8 feet (see Figure 7-1)

1 x (10 feet x 10 feet) x (8 feet) = 30 cubic yards

Steam clean concrete:

395 feet x 80 feet + 360 feet x 115 feet = 73,000 square feet

Asphalt pavement:

73,000 square feet

CLIENT MU INDIAN HEAD DIV, INDIAN HEAD		7129-1440	
SUBJECT SITE 41 – SCRAP YARD – ALTERNATIVE 2 – SOIL REMOVAL			
BASED ON		DRAWING NUMBER	
BY LMY	CHECKED BY 7/19/00	APPROVED BY	7/19/00

Wipe samples:

Using regulations for non-porous surfaces as a guideline, use a 3-foot grid spacing and sample 10% of the subdivisions. Given 73,000 square feet of concrete and a 9-square-foot grid = 8,111 grids. 10 percent = 811 samples. Since concrete is only being sampled to ascertain presence and/or absence of residual PCB contamination with the intent of covering the surface, assume 50 wipe samples.

Confirmatory soil samples:

From regulations, 5-foot grid spacing is required for confirmatory sampling for PCBs

Given surface areas of the removal areas outside the scrap yard

15 x (10 feet x 10 feet) + 12 x (10 feet x 10 feet) + 1 x (10 feet x 10 feet) = 2,800 square feet

2,800 square feet / 25 square feet = 112 confirmatory samples

Backfill/revegetation:

Volume of soil removed from outside scrap yard
28 cubic yards + 67 cubic yards + 30 cubic yards = 125 cubic yards

Common fill: 12 x (10 feet x 10 feet) x (1 foot) + 10 feet x 10 feet x 7.5 feet = 72 cubic yards

Top soil: 125 cubic yards – 72 cubic yards = 53 cubic yards

Off-site disposal:

Total volume of soil = 1,352 + 28 + 67 + 30 = 1,477 cubic yards

Soil with PCB concentrations < 50 ppm goes to municipal solid waste landfill
All soil, with the exception of the 64 cubic yards below = 1,477 – 64 = 1,413 cubic yards
Assume 1.5 tons per cubic yard = 2,120 tons

Soil with PCB concentrations >= 50 ppm; <500 ppm goes to RCRA C Landfill (with TSCA permit)
3 isolated locations have PCB concentrations in this range. Assume 3 truck loads = 48 cubic yards
Assume 1.5 tons per cubic yard = 72 tons

Soil with PCB concentrations >= 500 ppm goes to RCRA Incinerator (with TSCA permit)
1 isolated location has PCB concentrations > 500 ppm. Assume 1 truck load = 16 cubic yards
Assume 1.5 tons per cubic yard = 24 tons

Misc. Site Work

Retaining Wall
Length = 65 lf. Assume 4 foot high made of cast-in-place concrete.

Eroded Area
Stabilize and seed eroded area on slope. Assume area is 100' by 50' = 5,000 sf or 555 sy.
Say topsoil is 6" thick: 5,000 sf x 0.5' = 2,500 cf or 93 cy.

APPENDIX J

SITE 41 MONITORING WELL MW004

EMERGENCY/TEMP NO. IF ANY

B 1 | 8651 (1 2 3 6) — SEQUENCE NO. (MDE USE ONLY)

STATE OF MARYLAND
PERMIT TO DRILL WELL
please print or type

STATE PERMIT NUMBER: CH – 94 – 2303 (70–79)

fill in this form completely

Date Received (APA): 10/5/98 (MM DD YY 13)

OWNER INFORMATION

Navel Surface Warfare Center (15 Last Name — Owner — First Name 34)

Indian Head Division (36 Street or RFD 55)

Indian Head, MD (57 Town) 20640 (70 State 72 Zip 76)

DRILLER INFORMATION

Michael W. Huber (Driller's Name 76) M G D 046 (License No. 81)

Hardin-Huber, Inc. (Firm Name)

6720 Ft. Smallwood Rd., Balto Md. 21226 (Address)

Signature: Michael W. Huber — Date: 10/2/98

B 3 — LOCATION OF WELL

Charles County (8 COUNTY 21)

(23 SUBDIVISION 42)

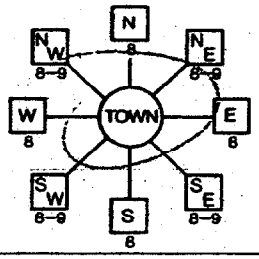
SECTION (44 46) LOT (48 50)

Indian Head (52 NEAREST TOWN 71)

MILES FROM TOWN (enter 0 if in town): 0 M I (73 76 77 78)

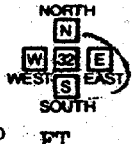
B 4

DIRECTION OF WELL FROM TOWN (CIRCLE BOX)



Hersey Road (11 NEAR WHAT ROAD 30)

ON WHICH SIDE OF ROAD (CIRCLE APPROPRIATE BOX)



V 270
H 750

DISTANCE FROM ROAD: 300 (34 37) FT (38 39)

TAX MAP: 20 BLK: 8 PARCEL —

B 2 — WELL INFORMATION

APPROX. PUMPING RATE (GAL. PER MIN.): NONE (8 12)

AVERAGE DAILY QUANTITY NEEDED (GAL. PER DAY): NONE (14 20)

USE FOR WATER (CIRCLE APPROPRIATE BOX)

- D — DOMESTIC POTABLE SUPPLY & RESIDENTIAL IRRIGATION
- F — FARMING (LIVESTOCK WATERING & AGRICULTURAL IRRIGATION
- I — INDUSTRIAL, COMMERICIAL, DEWATERING
- P — PUBLIC WATER SUPPLY WELL
- T — TEST, OBSERVATION, MONITORING
- G — GEO-THERMAL

NOT TO BE FILLED IN BY DRILLER
HEALTH DEPARTMENT APPROVAL

Charles (COUNTY NAME) — 98-480-WM (COUNTY NO.)

STATE SIGNATURE: — INSERT S → (41)

DATE ISSUED: 10/15/98 (43 MM DD YY 48) — CO SIGNATURE: 10/16/98 — EXP. DATE: 10/15/99

NORTH GRID: 270 000 (50 55) — EAST GRID: 750 000 (57 63)

APPROXIMATE DEPTH OF WELL: 30 FEET (24 28)

APPROXIMATE DIAMETER OF WELL: 2 NEAREST INCH

METHOD OF DRILLING (circle one)

BORED (or Augered) — JETTED — Jetted & DRIVEN

30 AIR-ROTary — AIR-PERcussion — ROTARY (Hydraulic Rotary)

37 CABLE — REVerse-ROTary — DRive-POINT

other

REPLACEMENT OR DEEPENED WELLS
(CIRCLE APPROPRIATE BOX)

- N — THIS WELL WILL NOT REPLACE AN EXISTING WELL
- Y — THIS WELL WILL REPLACE A WELL THAT WILL BE ABANDONED AND SEALED
- 39 S — THIS WELL WILL REPLACE A WELL THAT WILL BE USED AS A STANDBY CONTACT LOCAL APPROVING AUTHORITY FOR POLICY ON STANDBY WELLS
- D — THIS WELL WILL DEEPEN AN EXISTING WELL

PERMIT NUMBER OF WELL TO BE REPLACED OR DEEPENED (IF AVAILABLE) (41 52)

SHOW MAJOR FEATURES OF BOX & LOCATE WELL WITH AN X →

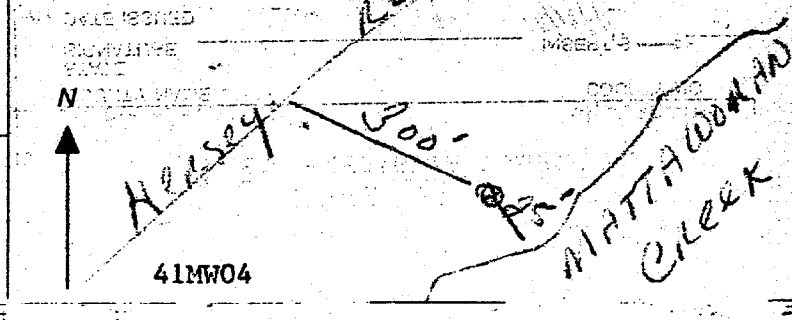
SOURCES OF DRILLING WATER
1. MUNICIPAL
2.
3.

WRITE THE BOX NUMBER FROM THE MAP HERE

E 750
N 270

000
000

DRAW A SKETCH BELOW SHOWING LOCATION OF WELL IN RELATION TO NEARBY TOWNS AND ROADS AND GIVE DISTANCE FROM WELL TO NEAREST ROAD JUNCTION



41MW04

Not to be filled in by driller (MDE OR COUNTY USE ONLY)

APPROP. PERMIT NUMBER: GAP (54 63)

DD — PERMIT No. CH – 94 – 2303 (70 71 72 73 74 75 76 77 78 79)

SPECIAL CONDITIONS

NOTE - APPROVING AUTHORITIES SHOULD USE SEPA

C 1 0897 (1 2 3 6)

SEQUENCE NO. (MDE USE ONLY)

STATE OF MARYLAND
WELL COMPLETION REPORT
FILL IN THIS FORM COMPLETELY
PLEASE TYPE

THIS REPORT MUST BE SUBMITTED AFTER WELL IS COMPLETED.

COUNTY NUMBER 98-480-WM

ST/CO USE ONLY
DATE Received MM DD YY (8 13)

DATE WELL COMPLETED MM 10 DD 19 YY 98 (15 20)

Depth of Well 22 15 26 (TO NEAREST FOOT)

PERMIT NO. FROM "PERMIT TO DRILL WELL" CH - 94 - 2302 (28 29 30 31 32 33 34 35)

OWNER Naval Surface Warfare Center (7208) (last name first name)
STREET OR RFD Indian Head Division TOWN Indian Head, Maryland 20640
SUBDIVISION SECTION LOT

WELL LOG
Not required for driven wells

STATE THE KIND OF FORMATIONS PENETRATED, THEIR COLOR, DEPTH, THICKNESS AND IF WATER BEARING

DESCRIPTION (Use additional sheets if needed)	FEET FROM	FEET TO	check if water bearing
yellow gravel w/some sand & silt	0	2	
dark sand & gravel	2	8	
yellow/brown clayey sand	8	10	
yellow/brown sand & gravel	10	15'	
water @ approx 12'			

NUMBER OF UNSUCCESSFUL WELLS:

WELL HYDROFRACTURED yes [Y] no [N]

N/A

CIRCLE APPROPRIATE LETTER
A A WELL WAS ABANDONED AND SEALED WHEN THIS WELL WAS COMPLETED
E ELECTRIC LOG OBTAINED
P TEST WELL CONVERTED TO PRODUCTION WELL

I HEREBY CERTIFY THAT THIS WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH COMAR 26.04.04 "WELL CONSTRUCTION" AND IN CONFORMANCE WITH ALL CONDITIONS STATED IN THE ABOVE CAPTIONED PERMIT, AND THAT THE INFORMATION PRESENTED HEREIN IS ACCURATE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

DRILLERS LIC. NO. M G D 046

Michael W. Kyler
DRILLERS SIGNATURE
(MUST MATCH SIGNATURE ON APPLICATION)

LIC. NO. D

SITE SUPERVISOR (sign. of driller or journeyman responsible for sitework if different from permittee)

GROUTING RECORD
WELL HAS BEEN GROUTED (Circle Appropriate Box) yes [Y] no [N] (44)

TYPE OF GROUTING MATERIAL (Circle one)
CEMENT [CM] BENTONITE CLAY [BC] (45 46)

NO. OF BAGS 7 NO. OF POUNDS 700 (45 46)

GALLONS OF WATER 7

DEPTH OF GROUT SEAL (to nearest foot)
from 0 (48 TOP 52) ft. to 7 (54 BOTTOM 58) ft.
(enter 0 if from surface)

CASING RECORD
casing types insert appropriate code below

[ST] STEEL [CO] CONCRETE [PL] PLASTIC [OT] OTHER

MAIN CASING TYPE	Nominal diameter top (main) casing (nearest inch)	Total depth of main casing (nearest foot)
PL (60 61)	2 (63 64)	5 (66 70)

OTHER CASING (if used)

EACH CASING	diameter inch	depth (feet) from	to

SCREEN RECORD
screen type or open hole insert appropriate code below

[ST] STEEL [BR] BRASS BRONZE [HO] OPEN HOLE [PL] PLASTIC [OT] OTHER

C 2 (1 2)

EACH SCREEN		DEPTH (nearest ft.)	
1	PL (8 9)	5 (11 15)	15 (17 21)
2	(23 24)	(26 30)	(32 36)
3	(38 39)	(41 45)	(47 51)

SLOT SIZE 1 010 2 3

DIAMETER OF SCREEN 2 (56 60) (NEAREST INCH)

GRAVEL PACK IF WELL DRILLED WAS FLOWING WELL INSERT F IN BOX 68 from 9 to 15 (68)

MDE USE ONLY (NOT TO BE FILLED IN BY DRILLER)
T (70) (E.R.O.S.) (72) W Q (74 75 76)
TELESCOPE CASING LOG INDICATOR OTHER DATA

C 3 (1 2)

PUMPING TEST
HOURS PUMPED (nearest hour) 1 (8 9)

PUMPING RATE (gal. per min.) 1 (11 15)

METHOD USED TO MEASURE PUMPING RATE

WATER LEVEL (distance from land surface)

BEFORE PUMPING (17 20) ft.

WHEN PUMPING (22 25) ft.

TYPE OF PUMP USED (for test)
[A] air (27) [P] piston (27) [T] turbine (27)
[C] centrifugal (27) [R] rotary (27) [O] other (describe below) (27)
[J] jet (27) [S] submersible

MONITORING

PUMP INSTALLED
DRILLER INSTALLED PUMP (CIRCLE) (YES or NO) YES NO

IF DRILLER INSTALLS PUMP, THIS SECTION MUST BE COMPLETED FOR ALL WELLS.

TYPE OF PUMP INSTALLED PLACE (A,C,J,P,R,S,T,O) IN BOX 29. (29)

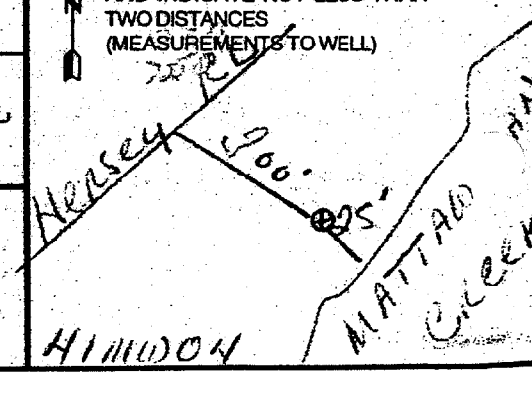
CAPACITY: GALLONS PER MINUTE (to nearest gallon) (31 35)

PUMP HORSE POWER (37 41)

PUMP COLUMN LENGTH (nearest ft.) (43 47)

CASING HEIGHT (circle appropriate box and enter casing height)
[+] above (49) / [−] below (49) LAND SURFACE 00 (50 51) (nearest foot)

LOCATION OF WELL ON LOT
SHOW PERMANENT STRUCTURES AND INDICATE NOT LESS THAN TWO DISTANCES (MEASUREMENTS TO WELL)



H1110104

BORING LOG

PROJECT NAME: INDIAN HEAD SITE 41
BORING NUMBER: 41MW04
PROJECT NUMBER: 7129
DATE: 10-8-98
DRILLING COMPANY: HHI
GEOLOGIST: FRED W RAMSER
DRILLING RIG: GEOPROBE/MOBILE 5744
DRILLER: MARK

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**
S-1 1315					DENSE		YEL BRN GRAVEL	GM				
	2		50%				W/SOME SAND TR SILT					
					MED DENSE		BLK SAND + GRAVEL	GW	ROOT MATL.			
	4											
S-2 1435			1	?			WOOD FRAG ~2.5' LONG		DRIVE ANOTHER 4'			
	6		0%									
									CLAYSAND PER CUTTING			
	8								HSA FOR 4-8'			
S-3 1445							YEL-BRN	SC				
	10		50%				CLAYEY SAND					
	12				MED DENSE	PALE	YEL BRN SAND + GRA	GP	SATURATED			
S-4 1500							GRAVEL CONT.					
	14		100%				DEC. DOWNWARD					
	16						GREY GREEN CLAY	CL				
									PLACE SCREEN			
							-DRILLER SAYS HE		@ 5-15			
							HIT THE CLAY ~13'					

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response read.

Drilling Area Background (ppm):

Remarks: DUE TO RAINY CONDITIONS USED GEOPROBE FOR LITHOLOGIC SAMPLING, AND USED HSA RIG TO INSTALL WELL.

Converted to Well: Yes X No ____ Well I.D. #: 41MW04

BORING NO.: 41MW04

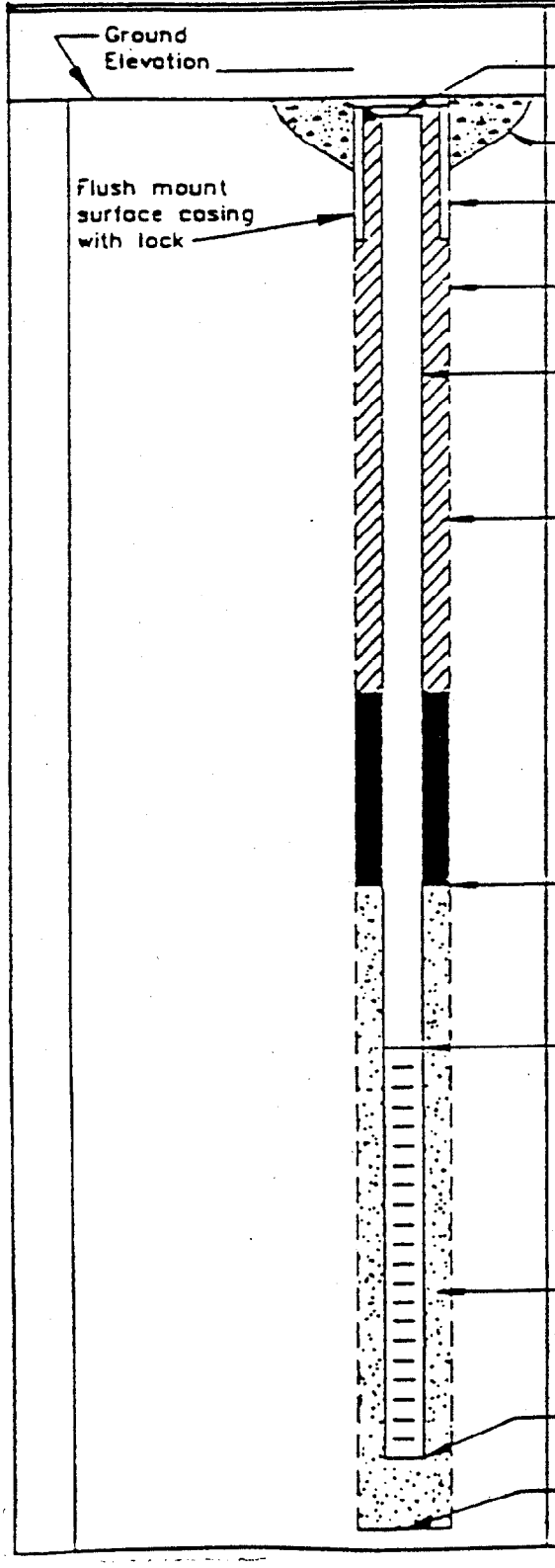
Tetra Tech NUS, Inc.

MONITORING WELL SHEET

PROJECT INDIANHEAD SITE 41
PROJECT NO. 7129
ELEVATION
FIELD GEOLOGIST FRED W RAMSER

LOCATION SITE 41
BORING 41MW04
DATE 10-8-98

DRILLER HHI
DRILLING METHOD 4 1/4 HSA
DEVELOPMENT METHOD 12VDC WELL PUMP



ELEVATION TOP OF RISER:

TYPE OF SURFACE SEAL: 3'x3'x6" CONCRETE

TYPE OF PROTECTIVE CASING: CAST STEEL

I.D. OF PROTECTIVE CASING: 12"

DIAMETER OF HOLE: 10"

TYPE OF RISER PIPE: SCH. 40 PVC

RISER PIPE I.D.: 2"

TYPE OF BACKFILL/SEAL: CONCRETE/ BENTONITE PELLETS

DEPTH/ELEVATION TOP OF SAND: 3'/

DEPTH/ELEVATION TOP OF SCREEN: 5'/

TYPE OF SCREEN: PVC 2" ID

SLOT SIZE x LENGTH: .010 x 10'

TYPE OF SAND PACK: #2 SILICA SAND

DIAMETER OF HOLE IN BEDROCK: NA

DEPTH/ELEVATION BOTTOM OF SCREEN: 15.0/

DEPTH/ELEVATION BOTTOM OF SAND: 15.5/

DEPTH/ELEVATION BOTTOM OF HOLE: 15.5/

BACKFILL MATERIAL BELOW SAND: NA

MONITORING WELL DEVELOPMENT RECORD

Well: 41MW04
Site: SITE 41
Date Installed: 10-8-98
Date Developed: 10-8-98
Dev. Method: PUMP + SURGE
Pump Type: 12VDC WELL PUMP

Depth to Bottom (ft.): 15'
Static Water Level Before (ft.): 5.2
Static Water Level After (ft.): 5.2
Screen Length (ft.): 10'
Specific Capacity: —
Casing ID (in.): 2"

Responsible Personnel: FRED WRAMSER
Drilling Co.: HHI
Project Name: INDIAN HEAD
Project Number: 7129

Time	Estimated Sediment Thickness (Ft.)	Cumulative Water Volume (Gal.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units mS/cm)	Turbidity (NTU)	Remarks (odor, color, etc.)
1730	—	5 GAL	—	19.0	3.55	.542	>999	BROWN
1805	—	45 GALS	—	19.3	3.60	.501	5	CLEAR
1810	—	50 GALS	—	19.2	3.61	.502	5	↓
1815	—	55 GALS	—	19.2	3.62	.501	5	↓