Record of Decision
Site 44 – Soak Out Area

Indian Head Division
Naval Surface Warfare Center
Indian Head, Maryland

Engineering Field Activity Chesapeake
Naval Facilities Engineering Command
Contract Number N62472-90-D-1298
Contract Task Order 0245

May 2002

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ACRONYMS AND ABBREVIATIONS

bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	chemical of concern
COPC	chemical of potential concern
CSF	cancer slope factor
CSM	Conceptual Site Model
EPA	United States Environmental Protection Agency
FDA	Food and Drug Administration
HEAST	Health Effects Assessment Summary Table
HI	hazard index
HQ	hazard quotient
IHDIV-NSWC	Indian Head Division Naval Surface Warfare Center
IR	Installation Restoration
IRIS	Integrated Risk Information System
MCL	Maximum Contaminant Level
MDE	Maryland Department of the Environment
msl	mean sea level
NCEA	National Center for Environmental Assessment
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
PAH	polynuclear aromatic hydrocarbon
PCB	polychlorinated biphenyl
RAB	Restoration Advisory Board
RBC	risk-based concentration
RDA	Recommended Daily Allowance
RfD	reference dose
RI	remedial investigation
ROD	Record of Decision
SARA	Superfund Amendments and Reauthorization Act
SI	site inspection
SVOC	semivolatile organic compound
TAL	Target Analyte List
TCE	trichloroethene
TCL	Target Compound List
TPH	total petroleum hydrocarbons

UCL	upper confidence limit
VOC	volatile organic compound

1.0 DECLARATION

1.1 SITE NAME AND LOCATION

Site 44 – Soak Out Area
Indian Head Division, Naval Surface Warfare Center
Indian Head, Maryland
CERCLIS ID No. MD7170024684

1.2 STATEMENT OF BASIS AND PURPOSE

This decision document presents the Selected Remedy for Site 44 – Soak Out Area at the Indian Head Division Naval Surface Warfare Center (IHDIV-NSWC) in Indian Head, Maryland. The Selected Remedy was chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA), and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision is based on information contained in the Administrative Record file for this site.

The Navy and the U.S. Environmental Protection Agency (EPA) jointly selected the remedy and Maryland Department of the Environment (MDE) concurs with the selected remedy.

1.3 DESCRIPTION OF SELECTED REMEDY

A no-action alternative is the Selected Remedy for Site 44. No CERCLA action is necessary to protect the public health or welfare or the environment from further actual or threatened releases of hazardous substances into the environment from Site 44.

Site 44 is one of the 48 sites at the main facility included in the IHDIV-NSWC Installation Restoration (IR) Program. Separate investigations and assessments are being conducted for these sites in accordance with CERCLA. Therefore, this Record of Decision (ROD) applies only to Site 44.

1.4 STATUTORY DETERMINATIONS

The no action remedy selection is based upon a remedial investigation of Site 44, which indicates that no remedial action is necessary to ensure protection of human health and the environment. A 5-year review will not be necessary for Site 44.

1.5 AUTHORIZING SIGNATURE

Marc A. Siedband
Captain, U.S. Navy

Date

Abraham Ferdas, Director
Hazardous Site Cleanup Division
U.S. EPA Region 3

Date

2.0 DECISION SUMMARY

2.1 SITE NAME, LOCATION, AND DESCRIPTION

The Indian Head Division Naval Surface Warfare Center (IHDIV-NSWC) is located in northwestern Charles County, Maryland, approximately 25 miles southwest of Washington, D.C. The IHDIV-NSWC is a military facility consisting of the main area on the Cornwallis Neck Peninsula and the Annex on Stump Neck. The main area is bounded by the Potomac River to the northwest, west, and south; Mattawoman Creek to the south and east; and the town of Indian Head to the northeast (Figure 2-1). The EPA identification number of the main area is MD7170024684. Stump Neck Annex is located across Mattawoman Creek. The Stump Neck Annex is not contiguous with the main area and is being addressed separately.

The Department of the Navy (Navy) is the lead agency for site activities at IHDIV-NSWC. EPA and MDE are the support agencies. Funding is provided by the Navy.

Site 44 – Soak Out Area is located between Buildings 903 and 1182 in the northwest-central portion of IHDIV-NSWC (Figure 2-2). The area is flat, grassy, and open with a slight grade to the southwest. A drainage ditch extends along the southeastern edge of the site to a culvert that extends beneath Boyd Road (Figure 2-3).

2.2 SITE HISTORY AND ENFORCEMENT ACTIVITIES

2.2.1 Site History

During the late 1960s and early 1970s, a soak-out tank located on Site 44 was used to remove propellant from rocket motor catapult tubes. The tank was located approximately 75 feet east of Building 1363 and 100 feet south of Building 1182. The tank consisted of two stacked 55-gallon drums that were welded together. The tank was filled with a nonflammable solvent believed to be Pennchem 9018, a polysulfide solvent containing mercaptan. The dirty rocket motor catapult tubes were dipped into the solvent from a large A-frame structure and allowed to soak for 2 to 3 days. A smaller catch tank was placed at the bottom of the larger tank to collect pieces of propellant that fell out of the tubes during cleaning. An unknown amount of solvent was spilled as the tubes were lifted out of the larger tank. During the 3 to 4 years that the soak-out tank was used, vegetation did not grow within a 10-foot radius of the tanks. However, no signs of stressed vegetation currently exist in this area.

The spent solvent was removed from the tank approximately once a month and stored in the woods near Building 1363. It was reported that approximately ten 55-gallon drums containing spent solvent were

stored near Building 1363. The suspected storage area is Site 45 – Abandoned Drums and is being investigated separately.

2.2.2 Previous Investigations and Enforcement Activities

Site 44 has been under investigation since 1992, when a site inspection (SI) was conducted to determine whether shallow soil or groundwater had been contaminated by spilled solvents. The SI included a soil-gas survey; installation of soil borings and shallow groundwater monitoring wells; and collection and analysis of surface soil, subsurface soil, groundwater, and sediment samples. Groundwater samples were also collected and analyzed during the Phase II SI in 1993.

IHDIV-NSWC was placed on the National Priorities List (NPL) in September 1995.

A remedial investigation (RI) was performed at Site 44 in 1997. The investigation included sampling and analysis of surface soil and groundwater samples.

No other enforcement activities, removal actions, or remediation activities have been initiated at Site 44.

2.3 COMMUNITY PARTICIPATION

A Restoration Advisory Board (RAB) made up of community members and Navy, federal, and state officials meets several times a year. The RAB is designed as a focal point for the exchange of information between IHDIV-NSWC and the local community regarding restoration activities.

The RI report and Proposed Plan for Site 44 – Soak Out Area at IHDIV-NSWC in Indian Head, Maryland, were made available to the public. The RI report was made available in July 1999, and the Proposed Plan was made available in February 2001. These documents can be found in the Administrative Record file and the information repositories maintained at the Charles County Library – La Plata Branch and the IHDIV-NSWC General Library. The notice of the availability of these documents was published in the *Maryland Independent* on February 9, 2001 and the *La Plata – Indian Head Independent* on February 10, 2001. A public comment period on the Proposed Plan was held from February 13, 2001 to April 6, 2001. In addition, a public meeting was held on February 20, 2001 to present the Proposed Plan to a broader community audience than those that had already been involved at the site. At this meeting, representatives of the Navy, EPA, and MDE answered questions about problems at the site and the decision that no action is required to protect human health and the environment. The Navy's response to the comments received during this period is included in the Responsiveness Summary, which is a part of this Record of Decision (ROD).

2.4 SCOPE AND ROLE OF RESPONSE ACTION

Site 44 – Soak Out Area is one of the 48 sites at the main facility currently included in the IHDIV-NSWC Installation Restoration (IR) Program. No response action is necessary at this site to protect human health and the environment. This is the only ROD contemplated for Site 44. Separate investigations and assessments are being conducted for the other IR sites at IHDIV-NSWC in accordance with CERCLA. Separate RODs or other CERCLA decision documents will be prepared for the other IR sites.

2.5 SITE CHARACTERISTICS

2.5.1 Physical Setting

The Soak Out Area, Site 44, covers an area of approximately 50 feet in diameter. Site features are shown on Figure 2-3. Buildings are located to the north, west, and east of the site. A rip-rap-lined drainage ditch is located east of the site. Boyd Road is southeast of the site. The ground surface elevation is approximately 37 feet above mean sea level (msl).

At the time of the SI, subsurface soil conditions were investigated during the drilling of five soil borings, three of which were converted into monitoring wells. The subsurface materials, in descending order, consist of a fine- to medium-grain sand layer, clayey sand and gravel layer, and green clay to the bottom of the borings. The deepest boring extended to a depth of 22 feet below ground surface (bgs).

The shallow groundwater beneath the site occurs under unconfined (water-table) conditions. A synoptic water-level measurement was made in January 1998 at all site wells. The groundwater surface ranged from between approximately 3 and 5 feet bgs. Shallow groundwater flows northeast toward the rip-rap drainage ditch, which was dry at the time of the synoptic water-level measurements. The green clay underlying the site at approximately 10 to 12 feet bgs is probably impeding the downward migration of groundwater. The groundwater is primarily recharged by downward migration of precipitation through the unsaturated zone to the water table. Groundwater from the shallow aquifer is not used as a potable water supply. Drinking water is obtained from a deeper aquifer (190 to 240 feet deep). There is no known hydrogeological connection or communication between the shallow water-table aquifer and the deeper aquifer used for drinking water.

There are no areas of archeological or historical importance at Site 44.

2.5.2 Conceptual Site Model

Figure 2-4 is the Conceptual Site Model (CSM) for human receptors. The CSM graphically integrates information regarding the physical characteristics of the site, potentially exposed populations, sources of

contamination, and contaminant mobility (fate and transport) to identify potential exposure routes and receptors evaluated in the risk assessment. A well-defined CSM allows for a better understanding of the risks at a site and aids in the identification of the potential need for remediation. Soil where solvents may have been spilled is the source of contamination.

Human receptors under the current land use scenario (open area) and reasonable future land use scenario include the maintenance worker, full-time employee, and adolescent trespasser. An additional receptor under the reasonable future use scenario is the construction worker. Hypothetical future residential use of the site was also evaluated to determine whether land use controls would be needed. However, residential use of the site with use of shallow groundwater as a source of drinking water is not a reasonable future land use. Current and potential future land and resource uses are discussed further in Section 2.6. Potential risks to human health are discussed in Section 2.7.1.

2.5.3 Sampling Strategy

A soil-gas survey was conducted in the grassy area between Buildings 903 and 1182 during the SI in 1992. Five soil borings were installed, and surface soil and subsurface soil samples were collected. Three of the soil borings were converted to groundwater monitoring wells. Groundwater samples were collected in 1992 and 1993. Two sediment samples were collected from the drainage ditch east of the site in 1992. All samples were analyzed for Target Compound List (TCL) volatile organic compounds (VOCs), TCL semivolatile organic compounds (SVOCs), TCL pesticides/polychlorinated biphenyls (PCBs), and total petroleum hydrocarbons (TPH). Sampling locations are shown on Figure 2-3.

During the 1997 RI, four surface soil samples were collected to identify areas of possible soil contamination at the site. These soil samples were analyzed for explosives, Target Analyte List (TAL) metals, and cyanide. Three existing monitoring wells were sampled to update and better define the nature and concentration of potential contamination present in the water-table aquifer. The groundwater samples were analyzed for TCL VOCs, TCL SVOCs, explosives, TAL metals, and cyanide. Sampling locations are shown on Figure 2-3.

The results of the investigations at Site 44 are summarized in Section 2.5.4.

2.5.4 Nature and Extent of Contamination

No chemicals of concern (COCs) have been identified for soil, groundwater, or sediment based on the analytical data, human health risk assessment, or exceedances of regulatory standards and criteria.

VOCs, SVOCs, and pesticides/PCBs were not detected in any surface soil samples. Nitrocellulose was the only explosive compound detected in surface soil samples. The results for cadmium, copper, magnesium, and zinc exceeded basewide background concentrations at one location, and the results for arsenic and calcium exceeded background at two locations. The reported concentrations of all metals were within the concentration ranges reported in the literature for soils of the eastern United States. The maximum concentration of zinc slightly exceeded the concentration range reported for the state of Maryland. The concentrations and locations of these detections are shown on Figure 2-5. TPH was detected in one surface soil sample (44SB04) at a concentration less than the basewide background concentration.

VOCs and pesticides/PCBs were not detected in any subsurface soil samples. Analyses for explosive compounds and metals were not performed for any of the subsurface soil samples. Three SVOCs, all polynuclear aromatic hydrocarbons (PAHs), were infrequently detected in subsurface soil samples. Fluoranthene, phenanthrene, and pyrene were detected in the subsurface soil sample collected from 15 to 17 feet deep at boring 44SB03. Phenanthrene was also detected in a sample collected from 10 to 12 feet deep at boring 44SB05. The concentrations and locations of these detections are shown on Figure 2-6. SVOCs were not detected in the soil samples from other depth intervals from these borings or from any of the other soil borings. TPH was detected in one subsurface soil sample (44SB05) at a concentration less than the basewide background concentration.

None of the soil concentrations exceeded EPA screening levels for migration of soil contaminants to groundwater.

Although shallow groundwater samples were collected in 1992, 1993, and 1997, the focus of this discussion is on the most recent results, which are the most representative of current site conditions. Trichloroethene (TCE) was detected at a concentration of 1 µg/L in a shallow groundwater sample collected from S44MW02 in 1997. The TCE concentration at this location was 13 µg/L in 1992, but TCE was not detected in 1993. No other organic compounds (VOCs, SVOCs, pesticides/PCBs, or explosives) were detected in 1997. Although eight metals were detected in shallow unfiltered groundwater samples, none of the reported concentrations exceeded basewide background concentrations. However, the concentrations of barium in two filtered groundwater samples and zinc in all filtered groundwater samples exceeded background levels. None of the chemicals detected in shallow groundwater in 1997 exceeded federal or state drinking water standards or Maximum Contaminant Levels (MCLs). The concentrations and locations of the positive detections are shown on Figure 2-7.

Acetone was detected in sediment sample 44SA01 at a concentration of 460 µg/kg. With this single exception, VOCs, SVOCs, and TPH were not detected in the Site 44 sediment samples. The samples were not analyzed for explosive compounds or metals.

2.5.5 Summary

Human receptors may come into direct contact with soil affected by the release of chemicals from the Soak Out Area. The receptors may be exposed via ingestion of a small amount of soil or via dermal absorption of certain contaminants from the soil. Conservatively domestic use of shallow groundwater and direct contact by hypothetical future residents were evaluated in the baseline risk assessment. Additionally, it is possible that an excavation (for construction, maintenance, etc.) could be deep enough to encounter shallow groundwater. In such an instance, workers could be exposed to the shallow groundwater via dermal contact.

Human receptors that could be affected from exposure to site contaminants include maintenance workers, full-time employees, adolescent trespassers, construction workers, and hypothetical future residents. The risks to these potential receptors are discussed in Section 2.7.1.

No ecological risk assessment was developed for Site 44. Results of previous investigations indicate that contaminants associated with Site 44 are confined to subsurface soil and groundwater in a developed area with limited habitat. Migration of contaminants via overland runoff to surface water or migration of groundwater contaminants to surface water is unlikely because surface water is limited near the site.

2.6 CURRENT AND POTENTIAL FUTURE LAND AND RESOURCE USES

This section of the ROD discusses the current and reasonably anticipated future land uses and current and potential beneficial groundwater uses at Site 44. This section forms the basis for reasonable exposure assessment assumptions and risk characterization conclusions.

Site 44 is a grassed open area between several buildings. The current land use for the site is military. Future land use is expected to be military, industrial, or commercial. Shallow groundwater beneath the site is not used for any purpose. The Navy has no plans to develop this resource in the future. The shallow groundwater is not hydraulically connected to deeper aquifers that are the principal sources of water for domestic use at IHDIV-NSWC.

It is unlikely that the site area would be developed for residential use. However, hypothetical future residential use of the site was evaluated in the risk assessment to determine whether land use controls would be needed.

2.7 SUMMARY OF SITE RISKS

2.7.1 Summary of Human Health Risk Assessment

The baseline risk assessment estimates the risks the site would pose if no action were taken. It can provide the basis for taking action and identifies the contaminants and exposure pathways that need to be addressed by a remedial action. It can also be used to support the determination that no remedial action is necessary to protect human health, which is the case at Site 44. This section of the ROD summarizes the results of the baseline risk assessment for Site 44. The risk assessment in the RI Report contains an evaluation of all chemicals of potential concern (COPCs) and exposure pathways, including those that do not pose unacceptable risks to human health. COPCs are those chemicals that are identified as a potential threat to human health and are evaluated further in the baseline risk assessment. COCs are a subset of the COPCs that are identified in the RI as needing to be addressed by a response action. No COCs were identified for Site 44; therefore, no action is warranted to protect human health. The following subsections summarize the risk assessment in the RI Report.

2.7.1.1 Identification of Chemicals of Potential Concern

The only COPCs that were identified were arsenic and iron in soil. There are no COPCs for groundwater or sediment. Table 2-1 presents the COPCs and exposure point concentrations for each of the COPCs detected in soil. The exposure point concentration is the concentration that was used to estimate the exposure and risk from each COPC. The table includes the concentration range for each COPC, the frequency of detection, the exposure point concentration, and how the exposure point concentration was derived. Generally, the 95 percent upper confidence limit (UCL) on the arithmetic mean concentration is used as the exposure point concentration. However, for sites with limited amounts of data, such as Site 44, the highest concentration (maximum value) is commonly used as a default exposure point concentration in the risk assessment.

2.7.1.2 Exposure Assessment

This section presents a summary of the exposure assessment in the RI Report. The exposure assessment defines and evaluates the type and magnitude of human exposure to the chemicals present at or migrating from a site. The exposure assessment is designed to depict the physical setting of the site, identify potentially exposed populations, and estimate chemical intakes under the identified exposure scenarios. Actual or potential exposures are based on the most likely pathways of contaminant release and transport, as well as human activity patterns. A complete exposure pathway has three components: a source of chemicals that can be released into the environment, a route of contaminant transport through an environmental medium, and an exposure or contact point for a human receptor.

The compilation of contaminant sources, likely exposure pathways, and receptors at Site 44 is depicted in the CSM (Figure 2-4). Potential receptors for Site 44 include the following: current and future maintenance workers, current and future full-time employees, current and future adolescent trespassers, future construction workers, and hypothetical future residents. Future residential use is not a reasonably anticipated land use, but it was evaluated to identify whether unrestricted land use could be permitted. At present, the Soak Out Area contains several buildings that are used infrequently. There is currently a low likelihood of trespassers because the site is in a restricted area. Potential exposure pathways for these receptors include incidental ingestion of and dermal contact with soil.

2.7.1.3 Toxicity Assessment

Table 2-2 provides carcinogenic risk information that is relevant to the COPCs in soil. At this time, cancer slope factors (CSFs) are not available for the dermal route of exposure. The dermal slope factors used in the assessment were extrapolated from oral values. An adjustment factor is applied that is dependent on how well the chemical is absorbed via the oral route. Adjustments are particularly important for chemicals with less than 50 percent absorption via the ingestion route. An adjustment was made for arsenic (95 percent absorption). Iron is not classifiable as a human carcinogen, and there are no cancer toxicity data available.

Table 2-3 provides noncarcinogenic risk information that is relevant to the COPCs in soil. Arsenic and iron have toxicity data indicating their potential for adverse noncarcinogenic effects in humans. The chronic toxicity data available for oral exposures have been used to develop oral reference doses (RfDs). The available toxicity data indicate that arsenic primarily affects the skin and iron primarily affects the lung and digestive system. As was the case with carcinogenic data, dermal RfDs can be extrapolated from oral values by applying an adjustment factor as appropriate. However, adjustment was only necessary for arsenic. No adjustment was needed for iron, and the oral value was used as the dermal RfD. At this time, inhalation reference concentrations are not available for arsenic or iron.

2.7.1.4 Risk Characterization

Methodology

The risk characterization summarizes and combines outputs of the exposure and toxicity assessments to characterize baseline risks, both in quantitative expressions and in qualitative statements.

For carcinogens, risks are generally expressed as the incremental probability of an individual developing cancer over a lifetime of exposure to the carcinogen. Excess lifetime cancer risk is calculated from the following equation:

Risk = CDI x SF

Where: risk = a unitless probability (e.g., 2E-05) of an individual developing cancer
CDI = chronic daily intake averaged over 70 years (mg/kg-day)
SF = slope factor (cancer potency factor), expressed as $(mg/kg\text{-}day)^{-1}$

These risks are probabilities that usually are expressed in scientific notation (e.g., 1E-06). An excess lifetime cancer risk of 1E-06 indicates that an individual experiencing the reasonable maximum exposure estimate has a one in 1,000,000 chance of developing cancer as a result of site-related exposure. This is referred to as an "excess lifetime cancer risk" because it would be in addition to the risks of cancer individuals face from other causes such as smoking or exposure to too much sun. The chance of an individual developing cancer from all other causes has been estimated to be as high as one in three (33 percent) for women and one in two (50 percent) for men. The EPA generally acceptable risk range for site-related exposure is 1E-04 to 1E-06 (i.e., 1 in 10,000 to 1 in 1,000,000).

The potential for noncarcinogenic effects is evaluated by comparing an exposure level over a specified time period (e.g., lifetime) with an RfD derived for a similar exposure period. An RfD represents a level that an individual may be exposed to that is not expected to cause any deleterious effects. The ratio of exposure to toxicity is called a hazard quotient (HQ). An HQ less than one indicates that a receptor's dose of a single contaminant is less than the RfD and that toxic noncarcinogenic effects from that chemical are unlikely. The hazard index (HI) is generated by adding the HQs for all COPCs that affect the same target organ (e.g., liver) or that act through the same mechanisms of action within a medium or across all media to which a given individual may reasonably be exposed. An HI less than one indicates that, based on the sum of all HQs from different contaminants and exposure routes, toxic noncarcinogenic effects from all contaminants are unlikely. An HI greater than one indicates that site-related exposures may present a risk to human health.

The HQ is calculated as follows:

Noncancer HQ = CDI/RfD

Where: CDI = chronic daily intake
RfD = reference dose

CDI and RfD are expressed in the same units and represent the same exposure period (i.e., chronic, subchronic, or short term).

Carcinogenic Risks

Carcinogenic risks for all evaluated receptors were within or below the EPA acceptable risk range (1E-04 to 1E-06) and are as follows:

- Full-Time Employee: 5.7E-06
- Maintenance Worker: 6.8E-07
- Adolescent Trespasser: 2.2E-07
- Construction Worker: 5.7E-07
- Hypothetical Child Resident: 9.3E-06
- Hypothetical Adult Resident: 8.3E-06
- Hypothetical Lifetime Resident: 1.8E-05

Noncarcinogenic Risks

Noncarcinogenic risks for all evaluated receptors had an HI less than one and are as follows:

- Full-Time Employee: 0.11
- Maintenance Worker: 0.01
- Adolescent Trespasser: 0.01
- Construction Worker: 0.33
- Hypothetical Child Resident: 0.97
- Hypothetical Adult Resident: 0.16

Uncertainty Analysis

There are several significant sources of uncertainty inherent in the human health risk assessment. Uncertainties are associated with evaluation of residential land use, evaluation of arsenic, and evaluation of iron.

Exposure to soil was evaluated for hypothetical future child and adult residents. However, the site is currently used as a military base, and the future use is expected to be the same. In addition, the site is relatively small and is currently within a restricted area. Therefore, it is unlikely that the area would be

developed for residential land use. Consequently, the estimated risks for the hypothetical residential scenario were only analyzed to determine whether land use restrictions are needed.

Although the more restrictive basis for evaluating risk associated with exposure to arsenic is to assume it is a carcinogen, carcinogenic effects are not the primary health effects expected upon exposure to arsenic. Most scientific evidence indicates that humans are capable of metabolizing arsenic to expedite its elimination from the body. Its elimination from the body mitigates the possibility for arsenic to result in carcinogenic effects. Therefore, evaluating arsenic only as a noncarcinogen would be more appropriate.

No toxicity criteria are available for iron in the EPA Integrated Risk Information System (IRIS) or in EPA Health Effects Assessment Summary Tables (HEAST). The EPA Region 3 risk-based concentration (RBC) table lists an oral RfD for iron and references the EPA National Center for Environmental Assessment (NCEA). The NCEA value is based on the Food and Drug Administration (FDA) Recommended Daily Allowance (RDA) for children and adults and not on any adverse effect level. Since the RfD is not based on an adverse effect level, it is not appropriate to use this value to calculate risks.

2.7.2 Ecological Risk Assessment

Results of previous investigations indicate that contaminants associated with Site 44 are confined to subsurface soil and groundwater in a developed area with limited habitat. Consequently, ecological receptor exposure to these contaminants is expected to be insignificant. In addition, migration of contaminants via overland runoff to surface water or migration of groundwater contaminants to surface water is unlikely because surface water is limited near the site. For these reasons, potential risks to ecological receptors are insignificant; therefore, the site was excluded from quantitative ecological risk assessment.

2.7.3 Conclusions

There are no unacceptable risks to human health from exposure to the chemicals detected at Site 44. All cancer risks were within or below the EPA unacceptable risk range of 1E-04 to 1E-06. All HI values were less than one.

Risks to ecological receptors were not evaluated because Site 44 is in a developed area with limited habitat.

2.8 SELECTED REMEDY

The results of the risk assessment and the RI indicate that, based on available information, Site 44 does not present an unacceptable risk to human health and the environment. In this case, the Navy, with the support of EPA and MDE, selects a remedy of no action. There are no costs associated with this remedy. The Navy, EPA, and MDE believe that this remedy is protective of human health and the environment and is cost effective.

2.9 DOCUMENTATION OF SIGNIFICANT CHANGES

The Proposed Plan for Site 44, Soak Out Area, at IHDIV-NSWC, Indian Head, Maryland was released for public comment in February 2001. The Proposed Plan identified that no action is necessary for protection of human health and the environment. No written or verbal comments were received during the public comment period. It was determined that no significant changes to this decision, as originally identified in the Proposed Plan, were necessary or appropriate.

TABLE 2-1

SUMMARY OF CHEMICALS OF POTENTIAL CONCERN AND EXPOSURE POINT CONCENTRATIONS
SITE 44 – SOAK OUT AREA
IHDIV-NSWC, INDIAN HEAD, MARYLAND

Exposure Point	Chemical of Potential Concern	Concentration Detected (mg/kg)	Frequency of Detection	Exposure Point Concentration (mg/kg)	Statistical Measure
Soil – ingestion, dermal contact, inhalation	Arsenic	2.9 – 4.4	4/4	4.4	Maximum
	Iron	11,200 – 15,700	4/4	15,700	Maximum

This table presents the chemicals of potential concern (COPCs) and exposure point concentrations for each of the COPCs detected in soil (i.e., the concentration that will be used to estimate the exposure and risk from each COPC). The table includes the range of concentrations detected for each COPC, the frequency of detection (i.e., the number of times the chemical was detected in the samples collected at the site), the exposure point concentration, and how the exposure point concentration was derived. The table indicates that arsenic and iron were detected in all soil samples. Because of the limited amount of data available, the maximum concentration was used as the default exposure point concentration.

TABLE 2-2

CANCER TOXICITY DATA SUMMARY
SITE 44 – SOAK OUT AREA
IHDIV-NSWC, INDIAN HEAD, MARYLAND

Pathway: Ingestion, Dermal

Chemical of Potential Concern	Oral Cancer Slope Factor	Dermal Cancer Slope Factor	Slope Factor Units	Weight of Evidence	Source	Date
Arsenic	1.50E+00	1.60E+00	$(mg/kg/day)^{-1}$	A	IRIS	1998
Iron	--	--	--	D	--	--

Pathway: Inhalation

Chemical of Potential Concern	Unit Risk	Units	Inhalation Cancer Slope Factor	Units	Weight of Evidence	Source	Date
Arsenic	4.29E-03	$(\mu g/m^3)^{-1}$	1.50E+01	$(mg/kg/day)^{-1}$	A	IRIS	1998
Iron	--	--	--	--	D	--	--

--: No information available
IRIS: Integrated Risk Information System

Weight of Evidence
A: Human carcinogen
D: Not classifiable as a human carcinogen

This table provides carcinogenic risk information that is relevant to the COPCs in soil. At this time, cancer slope factors (CSFs) are not available for the dermal route of exposure. The dermal slope factor used in the assessment has been extrapolated from oral values. An adjustment factor is applied and is dependent upon how well the chemical is absorbed via the oral route. Adjustments are particularly important for chemicals with less than 50 percent absorption via the ingestion route. An adjustment was necessary for arsenic.

TABLE 2-3

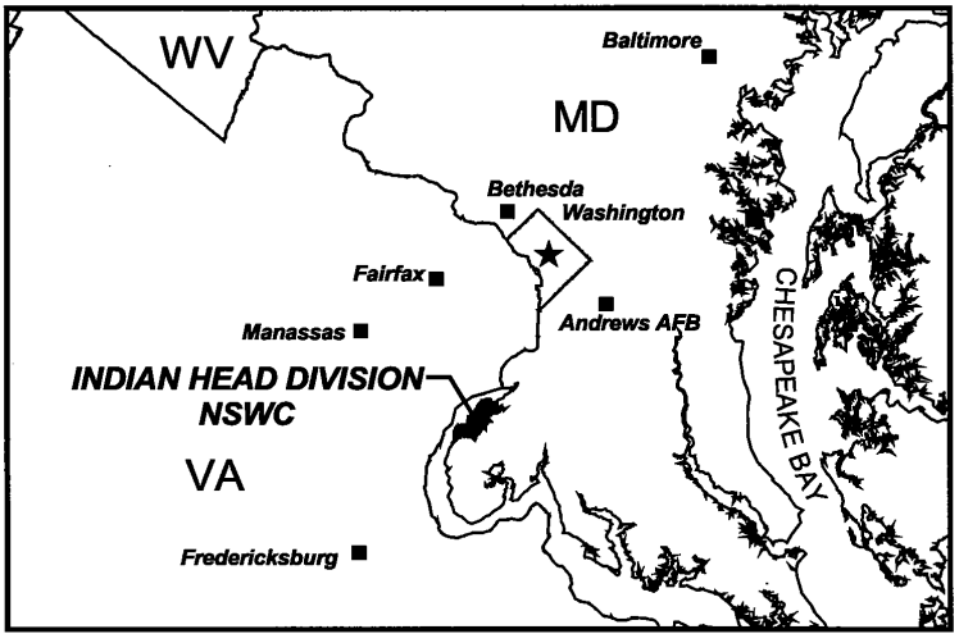
NONCANCER TOXICITY DATA SUMMARY
SITE 44 – SOAK OUT AREA
IHDIV-NSWC, INDIAN HEAD, MARYLAND

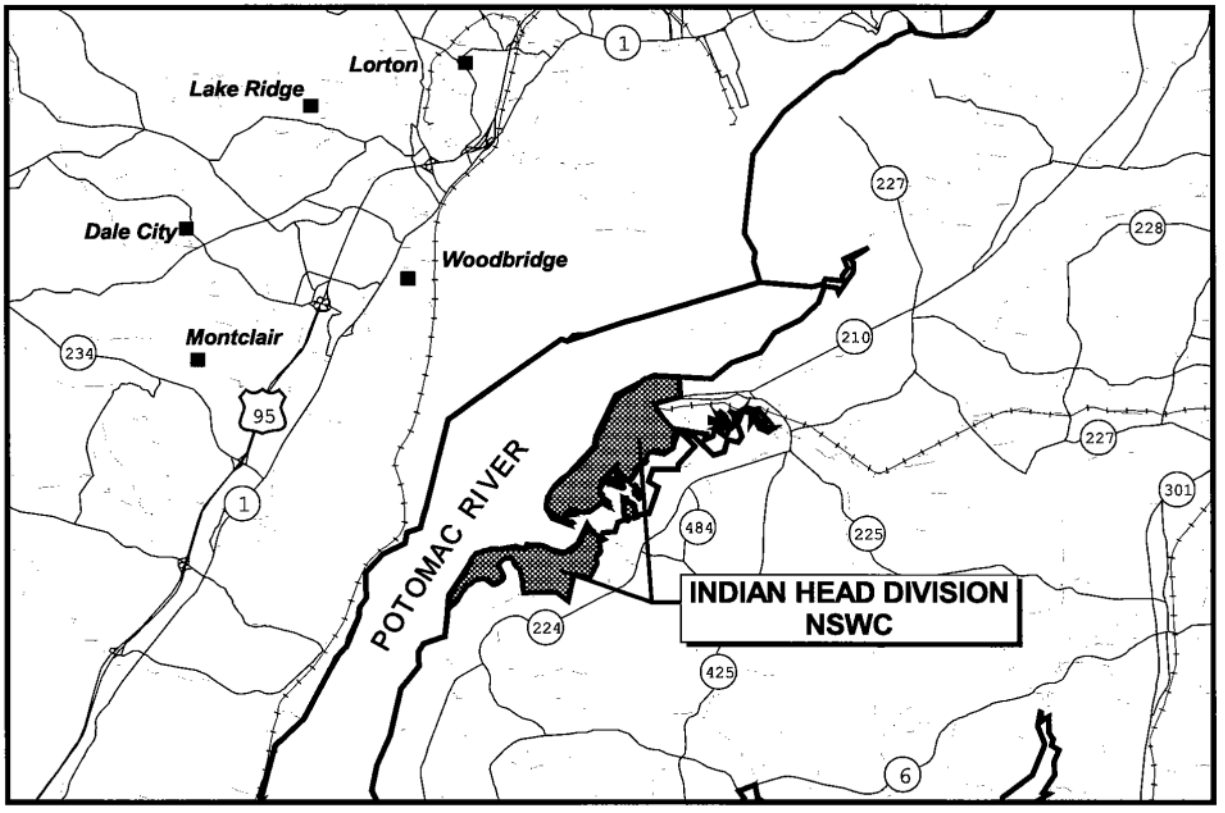
Pathway: Ingestion, Dermal

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD	Dermal RfD	Units	Target Organ(s)	Uncertainty Factor	Source	Date
Arsenic	Chronic	3.00E-04	2.90E-04	mg/kg-day	Skin	3	IRIS	1998
Iron	--	3.00E-01	3.00E-01	mg/kg-day	Lung and Digestive System	--	NCEA	1997

--: No information available
IRIS: Integrated Risk Information System
NCEA: National Center for Environmental Assessment

This table provides noncarcinogenic risk information that is relevant to the COPCs in soil. Both of the COPCs have toxicity data indicating their potential for adverse noncarcinogenic risk effects in humans. The chronic toxicity data available for oral exposures have been used to develop oral reference doses (RfDs). The available toxicity information data indicate that arsenic primarily affects the skin and iron primarily affects the lung and digestive system. As was the case with carcinogenic data, dermal RfDs can be extrapolated from oral values by applying an adjustment factor as appropriate. However, an adjustment was only necessary for arsenic. No adjustment was needed for iron, and the oral value was used as the dermal RfD. At this time, inhalation reference concentrations are not available for arsenic or iron. The Uncertainty Factor is used to account for uncertainty when deriving the RFD from experimental data.

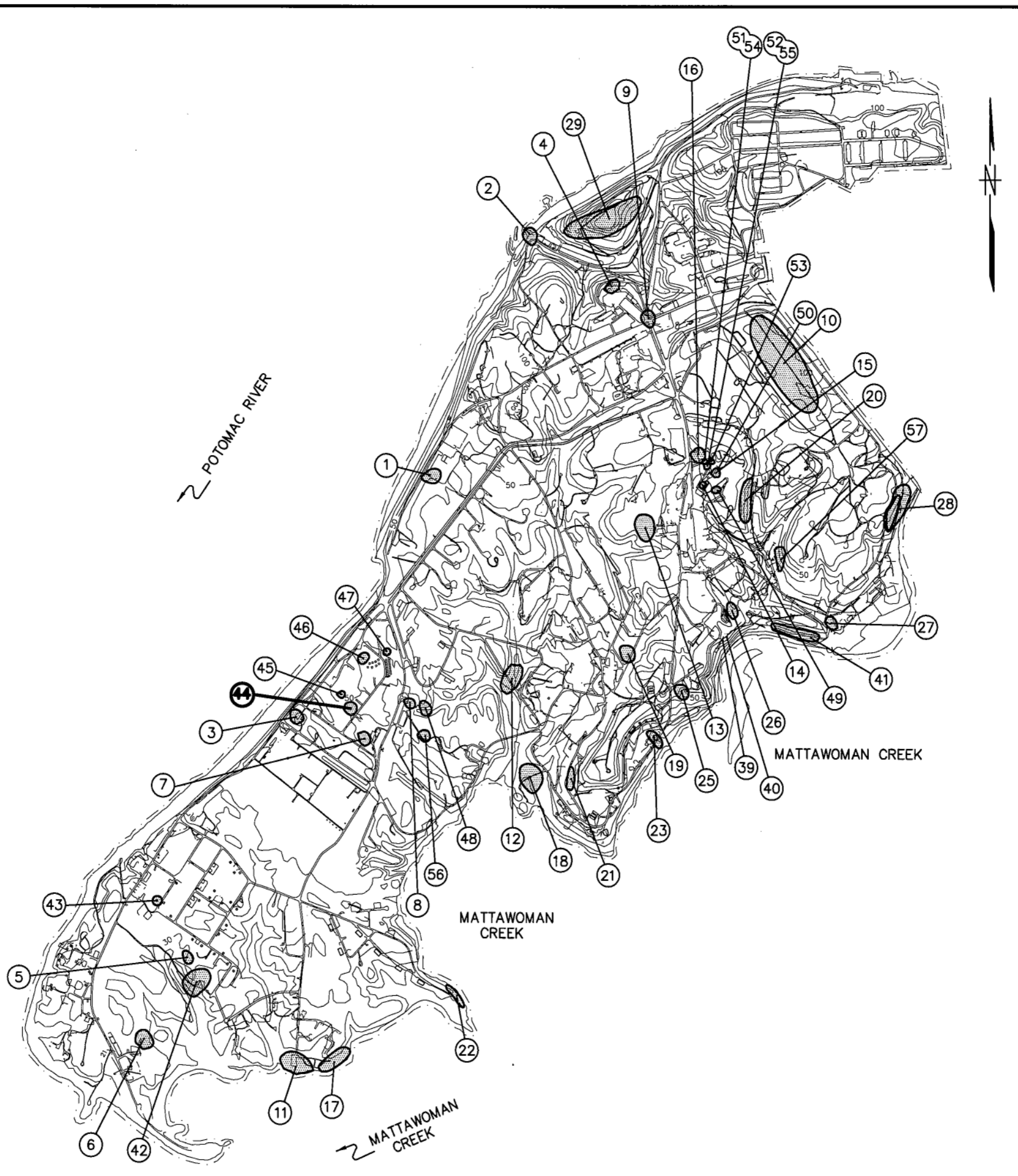




DRAWN BY: J. LAMEY	DATE: 8/2/01	Tetra Tech NUS, Inc.	CONTRACT NUMBER: 4020	OWNER NO.: 0805
CHECKED BY: GJL	DATE: 8/3/01		APPROVED BY: GJL	DATE: 8/3/01
COST/SCHEDULE-AREA		VICINITY MAP INDIV - NSWC, INDIAN HEAD, MARYLAND	APPROVED BY: —	DATE: —
SCALE: AS NOTED			DRAWING NO.: FIGURE 1 - 1	REV: 0

P:\GIS\NSWC_INDIAN_HEAD\SITE42_SITE_LOCATION.APR FACILITY LOCATION MAP LAYOUT 5/13/02 KMP

ACAD: 7129cm57.dwg 05/13/02 HJB PIT



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	Caffee 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
39	Organic Plant Outfall
40	Palladium Catalyst in Sediments
41	Scrap Yard
42	Olsen 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 Well
52	Building 102, Dry Well
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

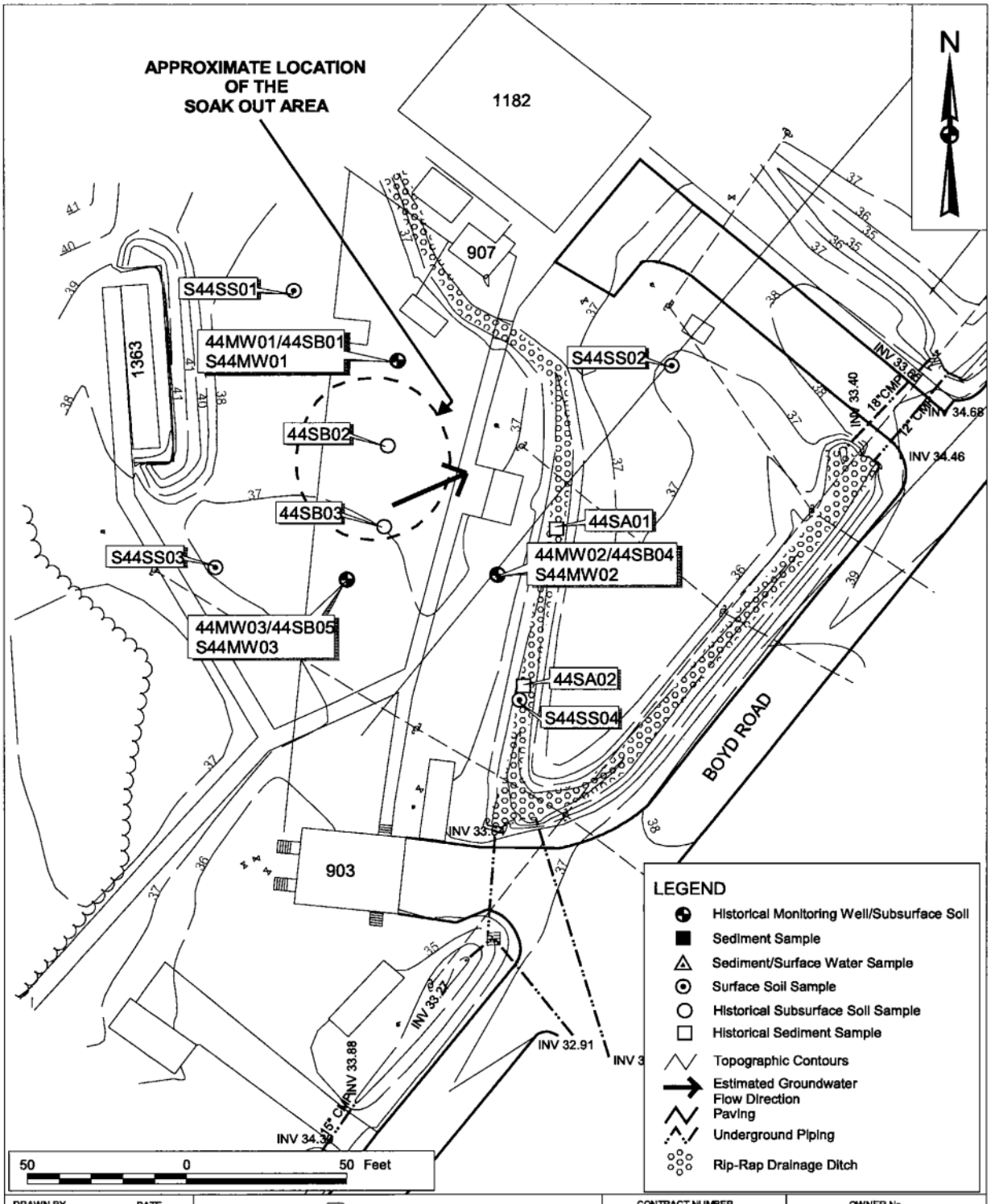
FLOW DIRECTION

0 1800 3600

SCALE IN FEET

DRAWN BY DATE HJB 5/13/02	Tetra Tech NUS, Inc.	CONTRACT NO. 7129	OWNER NO. 0245
CHECKED BY DATE	SITE LOCATION MAP SITE 44 – SOAK OUT AREA IHDIV–NSWC, INDIAN HEAD, MARYLAND	APPROVED BY DATE	
COST/SCHED–AREA		APPROVED BY DATE	
SCALE AS NOTED		DRAWING NO. FIGURE 2–2	REV. 0

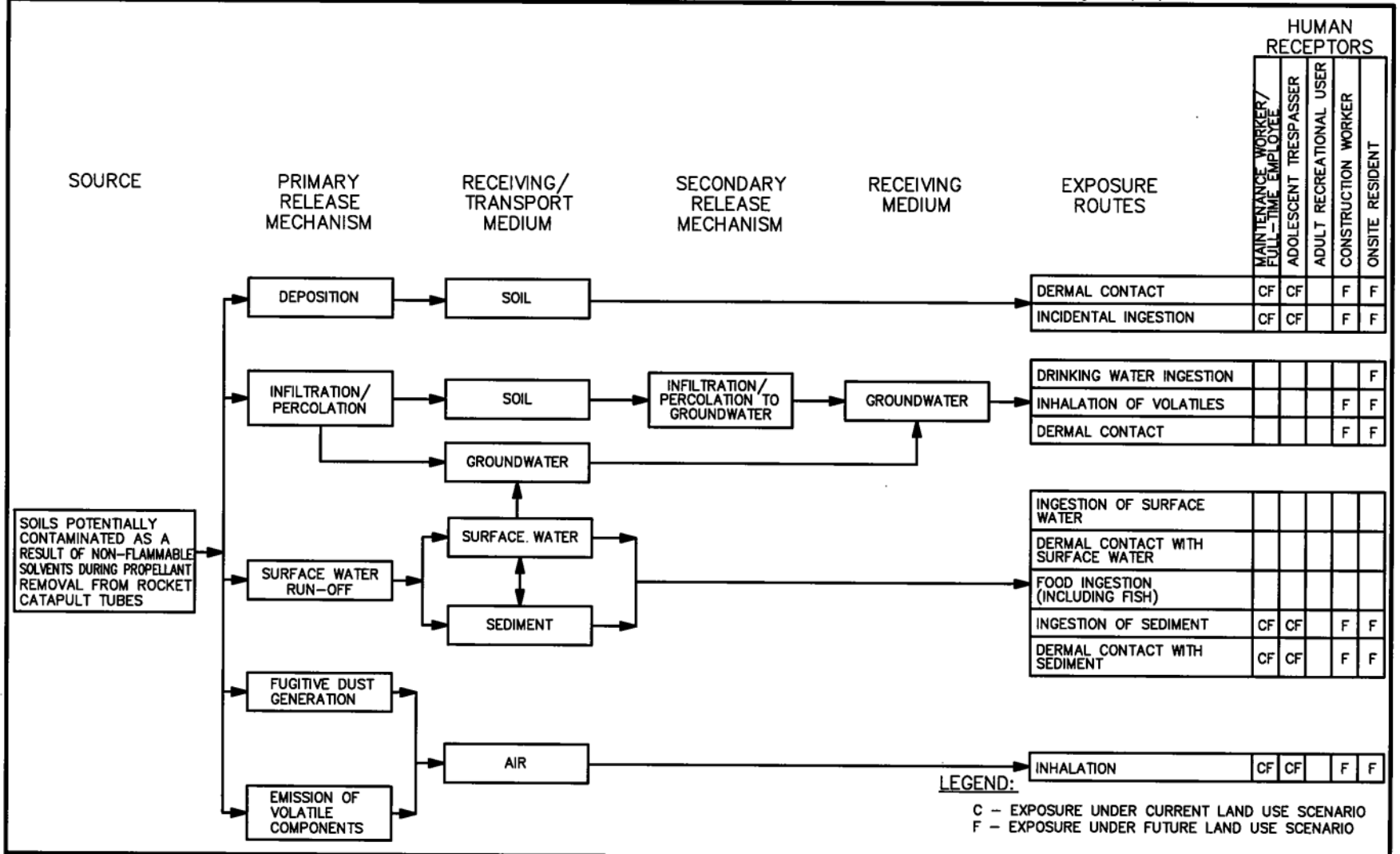
FORM CADD NO. TtNUS_BV.DWG – REV 0 – 1/20/98



DRAWN BY J. BELLONE	DATE 9/26/00	Tetra Tech NUS, Inc.	CONTRACT NUMBER 7129 / OWNER No. 0245
CHECKED BY	DATE	SITE CONDITIONS SITE 44 - SOAK OUT AREA IHDIV-NSWC, INDIAN HEAD, MARYLAND	APPROVED BY — / DATE —
COST/SCHEDULE-AREA			APPROVED BY — / DATE —
SCALE AS NOTED			DRAWING No. FIGURE 2-3 / REV 0

P:\GIS\NSWC_INDIAN_HEAD\7129_ROD.APR\SITE 44 - SITE CONDITIONS MAP JCB 10/12/01

ACAD: 7129kf07.dwg 09/25/00 HJP



DRAWN BY DATE HJP 9/25/00	Tetra Tech NUS, Inc.	CONTRACT NO. 7129	OWNER NO. 0245
CHECKED BY DATE	HUMAN HEALTH CONCEPTUAL SITE MODEL SITE 44 – SOAK OUT AREA NAVAL SURFACE WARFARE CENTER INDIAN HEAD, MARYLAND	APPROVED BY DATE	
COST/SCHED-AREA		APPROVED BY DATE	
SCALE NOT TO SCALE		DRAWING NO. FIGURE 2-4	REV. 0

FORM CADD NO. T:NUS_AH.DWG - REV 0 - 1/22/98

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N

S44SS01	
Depth = 0.0 - 0.5'	
Inorganics (mg/kg)	
ALUMINUM	7040
ARSENIC	3.3 L
BARIUM	32.9
CALCIUM	350 K
CHROMIUM	12.3
COBALT	4.0
COPPER	8.9 J
IRON	12100
LEAD	21.2 L
MAGNESIUM	562 K
MANGANESE	173
MERCURY	0.04
NICKEL	4.4
POTASSIUM	551 J
VANADIUM	21.8
ZINC	20.6 J

S44SS02	
Depth = 0.0 - 0.5'	
Explosives (ug/kg)	
NITROCELLULOSE	21500
Inorganics (mg/kg)	
ALUMINUM	8060
ARSENIC	4.4 L
BARIUM	38.6
CADMIUM	1.6 L
CALCIUM	704 K
CHROMIUM	16.8
COBALT	3.4
COPPER	21.2 J
IRON	12000
LEAD	49.0 L
MAGNESIUM	956 K
MANGANESE	60.8
MERCURY	0.06
NICKEL	7.1
POTASSIUM	673 J
SELENIUM	0.61 J
VANADIUM	32.7
ZINC	116 J

APPROXIMATE LOCATION OF THE SOAK OUT AREA

907

1363

903

44MW01/44SB01
S44MW01

44SB02

44SB03

44MW03/44SB05
S44MW03

44SA01

44MW02/44SB04
S44MW02

44SA02

BOYD ROAD

S44SS03	
Depth = 0.0 - 0.5'	
Explosives (ug/kg)	
NITROCELLULOSE	25300
Inorganics (mg/kg)	
ALUMINUM	4890
ARSENIC	2.9 L
BARIUM	31.8
CALCIUM	653 K
CHROMIUM	10.5
COBALT	4.7
COPPER	8.4 J
IRON	11200
LEAD	15.3 L
MAGNESIUM	531 K
MANGANESE	200
MERCURY	0.03
NICKEL	6.0
POTASSIUM	371 J
SELENIUM	0.62 J
VANADIUM	19.8
ZINC	19.6 J

S44SS04	
Depth = 0.0 - 0.5'	
Explosives (ug/kg)	
NITROCELLULOSE	20300
Inorganics (mg/kg)	
ALUMINUM	5680
ARSENIC	4.4 L
BARIUM	16.6
CALCIUM	249 K
CHROMIUM	18.8
COPPER	8.8 J
IRON	15700
LEAD	7.2 L
MAGNESIUM	1440 K
MANGANESE	31.5
NICKEL	13.1
POTASSIUM	681 J
SELENIUM	0.95 J
VANADIUM	25.0
ZINC	11.2 J

LEGEND

- Historical Monitoring Well/Subsurface Soil
- Sediment Sample
- Sediment/Surface Water Sample
- Surface Soil Sample
- Historical Subsurface Soil Sample
- Historical Sediment Sample
- Topographic Contours
- Estimated Groundwater Flow Direction
- Paving
- Underground Piping
- Rip-Rap Drainage Ditch
- J Estimate
- K Biased-high Estimate
- L Biased-low Estimate

50 0 50 Feet

NO.	DATE	REVISIONS

DRAWN BY: M. Spangenberg — DATE: 9/26/2000
CHECKED BY: ____ — DATE: ____
COST/SCHED-AREA:
SCALE: AS NOTED

Tetra Tech NUS, Inc.

SURFACE SOIL POSITIVE DETECTIONS
SITE 44 - SOAK OUT AREA
IHDIV-NSWC, INDIAN HEAD, MARYLAND

CONTRACT NO.: 7129
OWNER NO.: 0245
APPROVED BY: DATE:
APPROVED BY: DATE:
DRAWING NO.: FIGURE 2-5
REV.: 0

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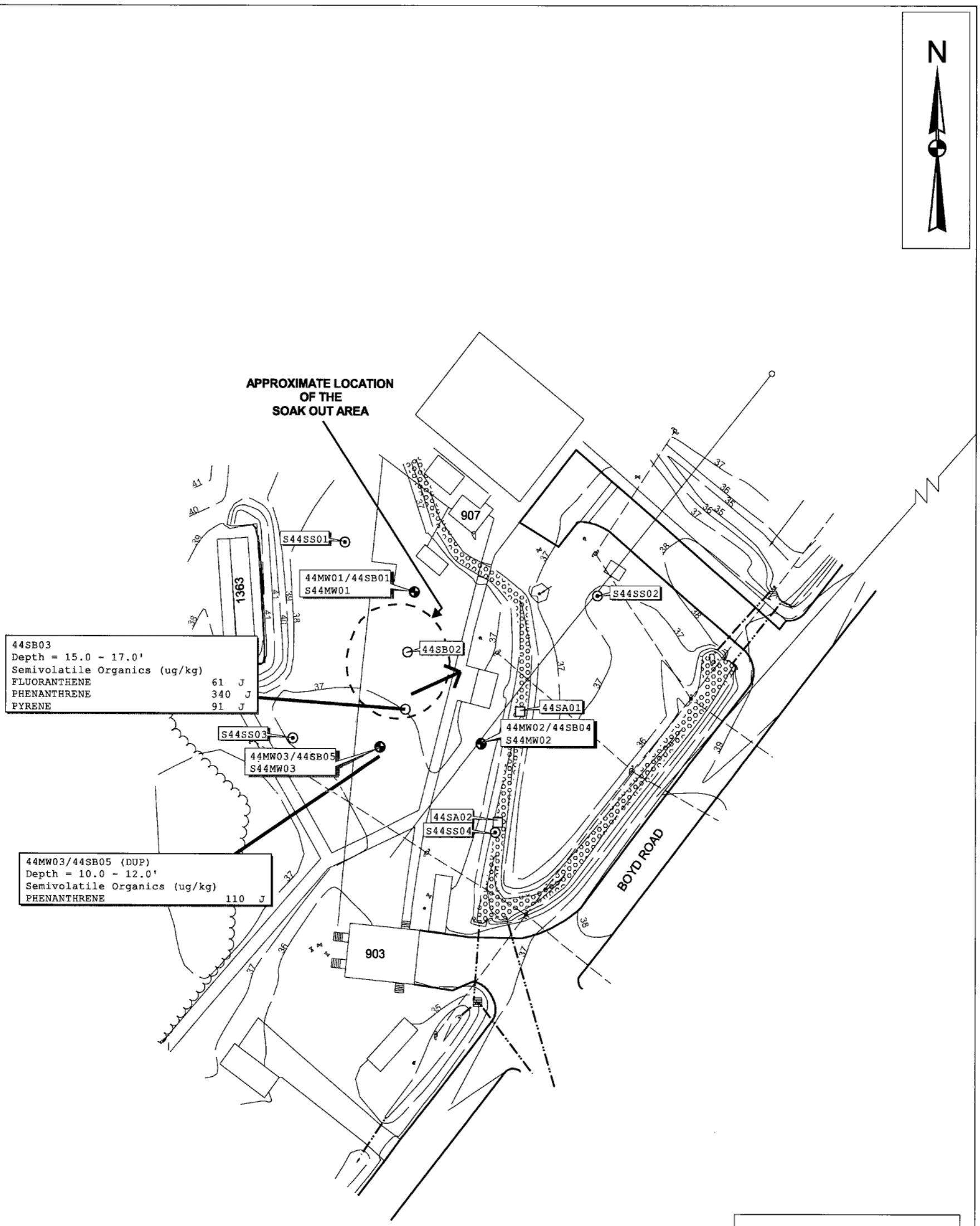


NO.	DATE	REVISIONS

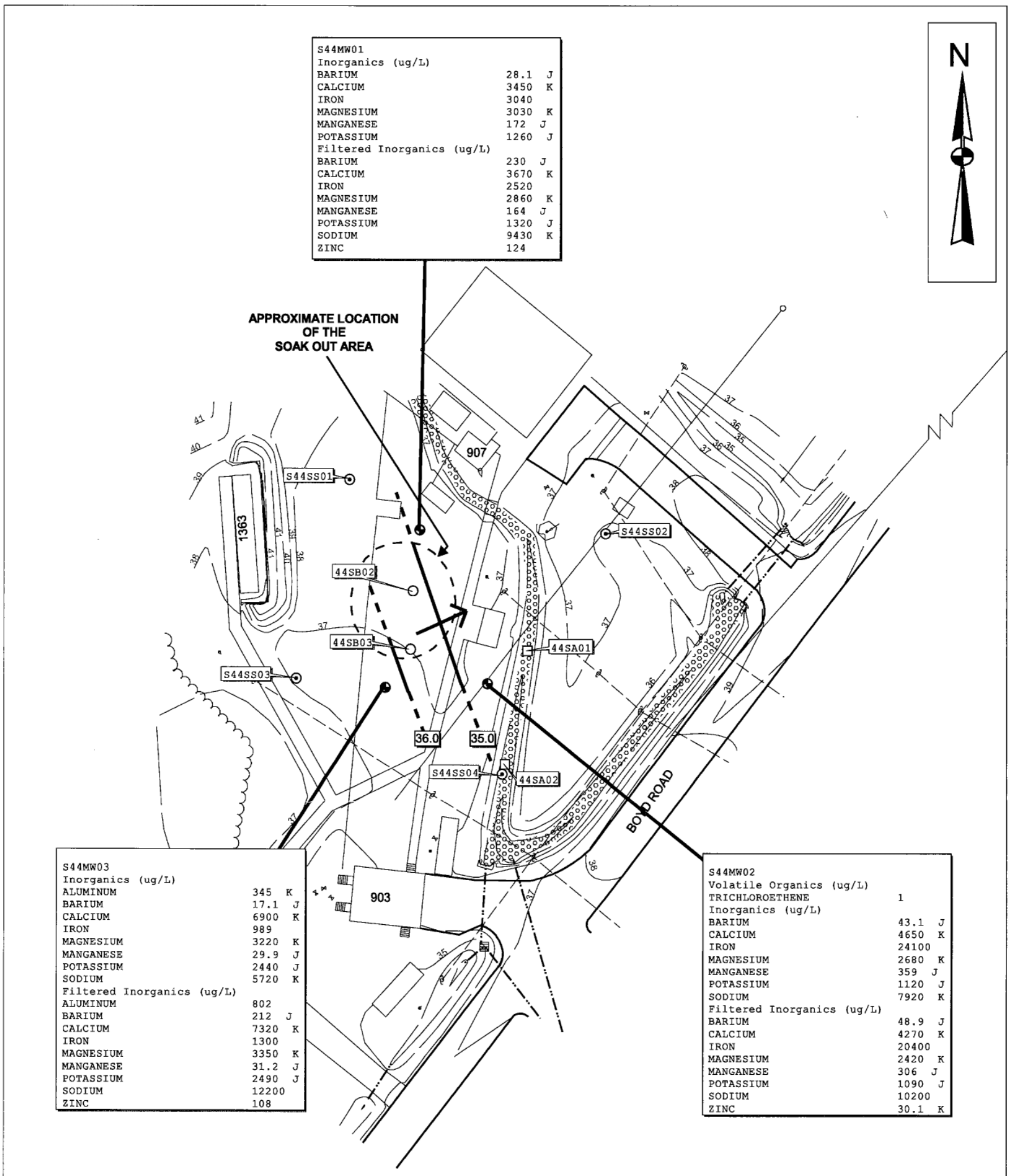
DRAWN BY / DATE	M. Spangenberg 9/27/00
CHECKED BY / DATE	
COST/SCHED-AREA	
SCALE	AS NOTED

Tetra Tech NUS, Inc.

SUBSURFACE SOIL POSITIVE DETECTIONS
SITE 44 - SOAK OUT AREA
IHDIV-NSWC, INDIAN HEAD, MARYLAND

CONTRACT NO.	7129
OWNER NO.	0245
APPROVED BY / DATE	
APPROVED BY / DATE	
DRAWING NO.	FIGURE 2-6
REV.	0

P:\GIS\NSWC_INDIAN_HEAD\7129_ROD.APR\SITE 44 - GW TAGS LAYOUT 10/12/01 JAL



NO.	DATE	REVISIONS

DRAWN BY	DATE
M. Spangenberg	9/26/2000
CHECKED BY	DATE
GJL	28-JAN-99
COST/SCHED-AREA	
SCALE	AS NOTED

Tetra Tech NUS, Inc.

GROUNDWATER POSITIVE DETECTIONS (1997)
SITE 44 - SOAK OUT AREA
IHDIV-NSWC, INDIAN HEAD, MARYLAND

CONTRACT NO. 7129	OWNER NO. 0245
APPROVED BY GJL	DATE 28-JAN-99
APPROVED BY	DATE
DRAWING NO. FIGURE 2-7	REV. 0

3.0 RESPONSIVENESS SUMMARY

The Responsiveness Summary is a concise and complete summary of significant comments received from the public and includes responses to these comments. The Responsiveness Summary was prepared after the public comment period (which ended on April 6, 2001) in accordance with guidance in "Community Relations in Superfund: A Handbook" (OSWER Directive 9320.3B, January 1992). The Responsiveness Summary provides the decision maker with information about the views of the community. It also documents how the Navy, EPA, and MDE considered public comments during the decision-making process and provides answers to major comments.

3.1 OVERVIEW

The Proposed Plan as presented to the public identified that no remedial action is necessary to protect human health and the environment.

3.2 BACKGROUND ON COMMUNITY INVOLVEMENT

The public comment period for the no-action decision for Site 44 began on February 13, 2001 and ended on April 6, 2001. A public meeting was held on February 20, 2001 at the Indian Head Senior Center, 100 Cornwallis Square, Indian Head, Maryland, to accept verbal comments on this decision. No verbal comments were received.

3.3 SUMMARY OF COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD AND NAVY RESPONSES

No comments were received during the public comment period or the public meeting.

APPENDIX A

GLOSSARY

APPENDIX A - GLOSSARY

This glossary defines terms used in this Record of Decision (ROD) describing CERCLA activities. The definitions apply specifically to this ROD and may have other meanings when used in different circumstances.

Administrative Record File: A file that contains all information used by the lead agency to make its decision in selecting a response under CERCLA. This file is to be available for public review, and a copy is to be established at or near the site, usually at one of the information repositories. Also, a duplicate is filed in a central location, such as regional or state office.

Aquifer: An underground formation of materials such as sand, soil, or gravel that can store and supply groundwater to wells and springs.

Background Concentrations: Concentrations of chemical compounds or elements in environmental media that are representative of naturally occurring conditions or that may be attributable to historic, widespread human activity.

Baseline Risk Assessment: A study conducted as a supplement to a remedial investigation to determine the nature and extent of contamination at a Superfund site and the risks posed to public health and the environment.

Carcinogen: A substance that may cause cancer.

Comment Period: A time during which the public can review and comment on various documents and actions taken, either by the Navy, EPA, or MDE. For example, a comment period is provided when EPA proposes to add sites to the National Priorities List. A minimum 30-day comment period is held to allow community members to review the Administrative Record file and review and comment on the Proposed Plan.

Community Relations: The Navy and IHDIV-NSWC program to inform and involve the public in the Superfund process and respond to community concerns.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA): A federal law passed in 1980 and modified in 1986 by the Superfund Amendments and Reauthorization Act (SARA). The act created a special tax that goes into a trust fund to investigate and clean up abandoned or uncontrolled hazardous waste sites. Under the program, EPA can do either of the following:

- Pay for site cleanup when parties responsible for the contamination cannot be located or are unwilling to perform the work.

- Take legal action to force parties responsible for site contamination to clean up the site or pay back the federal government for the cost of the cleanup.

Contaminant: Any physical, biological, or radiological substance or matter that, at certain threshold concentration, could have an adverse effect on human health or the environment.

Drinking Water Standards: Standards for the quality of drinking water that are set forth by EPA and MDE.

Ecological Receptor: A plant or animal that may be exposed to a contaminant in the environment.

Feasibility Study: See Remedial Investigation and Feasibility Study.

Groundwater: Water beneath the ground surface that fills spaces between materials such as sand, soil, or gravel to the point of saturation. In aquifers, groundwater occurs in quantities sufficient for drinking water, irrigation, and other uses. Groundwater may transport substances that have percolated downward from the ground surface as it flows toward its point of discharge.

Hazardous Substance: Any material that poses a threat to public health or the environment. Typical hazardous substances are materials that are toxic, corrosive, ignitable, explosive, or chemically reactive.

Information Repository: A file containing information, technical reports, and reference documents regarding a Superfund site that is made available to the public. Information repositories for IHDIV-NSWC are at the Charles County Library, La Plata Branch, Charles and Garrett Streets, La Plata, Maryland and the IHDIV-NSWC General Library, Indian Head Division, Naval Surface Warfare Center, Building 620, 101 Strauss Avenue, Indian Head, Maryland.

Maximum Contaminant Levels (MCLs): National standards for acceptable levels of contaminants in public drinking water systems. These are legally enforceable standards for supplies of drinking water set by EPA under the Safe Drinking Water Act and by MDE.

Metals: Metals are naturally occurring elements in the earth. Arsenic, cadmium, iron, mercury, and silver are examples of metals. Exposure to some metals, such as arsenic and mercury, can have toxic effects. Other metals, such as iron, are essential to the metabolism of humans and animals.

Monitoring Wells: Wells drilled at specific locations on or near a site where groundwater can be sampled at selected depths and studied to assess the groundwater flow direction and the types and amounts of contaminants present.

National Oil and Hazardous Substances Pollution Contingency Plan (NCP): Federal regulations that provide the organizational structure and procedures for preparing for and responding to discharges of oil and release of hazardous substances, pollutants, or contaminants.

National Priorities List (NPL): The EPA list of the most serious uncontrolled or abandoned hazardous waste sites identified for possible long-term remedial response. The list is based on the score a site receives in the Hazard Ranking System. EPA is required to update the NPL at least once a year.

Organic Compounds: Naturally occurring or man-made chemicals containing carbon. Volatile organics can evaporate more quickly than semivolatile organics. Other organics associated with RI/FS activities include pesticides and polychlorinated biphenyls (PCBs). Some organic compounds may cause cancer; however, their strength as a cancer-causing agent can vary widely. Other organics may not cause cancer but may be toxic. The concentrations that can cause harmful effects can also vary widely.

Parts per Billion (ppb)/Parts per Million (ppm): Units commonly used to express low concentrations of contaminants. For example, one ounce of a chemical in a million ounces of water is 1 ppm. One ounce of a chemical in a billion ounces of water is 1 ppb. If one drop of a chemical is mixed in a competition-size swimming pool, the water will contain about 1 ppb of the chemical. Parts per million are equivalent to mg/L and mg/kg. Parts per billion are equivalent to µg/L and µg/kg.

Proposed Plan: A public participation requirement of SARA in which the lead agency summarizes for the public the preferred clean-up strategy and rationale for preference and reviews the alternatives presented in the detailed analysis of the FS. The Proposed Plan may be prepared either as a fact sheet or as a separate document. In either case, it must actively solicit public review and comment on all alternatives under consideration.

Record of Decision (ROD): An official public document that selects the clean-up alternative(s) which will be used at NPL sites. The ROD is based on information and technical analysis generated during the

RI/FS and consideration of public comments and community concerns. The ROD explains the remedy selection process and is issued by the lead agency following the public comment period.

Remedial Action: The actual construction or implementation phase that follows the remedial design for the selected clean-up alternative at a site on the NPL.

Remedial Investigation/Feasibility Study (RI/FS): Investigation and analytical studies usually performed at the same time in an interactive process and together referred to as the RI/FS. They are intended to gather data needed to determine the type and extent of contamination, establish criteria for cleaning up the site, identify and screen clean-up alternatives for remedial action, and analyze in detail the technology and costs of the alternatives.

Response Action: As defined by CERCLA Section 101(25), means remove, removal, remedy, or remedial action, including enforcement activities.

Responsiveness Summary: A summary of oral and written public comments received by the lead agency during a comment period and the responses to these comments prepared by the lead agency. The responsiveness summary is an important part of the ROD, highlighting community concerns for decision makers.

Revegetate: To replace topsoil, seed, and mulch on prepared soil to prevent wind and water erosion.

Superfund: An informal name for CERCLA.

Superfund Amendments and Reauthorization Act (SARA): The public law enacted to reauthorize the funding provisions and amend the authorities and requirements of CERCLA and associated laws. Section 120 of SARA requires that all federal facilities be subject to and comply with this act in the same manner and to the same extent as any non-government entity.

Surface Water: Bodies of water that are above ground, such as rivers, lakes, ponds, and streams.