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RECORD OF DECISION

SITE 39

for

Naval District Washington, Indian Head

Indian Head, Maryland

September 2005

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Acronyms and Abbreviations

BERA	Baseline Ecological Risk Assessment
CDI	Chronic Daily Intake
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COPC	Chemical of Potential Concern
CSF	Cancer Slope Factor
CSM	Conceptual Site Model
DAF	Dilution and Attenuation Factor
ELCR	Excess Lifetime Cancer Risk
EPA	United States Environmental Protection Agency
FS	Feasibility Study
HHRA	Human Health Risk Assessment
HI	Hazard Index
HQ	Hazard Quotient
IHDIV-NSWC	Indian Head Division, Naval Surface Warfare Center
IEUBK	Integrated Exposure Uptake Biokinetic
MHSPE	Ministry of Housing, Spatial Planning, and Environment
MDE	Maryland Department of the Environment
Navy	Department of the Navy
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NDWIH	Naval District Washington Indian Head
NEESA	Naval Energy and Environmental Support Activity
NPL	National Priorities List
PA	Preliminary Assessment
PAH	polyaromatic hydrocarbon
RAB	Restoration Advisory Board
RBC	Risk-Based Concentration
RfD	Reference Dose
RI	Remedial Investigation
ROD	Record of Decision
SARA	Superfund Amendments and Reauthorization Act
SERA	Screening-Level Ecological Risk Assessment
SI	Site Inspection
SSL	Soil Screening Level
SVOC	semivolatile organic compound

TAL	Target Analyte List
TCL	Target Compound List
TOC	Total Organic Carbon
TtNUS	Tetra Tech NUS, Inc.
mg/kg	milligram(s) per kilogram
µg/dL	micrograms per deciliter
µg/kg	micrograms per kilogram

SECTION 1

Declaration

1.1 Site Name and Location

Site 39, Stack Emissions
Naval District Washington, Indian Head
Indian Head, Maryland
CERCLIS ID No. MD 7170024684

1.2 Statement of Basis and Purpose

This Record of Decision (ROD) presents the Selected Remedy for Site 39, Stack Emissions, at the Naval District Washington, Indian Head (NDWIH), 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 practical, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision is based on information contained in the Administrative Record file for NDWIH.[1]

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

1.3 Description of the Selected Remedy

The no further action remedy selection is based on the evaluation of site conditions and site-related risks during a remedial investigation, which indicated that current conditions are protective of human health and the environment.

1.4 Statutory Determinations

This remedy will not result in hazardous substances, pollutants, or contaminants remaining on site above levels that prevent unlimited use and unrestricted exposure; therefore, a 5-year review will not be required for this remedial action.

[1] On October 1, 2003, the installation management functions at Indian Head transferred from the Indian Head Division, Naval Surface Warfare Center (IHDIV-NSWC) to Naval District Washington. This installation will now be referred to as Naval District Washington, Indian Head (NDWIH).
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1.5 Authorizing Signatures

J. L. Smith

J. L. SMITH
By direction
Capt, USN
Area Operations Officer
Naval District Washington,
West Area

20 Sept 05
Date

Abe Ferdas

ABRAHAM FERDAS, Director
Hazardous Site Cleanup Division
U.S. EPA - Region III

9/29/05
Date

SECTION 2

Decision Summary

2.1 Site Name, Location, and Description

Naval District Washington, Indian Head, CERCLIS ID No. MD7170024684, is located in northwestern Charles County, Maryland, approximately 25 miles southwest of Washington, District of Columbia. NDWIH is a Navy facility consisting of the main installation on the Cornwallis Neck Peninsula and the Stump Neck Annex on the Stump Neck peninsula. The main installation contains approximately 2,500 acres and 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). Included as part of the main installation are Marsh Island and Thoroughfare Island, which are located in Mattawoman Creek.

The Navy is the lead agency for site activities at NDWIH. The EPA and the MDE are support agencies. Funding is provided by the Navy.

Site 39 is a former industrial complex located along the edge of Mattawoman Creek (Figure 2-2).

2.2 Site History, Enforcement Activities, and Investigations

2.2.1 Site History

Site 39 is located on the southeast side of NDWIH overlooking Mattawoman Creek and encompasses the area around Buildings 497, 497A and 498 (Figure 2-2). These buildings were constructed in 1942 and were used for the production of explosives until 1994 (Dolph, 2000). A variety of explosives, including Explosive D (also known as ammonium picrate), nitroguanidine, Composition D-2, dinitropropanol, bis-dinitropropyl acetal/formal, plastisol nitrocellulose, dimethyl ammonium nitrate, dimethyl nitramine, unsymmetrical dimethylhydrazine (UDMH), and high-bulk-density nitroguanidine were processed at Site 39 (Naval Energy and Environmental Support Activity (NEESA), 1983; Dolph, 2000). Buildings 497, 497A and 498 were used for the curing and drying of the explosives. Emissions from the curing and/or drying processes were released to the atmosphere through one stack at Building 497, which was used in the production of UDMH, and two stacks on the roof of 498, which were used in the production of nitroguanidine. Emissions from these stacks resulted in contamination of the surface soil at Site 39.

In addition to the stack emissions, other historical releases of chemicals to the environment occurred through the disposal of wastewaters to the sanitary wastewater collection system, building drains and stormwater drains. These wastewater collection systems discharged to Mattawoman Creek via aboveground piping (Dolph, 2000). The sediment in the vicinity of and downstream from these outfalls is not part of Site 39, but was addressed as part of the Mattawoman Creek Study (Tetra Tech NUS, Inc. (TtNUS), 2004). Site 39 encompasses only

the soils in the area surrounding Buildings 497, 497A and 498. The only known CERCLA release for these soils was the stack emissions from Buildings 497 and 498.

2.2.2 Enforcement Activities

The Preliminary Assessment (PA) prepared by NEESA in 1992 recommended that a Site Inspection (SI) be performed at Site 39 to investigate potential contamination of the sediment along Mattawoman Creek near the outfall of Building 497 (NEESA, 1992). The SI was performed in 1992 and the results were documented in the 1994 Final SI Report, Phase II (Ensafe/Allen & Hoshall, 1994). During the SI, two sediment samples from the outfall of a discharge pipe from Building 497 to Mattawoman Creek and four sediment samples from Mattawoman Creek were collected. No soil samples were collected. Based on the results, it was recommended that additional samples be collected from the sediment and the soil. Subsequently, evaluation of the sediment was separated from Site 39 and incorporated into the Mattawoman Creek Study (TtNUS, 2004).

In September 1995, the entire NDWIH facility, including, by definition, Site 39, was placed on the National Priorities List (NPL).

In 2001, a remedial investigation (RI) was performed at Site 39. The objective was to determine whether the stack emissions had resulted in contamination of the soil surrounding the site buildings. As part of the RI field work, surface soil samples and subsurface soil samples were collected and analyzed.

Based on the conclusions of the RI, a Feasibility Study (FS) was not warranted and a No Further Action Proposed Plan was prepared and made available for public comment in 2004.

No other enforcement activities, removal actions, or remediation activities have been initiated at Site 39.

2.3 Community Participation

A Restoration Advisory Board (RAB) made up of community members and Navy, Federal, and State officials meets several times each year. The RAB is designed as a forum for the exchange of information between NDWIH and the local community regarding IR activities.

The *Final Remedial Investigation Report for Sites 6, 39, and 45, Naval District Washington, Indian Head, Indian Head, Maryland* (herein referred to as the RI Report) (HGL, Inc., 2004) and Proposed Plan for Site 39 were made available to the public. The RI Report was made available in April 2004, and the Proposed Plan was made available on October 19, 2004. These documents, which are included in the Administrative Record file, can be found in the Information Repository located in the NDWIH General Library, Building 620 (The Crossroads). The notice of the availability of the Proposed Plan was published in the Maryland Independent Newspaper on October 19, 2004. A public comment period on the Proposed Plan was held from October 19, 2004, to November 17, 2004. In addition, a public meeting was held on October 21, 2004, 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 the site and the decision that no further action is required to protect human health and the environment. No significant verbal comments were received during the public comment period. This is documented in the *Responsiveness Summary*, which is a part of this ROD.

2.4 Scope and Role of Response Action

Site 39 is included in the NDWIH Installation Restoration Program. No response action is necessary at this site to protect human health and the environment. Separate investigations and assessments are being conducted for other Installation Restoration sites at NDWIH in accordance with CERCLA. Separate RODs and other CERCLA decision documents will be prepared for those other sites.

2.5 Site Characteristics

The site characteristics, nature and extent of contamination, and the baseline risk assessment are presented in greater detail in the RI Report.

2.5.1 Physical Setting

Site 39 overlooks Mattawoman Creek, which flows along the southeastern side of the site (Figure 2-2). From the edge of the site, the land slopes steeply to the creek. On the southwestern side of the site, the land slopes steeply up. On the northern part of the site, the land slopes gently away from the buildings. The area immediately surrounding the buildings is covered with grass, while the perimeter of the site is forested with mixed oak and pine. Paved roads provide access from along the edge of Mattawoman Creek and from the northwestern side of the site. Shallow stormwater runoff ditches parallel the access road along the northwestern side of the site. Surrounding Site 39 is an undeveloped, wooded area.

Use of Site 39 as an industrial complex ceased in 1994. Currently, the site is not used. However, the Navy may use the site for industrial processes in the future.

There are no known areas of archeological or historical importance at Site 39.

2.5.2 Conceptual Site Model

Figure 2-3 presents the Conceptual Site Model (CSM) for human receptors at Site 39. The CSM integrates information regarding the physical characteristics of the site, potentially exposed populations, sources of contamination, and contaminant mobility (fate and transport) to identify 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. The historical release of airborne emissions through the stacks on Buildings 497 and 498 and their deposition on the soil is the contaminant source at Site 39.

Human receptors under the current land use scenario include adolescent and adult trespassers/visitors and industrial workers. Human receptors under the future land use scenario include the adult and child residents, adult and adolescent trespassers/visitors,

industrial workers, and construction workers. Hypothetical future residential use of the site was evaluated to confirm that no land use controls would be needed at the site. Residential development of the site, however, is not a likely future land use.

2.5.3 Sampling Strategy

The RI included the collection and analysis of 21 surface soil samples and 21 subsurface soil samples (all collected from 2-3 feet below the ground surface). Of these samples, one surface soil sample and one subsurface soil sample were collected from a location upslope from Site 39 (i.e., an area considered to be unaffected by any release at Site 39) in order to obtain site-specific background information. Facility-wide background data for surface soil and subsurface soil were obtained from the Background Soil Investigation Report (TtNUS, 2002). All samples were analyzed for target compound list (TCL) semi-volatile organic compounds (SVOCs), explosives, and Target Analyte List (TAL) metals.

To determine whether groundwater samples should be collected, the maximum detected soil concentrations were compared to the EPA Region III Soil Screening Levels (SSLs) with a dilution and attenuation factor (DAF) of 20. Because the SSL does not take into account subsurface processes which reduce the mobility of chemicals (e.g., sorption), the comparison to SSLs is a conservative approach. No SVOCs had concentrations greater than the corresponding SSL. Arsenic was the only analyte that had subsurface soil concentrations greater than the SSL. Based on analytical data from other NDWIH sites, in particular Site 25, the arsenic concentrations in the soil were not high enough to pose a threat to the underlying groundwater. It was concluded that the chemicals present in the soil had minimal potential to adversely affect the quality of the underlying groundwater. Therefore, the RI field investigation did not include the collection of groundwater samples.

2.5.4 Nature and Extent of Contamination

Summary. The nature and extent of contamination at Site 39 can be summarized as follows:

- Twenty-five SVOCs were detected in the surface soil samples. Of these 25 chemicals, 18 were also detected in the facility-wide background surface soil samples. This observation suggests that some of the SVOC detections may have been due to activities not associated with Site 39.
- Seven SVOCs were detected in the subsurface soil samples. In general, the concentrations in the subsurface soil were less than the concentrations in the co-located surface soil samples, indicating that minimal vertical leaching of the SVOCs is occurring.
- Nitrocellulose was detected in seven surface soil samples and seven subsurface soil samples. The nitrocellulose concentrations ranged from 2.7 milligrams per kilogram (mg/kg) to 25 mg/kg in the surface soil and from 2.7 mg/kg to 3.1 mg/kg in the subsurface soil. An RBC value for nitrocellulose is not available. Based on the available toxicity information, nitrocellulose appears to be relatively non-toxic. At the detected concentrations the nitrocellulose does not pose an explosion hazard. Therefore, the nitrocellulose detected at Site 39 does not appear to pose a threat to human health.
- Metals were detected in the surface soil and subsurface soil samples. Although most of these metals were present at concentrations greater than the facility-wide background

levels, approximately half of the metals were also present in the site-specific background samples at concentrations greater than the facility-wide background values. These data suggest that some of the metals resulted from activities not related to the CERCLA release at Site 39. In general, the metals concentrations in the subsurface soil samples were less than the concentrations in the co-located surface soil sample. These data indicate that, while some leaching of metals from the surface soil to the subsurface soil has occurred, the metals have a greater tendency to remain in the surface soil than to move downwards.

The nature and extent of soil contamination is discussed in more detail below.

Surface Soil. Twenty surface soil samples were collected from Site 39 and one site-specific background surface soil sample was collected adjacent to Site 39 (Figure 2-2). All samples were analyzed for TCL SVOCs, TAL metals, and explosives. Table 2-1 summarizes the chemicals detected in the surface soil.

Twenty-five SVOCs were detected in the surface soil samples from Site 39. Two of these SVOCs, bis(2-ethylhexyl)phthalate and di-n-butylphthalate, were detected in the site-specific background sample. In addition to these two phthalates, the detected SVOCs included several polyaromatic hydrocarbons (PAHs), three other phthalates (butylbenzylphthalate, di-n-octylphthalate, and diethylphthalate), benzaldehyde, carbazole, dibenzofuran, and phenol.

The PAHs tended to be clustered around the former industrial buildings of Site 39. The site-specific background sample did not contain detectable concentrations of any PAHs, suggesting that the PAHs detected in the surface soil were related to site activities. It should be noted that several PAHs were detected in one or more of the facility-wide background surface soil samples. Because PAHs are found in petroleum-based products, such as asphalt, PAHs have become ubiquitous in the environment. Some of the PAHs detected at Site 39 may have resulted from the asphalt used on the access roads and from minor oil leaks in vehicles.

The majority of the metals detected in the Site 39 surface soil were present at concentrations greater than the facility-wide background samples, suggesting that the site has been affected by human activity. Nine metals were present in the site-specific background sample at concentrations which also exceeded the facility-wide background levels. The site-specific background results suggest that Site 39 has been influenced by off-site human activities. For example, Site 39 is approximately one-half mile downwind from a coal combustion facility. The coal combustion facility could have contributed to the elevated levels of antimony and selenium observed in both the site samples and the site-specific background sample.

Lead was detected at elevated concentrations in samples collected along the access roads and near the site buildings. The lead is likely due to degraded exterior building paint and to exhaust emissions from vehicular traffic on the access roads prior to the phase-out of leaded gasoline in the 1970s. Zinc was detected at elevated concentrations in samples collected near the fence, along the access roads, and adjacent to the site buildings. The zinc is likely due to the galvanized fence material, degraded exterior building paint (zinc oxide is used in paint), and use of the access road by vehicles (zinc is found in tires). Therefore, the elevated lead and zinc concentrations likely stemmed from human activities related to general

maintenance activities (using ordinary consumer goods in the ordinary manner). These general maintenance activities do not constitute a CERCLA release.

Nitrocellulose was detected in seven surface soil samples at concentrations ranging from 2.7 mg/kg to 25 mg/kg. The nitrocellulose tended to be clustered near Buildings 497 and 498. Perchlorate was detected in one surface soil sample at a concentration of 0.006 mg/kg. No explosives were detected in the site-specific background sample, suggesting that the nitrocellulose and perchlorate detections were due to the previous use of the site for explosives production.

Subsurface Soil. Twenty subsurface soil samples were collected from Site 39 and one site-specific background subsurface soil sample was collected adjacent to Site 39 (Figure 2-2). The samples were collected from between 2 and 3 feet below the ground surface. All samples were analyzed for TCL SVOCs, TAL metals, and explosives. Table 2-2 summarizes the chemicals detected in the subsurface soil.

Seven SVOCs were detected in the subsurface soil samples: bis(2-ethylhexyl)pyhthalate, diethylphthalate, di-n-butylphthalate, butylbenzylphthalate, fluoranthene, phenanthrene, and pyrene. Butylbenzylphthalate, fluoranthene, phenanthrene, and pyrene were detected in only one sample. No SVOCs were detected in the site-specific background subsurface soil sample. The SVOC concentrations tended to be lower in the subsurface soil samples than in the co-located surface soil sample, suggesting that minimal leaching of the SVOCs from the surface soil is occurring.

Twenty-two metals were detected in the subsurface soil samples. Concentrations of 14 metals exceeded the facility-wide background levels. In the site-specific background sample, ten metals were each detected at a concentration greater than the facility-wide background value. Similar to the surface soil data, the subsurface soil data suggest that the Site 39 soils have been affected by off-site activities and on-site activities. In general, the metals concentrations in the subsurface soil samples were lower than the concentrations in the co-located surface soil samples. For example, at location IS39SO18, the zinc concentration was 1,450 mg/kg in the surface soil but only 27.4 mg/kg in the co-located subsurface soil sample. These results indicate that the metals in the surface soil tend to remain in the surface soil and not leach downwards.

Two explosives, nitrocellulose and 2-amino-4,5-dinitrotoluene, were detected in the subsurface soil samples. Nitrocellulose was detected in seven subsurface soil samples at concentrations ranging from 2.7 mg/kg to 3.1 mg/kg. The nitrocellulose was clustered around Building 497. 2-Amino-4,6-dinitritoluene was detected in one sample at a concentration of 0.485 mg/kg.

2.6 Current and Potential Future Land and Resource Uses

Site 39 is a former industrial complex surrounded by woods. In the future, Site 39 may be used again as an industrial facility. No other land use for this site is planned by the Navy. Shallow groundwater beneath the site is not used for any purpose. The Navy has no plans to develop the groundwater resource in the future.

It is unlikely that Site 39 would be developed for residential use. However, hypothetical future residential use of the site was evaluated in the risk assessment to assess the need for institutional controls.

2.7 Summary of Site Risks

A detailed discussion of the human health and ecological risks at Site 39 and the baseline risk assessment process is presented in the RI Report.

2.7.1 Human Health Risk Assessment

A baseline human health risk assessment (HHRA) was performed for surface and subsurface soil at Site 39 to determine the current and future effects of contaminants on human health. The receptors evaluated in the risk assessment for both current and future uses included:

- For current uses - adolescent and adult trespassers/visitors, and adult industrial workers.
- For future uses - adult and child residents, adult and adolescent trespassers/visitors, adult industrial workers, and adult construction workers.

The Navy evaluated the residential exposure scenario to confirm that no institutional controls would be necessary at the site. A detailed discussion of the HHRA is provided in Sections 4.4.1 and 6.6 in the RI Report.

2.7.1.1 Identification of Chemicals of Potential Concern

Chemicals of potential concern (COPCs) are those chemicals that are identified as a potential threat to human health and are evaluated further in the baseline risk assessment.

The COPCs for soil under the current land use scenario consisted of aluminum, arsenic, chromium, iron, lead, manganese, thallium, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and perchlorate. Under the future land use scenario, the soil COPCs were identified to be aluminum, arsenic, chromium, iron, lead, manganese, thallium, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, perchlorate, and 2-amino-4,6-dinitrotoluene. COPCs for the soil under the future land use scenario were determined by pooling the analytical results for the surface soil and subsurface soil samples. This pooling is based on the assumption that the future exposed soil is a mixture of the current surface soil and the current subsurface soil. Section 6.6.3 in the RI Report presents the identification of COPCs.

As described in Section 2.5.4 , it was determined that the historical activities at Site 39 had not adversely affected the quality of the underlying shallow groundwater. Therefore, the HHRA did not evaluate the groundwater pathway.

2.7.1.2 Exposure Assessment

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.

Onsite exposure points include surface soil. It is assumed that current trespassers/visitors and industrial workers could be exposed to surface soil through dermal absorption and incidental ingestion. All future receptors could be exposed to future exposed soils (a mixture of surface soil and subsurface soil) through dermal absorption and incidental ingestion. Inhalation of fugitive emissions from both current surface soil and future exposed soil was not evaluated quantitatively because no COPCs were identified for these pathways.

2.7.1.3 Toxicity Assessment

Toxicity assessment weighs the available evidence regarding the potential for a particular chemical to cause adverse effects in exposed individuals and provides a numerical estimate of the relationship between the extent of exposure and possible severity of adverse effects. Toxicity assessment consists of two steps: hazard identification and dose-response assessment. Hazard identification is the process of determining the potential adverse effects from exposure to a chemical. Dose-response assessment is the process of quantitatively evaluating the toxicity information and characterizing the relationship between the dose of the contaminant administered or received and the incidence of adverse health effects in the exposed population. From this quantitative dose-response relationship, toxicity values (e.g., reference doses [RfDs] and cancer slope factors [CSFs]) are derived. These toxicity values are used in conjunction with the exposure assessment to estimate non-cancer hazards and cancer risks associated with exposure to the site media.

EPA has assessed the toxicity of many chemicals and has published the resulting toxicity information and toxicity values in the Integrated Risk Information System and Health Effects Assessment Summary Tables databases. Additionally, toxicity information is available from USEPA's National Center for Environmental Assessment.

Health effects are divided into two broad groups: non-cancer hazards and cancer effects. This division is based on the different mechanisms of action currently associated with each category. Chemicals causing non-cancer health effects were evaluated independently from those having carcinogenic effects. Some chemicals may produce both non-cancer and carcinogenic effects, and were evaluated in both groups. Non-cancer health affects are evaluated using the RfDs. Cancer risks are evaluated using CSFs.

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, risk is 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:

$$ELCR = CDI \times CSF$$

where:

ELCR = excess lifetime cancer risk, a unitless probability (e.g. one in one million) of an individual developing cancer that is in addition to the incidence of cancer in the general population unaffected by these releases

CDI = chronic daily intake averaged over 70 years (mg/kg-day)

CSF = cancer slope factor, (cancer potency factor), expressed as $(mg/kg\text{-}day)^{-1}$.

These risks are probabilities that usually are expressed in scientific notation. 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" (ELCR) because exposure to site conditions results in an incremental risk in addition to the risks of cancer from other causes, such as smoking. The chance of an individual developing cancer from all other causes has been estimated to be as high as one in three (33 percent or 3E-1) for women and one in two (50 percent or 5E-1) for men. The EPA generally acceptable ELCR 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 non-cancer effects is evaluated by comparing an exposure level over a specified time period with an RfD derived for a similar exposure period. An RfD represents a level to which an individual may be exposed without experiencing 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 non-cancer effects from that chemical are unlikely. To address the potential effect from exposure to multiple chemicals, the HQs for exposure to all COPCs across all exposure routes are summed to obtain the hazard index (HI). If the HI exceeds one, then a target organ analysis is used. The chemicals are classified according to target organ (e.g., liver) or toxic mechanism. Then the HQs for the chemicals which affect the same target organ or have the same mechanism are summed to result in a target organ HI. A target organ HI less than one indicates that toxic non-cancer effects from exposure to the site chemicals are unlikely. A target organ HI greater than one indicates that site-related exposures may present an unacceptable risk to human health.

The HQ is calculated as follows:

$$HQ = CDI/RfD$$

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). The CDI for HQ calculations may not be the same as that used in the ELCR calculations.

Cancer Risks. Cancer risks for all evaluated receptors were within or below the EPA acceptable ELCR range (1E-04 to 1E-06).

Non-cancer Hazards. On a target organ basis, the HIs for all evaluated receptors were below the target value of one. No non-cancer health effects are expected from exposure to the site.

Lead. The lead concentration in some of the Site 39 soil samples exceeded the residential soil screening value of 400 mg/kg. Lead is not evaluated using either RfDs or CSFs. Instead, the concentration of lead in the bloodstream is modeled using site-specific data. If the modeled concentration is less than 10 micrograms per decliliter (µg/dL), then no adverse health effects are expected. The potential risk to the future child resident, the most sensitive receptor, was evaluated using EPA's Integrated Exposure Uptake Biokinetic (IEUBK) model. The estimated blood concentration from exposure to the site soil was 2.17 µg/dL, which is substantially less than the target value of 10 µg/dL. The lead detected in the soil does not pose a threat to human health.

A detailed discussion of the risk characterization is provided in Section 4.4.1.4 and Section 6.6.5 in the RI Report. Sections 4.4.1.6 and 6.6.6 in the RI Report present the uncertainty analysis for the HHRA. In general, assumptions were made to err on the side of conservatism in the analysis.

2.7.2 Ecological Risk Assessment

A screening-level ecological risk assessment (SERA) was conducted for Site 39 to estimate the potential for risk to ecological receptors if no action were taken. The SERA provides a conservative assessment of potential ecological risk. The SERA for Site 39 was performed as three steps as described below: Step 1, Step 2, and Step 3A. According to Superfund guidance (EPA, 1997), Step 3 initiates the problem formulation phase of the baseline ecological risk assessment (BERA). Under Navy guidance (Chief of Naval Operations, 1999), the BERA is defined as Tier 2, and the first activity under Tier 2 is Step 3A. The general approach and site-specific approach for the Site 39 ecological risk assessment are provided in Section 4.4.2 and Section 6.7, respectively, in the RI Report.

In Step 1, the conceptual site model was developed and the potential ecological receptors (e.g., earthworms, carnivores, etc.) were identified. In Step 2, a conservative, initial screening is performed to identify ecological COPCs. In Step 3A, the conservative assumptions employed in Tier 1 were refined to better represent actual site conditions and risk estimates were recalculated using the same conceptual site model for the site.

2.7.2.1 Step 1 – Identification of Exposure Routes and Receptors

In Step 1, the potential exposure route and representative receptors were identified. At Site 39, ecological receptors may contact chemicals in the surface soil. The ecological receptors identified for evaluation consisted of soil invertebrates, terrestrial plants, insect-eating birds (e.g., American robin), carnivorous birds (e.g., red-tailed hawk), insect-eating mammals (e.g., white-footed mouse), and carnivorous mammals (e.g., red fox). Section 6.7.1 of the RI Report presents the Step 1 analysis for Site 39.

2.7.2.2 Ecological Effects Assessment

The purpose of the effects evaluation is to establish chemical exposure levels (screening values) that represent conservative thresholds for adverse ecological effects. Direct contact screening values were used to assess potential risks to the soil invertebrate and terrestrial

plant communities. Ingestion screening values for dietary exposures were derived for each avian and mammalian receptor species and chemical evaluated in the assessment. Section 4.4.2.3 in the RI Report provides a detailed description of the screening values used in the ecological risk assessment.

2.7.2.3 Step 2 – Identification of Ecological COPCs

In this step, the maximum concentration of each detected chemical and the maximum reporting limit of each non-detected chemical was compared to screening values selected in the ecological effects assessment in order to identify those chemicals which have the potential to adversely affect ecological receptors. This initial screening is very conservative. Because of the conservatism of the screening, a chemical identified as an ecological COPC may not actually represent a threat to ecological receptors.

The approach used for the Step 2 screening is described in Sections 4.4.2.3 and 4.4.2.4, and the results of the initial screening for Site 39 are presented in Section 6.7.3 of the RI Report.

2.7.2.4 Step 3A - Refinement of Exposure Assumptions

In Step 3A, the list of ecological COPCs developed in Step 2 was refined. This process involves consideration of the results of the refined exposure assumptions, patterns in detection, consideration of likely risk from chemicals without screening values, consideration of background concentrations, and consideration of the basis of the direct contact and ingestion-based screening values compared to site conditions. The general approach used to perform the Step 3A analysis is described in Section 4.4.2.5 of the RI Report.

One major difference between Step 2 and Step 3A is the replacement of the maximum concentration (Step 2) with the average concentration (Step 3A). For upper trophic level receptors (i.e., carnivorous animals), average chemical concentrations provide a more representative estimate of the likely level of chemical exposure because the local population (and in many cases individual organisms for highly mobile species with large home ranges relative to the size of the site) would be expected to range throughout the site (where suitable habitat is present) and, in many cases, off the site. Mean concentrations (or some other estimate of central tendency) may also be appropriate for evaluating potential risks to populations of lower trophic level terrestrial receptors because the members of the population are expected to be found throughout the site (where suitable habitat is present), rather than concentrated in one particular area.

While effects on individual organisms might be important for some receptors, such as rare and endangered species, population- and community-level effects are typically more relevant to ecosystems. In many cases, the average concentration is a conservative representation of the true site average because samples are typically biased toward areas of known or suspected contamination.

If the Step 3A analysis results in the retention of ecological COPCs, the risk assessment process continues to Step 3B (revised problem formulation) and Step 4 (BERA work plan). As described in Section 2.7.2.5 below, the Step 3A analysis for Site 39 eliminated as ecological COPCs the chemicals identified in Step 2 (Section 6.7.4 of the RI Report).

2.7.2.5 Ecological Risk Characterization

On average, concentrations of aluminum, chromium, iron, lead, vanadium, and zinc exceeded the screening values. Aluminum, chromium, iron, and vanadium were present at concentrations consistent with the facility-wide background values. Therefore, any risk posed by these metals to ecological receptors would be consistent with risks posed by the background conditions at NDWIH.

The average lead concentration of 73.4 mg/kg exceeded the direct contact screening value of 50 mg/kg. The highest lead concentrations were detected in samples collected near the site buildings. It is likely that the majority of the lead in these samples was due to degraded exterior paint. Most of the lead compounds used in paint are insoluble (Merck, 1989). The lead screening value, however, was based on a study which used lead chloride (Efroymson, *et al*, 1997), which is a very soluble form of lead. Therefore, the bioavailability of the lead at Site 39 is expected to be substantially less than the bioavailability of the lead used in the study which developed the screening value. In addition, if the average lead concentration is re-calculated excluding the maximum detected concentration, the average value is reduced to 48.2 mg/kg, which is less than the screening value. In other words, that one sample is exerting a substantial influence on the site average lead concentration. Based on the bioavailability and the data distribution, the observed lead concentrations at the site are expected to pose minimal risk to ecological receptors.

Several organic compounds were not detected in any samples collected from the site. In this situation, instead of assuming that the chemical is not present at the site, a surrogate concentration based on the sample quantitation limit, which is the lowest concentration that can be reliably quantified, is developed. This surrogate concentration is then used in the SERA. In Step 3A, this surrogate concentration is equal to the average value of one-half the quantitation limit for each sample. The Step 3A surrogate concentrations for five phenolic compounds (2,4,5-trichlorophenol, 2,4-dimethylphenol, 2-chlorophenol, 2-methylphenol, and 4-nitrophenol) exceeded their respective screening values. For three of these compounds, the screening value was based on Canadian background concentrations, not on ecological toxicity. The screening value for phenol, which is toxicologically based, was either similar to or greater than the surrogate concentrations of these five phenolic compounds. Based on the lack of detections and the comparison of the surrogate concentrations to the screening value for phenol, these five compounds are not expected to pose a threat to ecological receptors.

Benzaldehyde, di-n-octylphthalate, and perchlorate were detected in only one sample and at low concentrations. Based on their limited occurrence and low concentrations, these chemicals are expected to pose minimal risk to ecological receptors.

Bis(2-ethylhexyl)phthalate did not have a screening value. A screening value for total phthalates was obtained from the Dutch Ministry of Housing, Spatial Planning, and Environment (MHSPE) (1994). The individual phthalate concentrations were summed, and the resulting total phthalate concentration was 1.338 mg/kg, which is less than the Dutch screening value (adjusted for total organic carbon (TOC)) of 6.611 mg/kg.

The mean concentrations of the PAHs detected in the Site 39 surface soil were greater than the screening value of 0.1 mg/kg. This screening value is reportedly based on carcinogenic effects of mice treated with benzo(a)pyrene, and is not directly applicable to the direct

contact situation for which this screening value was used. The Dutch MHSPE developed a direct contact screening value for total PAHs. This screening value, adjusted for TOC, is 4.51 mg/kg. For each surface soil sample, the PAH concentrations were added and compared to this screening value. The total PAH concentration exceeded the screening value in only three samples. These three samples were collected either adjacent to a building or an access road, locations which are poor quality habitat for ecological receptors. Based on the limited number of samples which had a total PAH concentration greater than the screening value and the location of the samples, PAHs are expected to pose minimal risks to ecological receptors.

Nitrocellulose has no screening value. The maximum detected concentration was 25 mg/kg. Nitrocellulose is readily biodegraded in the soil (U.S. Army Environmental Center, 2001). In addition, studies have shown relatively high concentrations of nitrocellulose (540 mg/kg in sediment, 1,000 milligrams per liter in water) to have no effect on several invertebrate, fish and algal species (Bentley, *et al.*, 1976; Sullivan, *et al.*, 1978). Because the Site 39 soil concentrations were substantially lower than the no effect concentration for sediment invertebrates, it was determined that the nitrocellulose poses minimal risk to soil invertebrates and plants at Site 39.

The only chemical identified in Step 3A as having the potential to pose a risk to ecological receptors was zinc. As described in Section 2.5.4, the elevated zinc concentrations resulted from standard maintenance activities not related to the CERCLA release. Therefore, zinc at Site 39 will not be addressed under the CERCLA program. Section 6.7.4 and Section 6.8.1.3 in the RI Report present the uncertainty and conclusions, respectively, of the ecological risk assessment.

2.7.3 Conclusions

There were no unacceptable risks to human health from exposure to the chemicals detected at Site 39. The only chemical with the potential to pose a threat to ecological receptors was zinc, the presence of which is not related to the CERCLA release. Sections 6.8.1.2 and 6.8.1.3 in the RI Report present the conclusions of the HHRA and SERA, respectively.

2.8 Selected Remedy

The Navy and the EPA, with the concurrence of the MDE, have selected no further action as the preferred alternative for Site 39. Based on the results of investigations conducted at Site 39, the Navy, EPA, and MDE have determined that the CERCLA release at Site 39 does not pose an unacceptable risk to human health or the environment; therefore, no alternative other than the no further action alternative was evaluated. Under this alternative, no response action will be performed at the site; therefore, no institutional controls, remedy schedule, capital cost estimation, or annual operation and maintenance are necessary.

2.9 Documentation of Significant Changes

The Proposed Plan for Site 39, Stack Emissions, at NDWIH, Indian Head, Maryland was released for public comment on October 19, 2004. The Proposed Plan identified that no action is necessary for protection of human health and the environment. No significant

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.

TABLES

Table 2-1
Chemicals Detected in Site 39 Surface Soil Samples
Site 39 Record of Decision
NDWIH, Indian Head, Maryland

Sample ID **Sample Date**	IS39SS010001 03/26/01	IS39SS020001 03/26/01	IS39SS030001 03/26/01	IS39SS040001 03/27/01	IS39SS050001 03/27/01	IS39SS060001 03/27/01	IS39SS070001 03/27/01
Chemical Name							
SVOCs (µg/kg)							
Acenaphthene			220 J				
Acenaphthylene							
Anthracene			260 J	58 J			
Benzaldehyde							
Benzo(a)anthracene			960	180 J	71 J		
Benzo(a)pyrene			850	130 J	74 J		
Benzo(b)fluoranthene			980	160 J	93 J		
Benzo(g,h,i)perylene			370	76 J			
Benzo(k)fluoranthene			690	140 J	88 J		
Butylbenzylphthalate							
Carbazole			230 J				
Chrysene			1,000	190 J	80 J		
Di-n-butylphthalate							
Di-n-octylphthalate							
Dibenz(a,h)anthracene			43 J				
Dibenzofuran			96 J				
Diethylphthalate		42 J		66 J			
Fluoranthene			1,500	380 J	130 J		40 J
Fluorene			160 J				
Indeno(1,2,3-cd)pyrene			380	72 J			
Naphthalene			77 J				
Phenanthrene			1,200	220 J	57 J		
Phenol			43 J				
Pyrene			1,400	290	110 J		
bis(2-Ethylhexyl)phthalate	390	140 J	530	64 J	54 J	45 J	94 J
Explosives (µg/kg)							
Nitrocellulose	3,900	2,700	2,800				
Perchlorate				6			

Metals in mg/kg; organics in ug/kg
Shaded cell = metals result greater than background concentration
J = reported value is estimated
K = reported value may be biased high
L = reported value may be biased low

Table 2-1
Chemicals Detected in Site 39 Surface Soil Samples
Site 39 Record of Decision
NDWIH, Indian Head, Maryland

Sample ID **Sample Date**	IS39SS010001 03/26/01	IS39SS020001 03/26/01	IS39SS030001 03/26/01	IS39SS040001 03/27/01	IS39SS050001 03/27/01	IS39SS060001 03/27/01	IS39SS070001 03/27/01
Total Metals (mg/kg)							
Aluminum	3,590	1,980	1,880	8,650	1,980	695	1,350
Antimony							
Arsenic	3.2	1.9 J	1.7 J	**12.5**			
Barium	13.6 J	9.6 J	9.1 J	28.9 J	12.6 J	4.8 J	9.6 J
Beryllium	0.16 J	0.09 J	0.13 J	0.37 J	0.13 J	0.04 J	0.07 J
Cadmium	0.47 J		0.23 J				
Calcium	**2,630**	555 J	470 J	217 J	524 J	462 J	**1,480**
Chromium	10.5	3.6	4.7	14.1	5.9	1.7 J	5
Cobalt	**14.9**	2.9 J	3.4 J	5.9 J	3.3 J	0.58 J	2.1 J
Copper	6.2		**39.4**	**10.6**	**15.3**	1.5 J	3.2 J
Iron	7,880	4,010	5,120	**16,300**	6,970	1,560	3,160
Lead	**67.6**	9.4	**67.7**	**25.2**	**58.4**	3.5	6.4
Magnesium	**1,330**	239 J	224 J	479 J	569 J	111 J	561 J
Manganese	151	61.2	64.9	161	67	33.9	66.1
Mercury				**0.13** K			
Nickel	**12.5**	3.5 J	2.7 J	4.5 J	**16**	1.5 J	**10.6**
Potassium	295 J	264 J	311 J	420 J	153 J	120 J	200 J
Selenium					**1.8**		
Silver	**0.88** J		0.39 J	0.45 J	0.48 J		0.49 J
Sodium					70.6 J	95.2 J	80.7 J
Thallium							
Vanadium	19.5	7.4 J	9.1 J	**33.2**	11.4 J	3.6 J	6.6 J
Zinc	**226**	19	**45.4**	23.6 J	**52.5** J	9.2 J	**68.1** J

Metals in mg/kg; organics in ug/kg
Shaded cell = metals result greater than background concentration
J = reported value is estimated
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Table 2-1
Chemicals Detected in Site 39 Surface Soil Samples
Site 39 Record of Decision
NDWIH, Indian Head, Maryland

Sample ID **Sample Date**	IS39SS080001 03/27/01	IS39SS090001 03/27/01	IS39SS100001 03/28/01	IS39SS110001 03/28/01	IS39SS120001 03/28/01	IS39SS130001 03/28/01	IS39SS140001 03/28/01
Chemical Name							
SVOCs (µg/kg)							
Acenaphthene		76 J	59 J				
Acenaphthylene							
Anthracene	52 J	230 J	160 J				
Benzaldehyde							
Benzo(a)anthracene	220 J	1,200 J	680 J				150 J
Benzo(a)pyrene	240 J	1,300 J	740 J				150 J
Benzo(b)fluoranthene	270 J	1,700 J	830 J				300 J
Benzo(g,h,i)perylene	86 J	580 J	300 J				
Benzo(k)fluoranthene	260 J	1,500 J	810 J				240 J
Butylbenzylphthalate							
Carbazole		160 J	120 J				
Chrysene	240 J	1,300 J	690 J				190 J
Di-n-butylphthalate	64 J		54 J		81 J		110 J
Di-n-octylphthalate							
Dibenz(a,h)anthracene		61 J					
Dibenzofuran		43 J					
Diethylphthalate		57 J		52 J			100 J
Fluoranthene	370 J	1,400 J	1,000 J	39 J			240 J
Fluorene							
Indeno(1,2,3-cd)pyrene	88 J	530 J	300 J				50 J
Naphthalene			45 J				
Phenanthrene	210 J	980 J	680 J				110 J
Phenol							
Pyrene	340 J	2,400 J	980 J				190 J
bis(2-Ethylhexyl)phthalate	78 J	130 J	130 J		71 J		150 J
Explosives (µg/kg)							
Nitrocellulose	4,900	5,100					
Perchlorate							

Metals in mg/kg; organics in ug/kg
Shaded cell = metals result greater than background concentration
J = reported value is estimated
K = reported value may be biased high
L = reported value may be biased low

Table 2-1
Chemicals Detected in Site 39 Surface Soil Samples
Site 39 Record of Decision
NDWIH, Indian Head, Maryland

Sample ID **Sample Date**	IS39SS080001 03/27/01	IS39SS090001 03/27/01	IS39SS100001 03/28/01	IS39SS110001 03/28/01	IS39SS120001 03/28/01	IS39SS130001 03/28/01	IS39SS140001 03/28/01
Total Metals (mg/kg)							
Aluminum	3,650	2,440	**9,650**	6,550	5,870	**12,100**	**14,400**
Antimony							
Arsenic	1.7 J	2.9	**7.2**	4.1	**5.3**	**10.5**	**11.3**
Barium	35.7 J	11.7 J	42.2 J	24.7 J	42.8 J	40.9 J	41.8 J
Beryllium	0.43 J	0.17 J	0.51 J		0.77 J	0.48 J	0.54 J
Cadmium	**2.9**	0.67 J					0.31 J
Calcium	**2,510**	**15,700**	**1,510**	**697** J	**808** J	**711** J	**5,440**
Chromium	**43.9**	**16.1**	15	10.4	11.6	**18.7**	**75.6**
Cobalt	**14.3**	**10.5** J	3.8 J	3.1 J	**9.7** J	3.2 J	**12.1** J
Copper	**57.9**	**16.1**	**17.5**	**11.1**	**14.4**	**18.3**	**34.9**
Iron	14,100	11,400	**21,000**	14,700	**17,400**	**27,800**	**23,500**
Lead	**552**	**182**	**37.6**	**47.5**	20.9	**36.3**	**137**
Magnesium	**2,640**	**3,930**	**923** J	698 J	**1,030** J	653 J	**10,600**
Manganese	286	178	92.7	58.2	138	66.4	233
Mercury						**0.16** L	
Nickel	**36.4**	**96.4**	**8** J	**7** J	**11.3**	4.9 J	**105**
Potassium	171 J	261 J	**1,050** J	**692** J	**672** J	**1,000** J	**1,140** J
Selenium							
Silver	**7.9**	**5.7**	**1.7** J	0.69 J	**0.91** J	**2.9**	**1.3** J
Sodium	113 J	**276** J					**314** J
Thallium			1.4 J	1.3 J		2 J	1.7 J
Vanadium	**34.2**	14.6	**29.2**	21.6	21.7	**38.1**	**36.9**
Zinc	**486** J	**1,070** J	**75.8**	**51.5**	**49.7**	**57.8**	**130**

Metals in mg/kg; organics in ug/kg
Shaded cell = metals result greater than background concentration
J = reported value is estimated
K = reported value may be biased high
L = reported value may be biased low

Table 2-1
Chemicals Detected in Site 39 Surface Soil Samples
Site 39 Record of Decision
NDWIH, Indian Head, Maryland

Sample ID **Sample Date**	IS39SS150001 03/28/01	IS39SS160001 03/29/01	IS39SS170001 03/29/01	IS39SS180001 03/29/01	IS39SS190001 03/30/01	IS39SS200001 03/30/01	IS39SS210001 03/30/01 Site-Specific Background
Chemical Name							
SVOCs (µg/kg)							
Acenaphthene							
Acenaphthylene						46 J	
Anthracene						48 J	
Benzaldehyde					48 J		
Benzo(a)anthracene						130 J	
Benzo(a)pyrene						88 J	
Benzo(b)fluoranthene						160 J	
Benzo(g,h,i)perylene							
Benzo(k)fluoranthene						140 J	
Butylbenzylphthalate	720 J				48 J		
Carbazole						52 J	
Chrysene						270 J	
Di-n-butylphthalate	170 J	74 J		93 J	250 J		290 J
Di-n-octylphthalate	88 J						
Dibenz(a,h)anthracene							
Dibenzofuran							
Diethylphthalate	78 J				190 J		
Fluoranthene	51 J	61 J				670	
Fluorene							
Indeno(1,2,3-cd)pyrene							
Naphthalene							
Phenanthrene						390	
Phenol							
Pyrene		48 J				510	
bis(2-Ethylhexyl)phthalate	110 J	40 J	50 J	44 J	91 J	230 J	47 J
Explosives (µg/kg)							
Nitrocellulose		25,000				2,700	
Perchlorate							

Metals in mg/kg; organics in ug/kg
Shaded cell = metals result greater than background concentration
J = reported value is estimated
K = reported value may be biased high
L = reported value may be biased low

Table 2-1
Chemicals Detected in Site 39 Surface Soil Samples
Site 39 Record of Decision
NDWIH, Indian Head, Maryland

Sample ID **Sample Date**	IS39SS150001 03/28/01	IS39SS160001 03/29/01	IS39SS170001 03/29/01	IS39SS180001 03/29/01	IS39SS190001 03/30/01	IS39SS200001 03/30/01	IS39SS210001 03/30/01 Site-Specific Background
Total Metals (mg/kg)							
Aluminum	**9,030**	3,620	**9,760**	8,600	8,770	5,560	**12,100**
Antimony					**1.3** J	**0.96** J	**1.5** J
Arsenic	**12.5**	**8.5**	**8.6**	**7.6**	**6.6**	4.7	4.7
Barium	38.1 J	18.7 J	36.4 J	**72.9**	27.4 J	16.1 J	37.7 J
Beryllium			0.51 J	0.53 J	0.45 J		0.43 J
Cadmium				1.8			
Calcium	**2,220**	**814** J	**906** J	**8,280**	**1,200** J	316 J	404 J
Chromium	**43.8**	**27.8**	**17.9**	**18.9**	14.8 J	10.9 J	**30.1** J
Cobalt	**8.1** J	**7.7** J	2.7 J	3.8 J	3.7 J	3.3 J	5.5 J
Copper	**22.4**	**15.6**	**10.4**	**33.2**	**15.6** J	**12.6** J	6.5 J
Iron	**17,100**	10,400	**24,000**	**21,400**	**23,400** J	**17,900** J	**16,800** J
Lead	**44.1**	14.9	15.2	**99.3**	18.2	**24**	10.6
Magnesium	**6,940**	**7,560**	**740** J	**1,150** J	**747** J	357 J	**1,910**
Manganese	128	98.9	51.6	151	136 J	109 J	79.9 J
Mercury							
Nickel	**91.8**	**107**	**8.3** J	6.2 J	6.1 J	4.8 J	**24.5**
Potassium	568 J	516 J	495 J	579 J	**647** J	470 J	505 J
Selenium					**1.7**		**1.9**
Silver	**1.1** J	**1.5** J	0.65 J	**1.3** J	**1.9** J		
Sodium	113 J			**244** J			
Thallium			2.1 J	2.1 J			
Vanadium	**28.7**	15.8	**33.8**	**33.9**	**32.7**	23	**33.8**
Zinc	**93.7**	**75.2**	**40.7**	**1,450**	**34.5**	**33**	**27.4**

Metals in mg/kg; organics in ug/kg
Shaded cell = metals result greater than background concentration
J = reported value is estimated
K = reported value may be biased high
L = reported value may be biased low

Table 2-2
Chemicals Detected in Site 39 Subsurface Soil Samples
Site 39 Record of Decision
NDWIH, Indian Head, Maryland

Sample ID **Sample Date**	IS39SB010203 03/26/01	IS39SB020203 03/26/01	IS39SB030203 03/26/01	IS39SB040203 03/27/01	IS39SB050203 03/27/01	IS39SB060203 03/27/01	IS39SB070203 03/27/01	IS39SB080203 03/27/01	IS39SB090203 03/27/01	IS39SB100203 03/28/01	IS39SB110203 03/28/01	IS39SB120203 03/28/01
Chemical Name												
SVOCs (µg/kg)												
Butylbenzylphthalate												
Di-n-butylphthalate										82 J		120 J
Diethylphthalate	95 J			43 J								84 J
Fluoranthene												
Phenanthrene												
Pyrene												
bis(2-Ethylhexyl)phthalate	72 J	48 J	58 J	56 J	59 J	45 J	54 J		160 J	44 J	46 J	140 J
Explosives (µg/kg)												
2-AMINO-4,6-DNT												
Nitrocellulose		2,700	3,000	3,100	2,800	2,700	2,800		2,900			
Total Metals (mg/kg)												
Aluminum	2,270	1,650	4,130	19,300	2,300	1,340	2,910	5,490	3,830	8,910	3,540	12,000
Antimony												
Arsenic			1.3 J	7.5		1.3 J		4.2	2.3 J	5.1	2.9	7.7
Barium	9.7 J	7.6 J	15.4 J	41.6 J	10.1 J	4 J	12.5 J	16.5 J	14.2 J	31 J	15.1 J	45.4 J
Beryllium	0.13 J	0.08 J	0.22 J	0.41 J	0.14 J	0.04 J	0.16 J	0.28 J	0.17 J	0.37 J		0.63 J
Calcium	537 J	202 J	809 J	116 J	447 J	252 J	325 J	372 J	353 J	442 J	219 J	1,460
Chromium	6.1	3.2	5.5	24.2	5	3.9	4.3	8.6	4.6	12.1	9	17.2
Cobalt	23.9	2.3 J	8.2 J	3.6 J	2.2 J	1.6 J	3.5 J	3.6 J	1.4 J	2.7 J	1.9 J	6.4 J
Copper	0.27 J		0.77 J	15.9	3.8 J	1.5 J	3.5 J	9.1	3.7 J	10.5	5.2 J	17.1
Iron	4,300	2,820	7,200	32,700	5,440	3,030	5,750	12,600	7,110	16,900	10,700	28,000
Lead	6.1	2.3	4.8	18	4.9	2	2.6	27.7	6.2	13.3	14.7	32.8
Magnesium	174 J	104 J	368 J	858 J	197 J	1,730	219 J	343 J	360 J	548 J	209 J	904 J
Manganese	115	15.7	57.2	62.2	31.4	15.8	34.2	63.3	66.1	57	33.2	135.0
Mercury										0.22 L		
Nickel	3.4 J	1.6 J	3.8 J	4.6 J	2.9 J	37	3.1 J	6 J	3.4 J	5.2 J	3.3 J	8.7 J
Potassium	191 J	185 J	475 J	889 J	212 J	89.6 J	281 J	282 J	307 J	845 J	307 J	1,110 J
Selenium												1.1 J
Silver								0.56 J		0.66 J	0.61 J	1.9 J
Sodium				91.9 J	72.8 J		73.1 J	80.7 J			85.4 J	
Thallium												1.8 J
Vanadium	9 J	6 J	13.1	53.9	11.6	5.7 J	11.1	16.8	9.9 J	22.4	12.2	33.4
Zinc	26.9	8.1	34.7	33.6 J	10.1 J	2.8 J	10 J	78.8 J	14.8 J	28.8	17.7	61.1

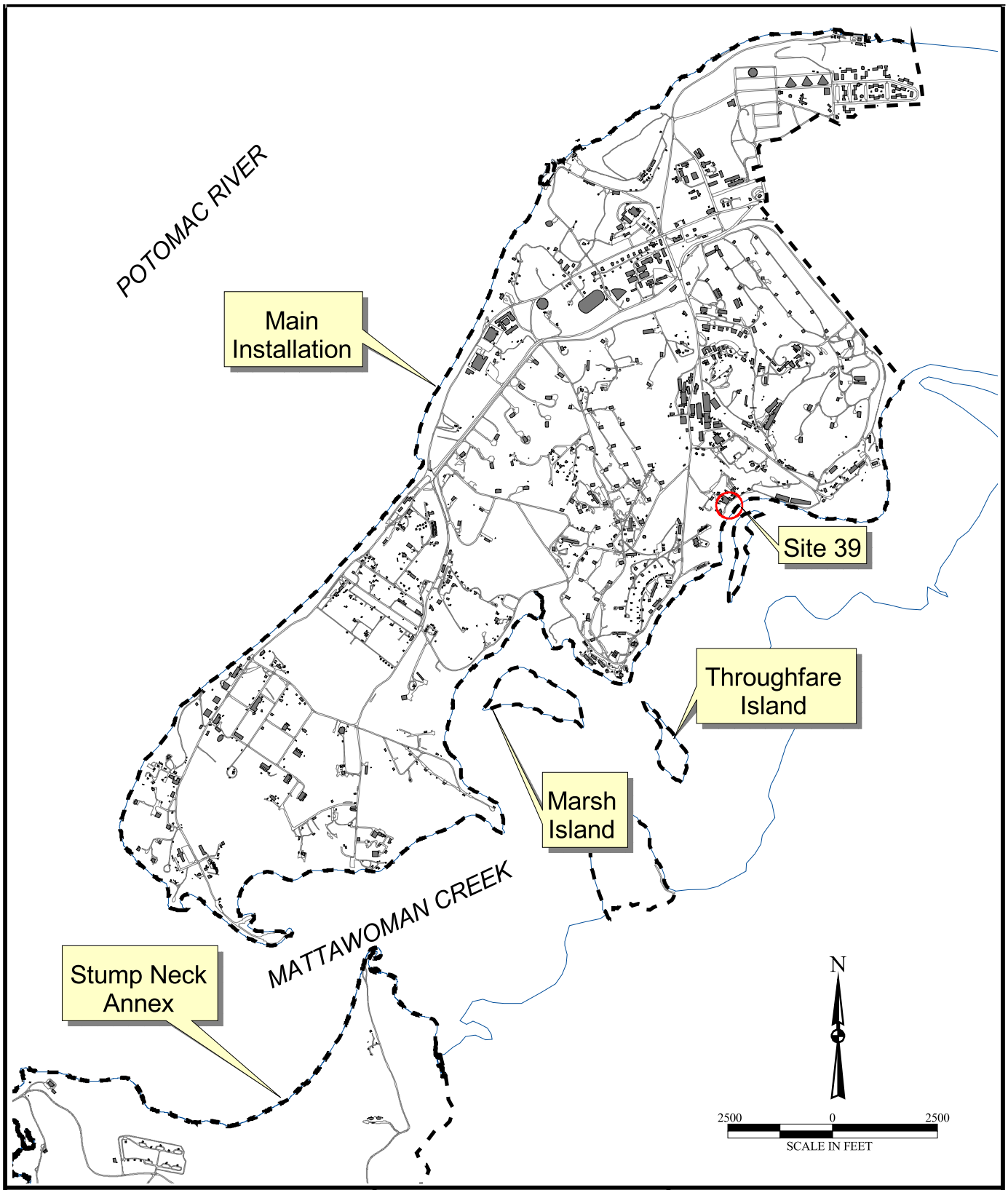
Metals in mg/kg; organics in ug/kg
J = Reported value is estimated
K = Reported value may be biased high
L = Reported value may be biased low

Table 2-2
Chemicals Detected in Site 39 Subsurface Soil Samples
Site 39 Record of Decision
NDWIH, Indian Head, Maryland

Sample ID **Sample Date**	IS39SB130203 03/28/01	IS39SB140203 03/28/01	IS39SB150203 03/28/01	IS39SB160203 03/29/01	IS39SB170203 03/29/01	IS39SB180203 03/29/01	IS39SB190203 03/30/01	IS39SB200203 03/30/01	IS39SB210203 03/30/01 Site-Specific Background
Chemical Name									
SVOCs (µg/kg)									
Butylbenzylphthalate							52 J		
Di-n-butylphthalate		67 J	45 J	90 J	50 J		180 J	160 J	
Diethylphthalate		100 J					230 J	49 J	
Fluoranthene								85 J	
Phenanthrene								75 J	
Pyrene								61 J	
bis(2-Ethylhexyl)phthalate	56 J	59 J	54 J	45 J	47 J	42 J	110 J	47 J	
Explosives (µg/kg)									
2-AMINO-4,6-DNT							485 J		
Nitrocellulose									
Total Metals (mg/kg)									
Aluminum	9,510	9,030	6,460	7,570	10,100	10,500	2,490	1,780	19,300
Antimony							0.78 J	1.4 J	1.6 J
Arsenic	7.2	6.4	5.6	7.8	7.4	5.7	2.3	3.4	7.9
Barium	43.9 J	43.5 J	29.7 J	29.1 J	37.4 J	33 J	31.1 J	8.3 J	42.4 J
Beryllium	0.75 J	0.95 J	0.58 J	0.47 J	0.44 J	0.48 J		0.56 J	0.45 J
Calcium	208 J	274 J	208 J	774 J	1,330	374 J	182 J	187 J	211 J
Chromium	13	12.4	8.9	10.1	19.8	20.7	6.8 J	12 J	31.1 J
Cobalt	5.9 J	7.8 J	4.9 J	2.9 J	4.6 J	2.2 J	2.3 J	5.5 J	4.1 J
Copper	18	17.7	12.8	23	12	9	3.8 J	5.3 J	10.9 J
Iron	27,100	23,200	17,300	11,900	26,200	37,100	6,070 J	13,400 J	29,300 J
Lead	12.7	8.8	5.6	11.2	18.3	10.9	10.5	4.5	9.5
Magnesium	784 J	1,140 J	700 J	674 J	10,400	297 J	171 J	189 J	1,400
Manganese	137	191	122	50.9	61.7	39.6	71.1 J	113 J	27.9 J
Mercury									
Nickel	8.4 J	12.2	8.2 J	6.5 J	74.7		2.7 J	5.1 J	10.6
Potassium	726 J	802 J	578 J	697 J	594 J	434 J	203 J	142 J	1,030 J
Selenium		1.5	0.89 J				1.1 J		2.6
Silver	0.98 J	0.98 J	0.53 J	1.3 J	1.5 J	1.3 J			
Sodium		239 J							
Thallium						1.6 J			1.1 J
Vanadium	29.9	26.6	18.6	19.4	31.3	38.5	9.2 J	12.9 J	49.1
Zinc	38.6	51.4	31.9	69.0	38.8	27.4	11.4	20.4	33.2

Metals in mg/kg; organics in ug/kg
J = Reported value is estimated
K = Reported value may be biased high
L = Reported value may be biased low

FIGURES



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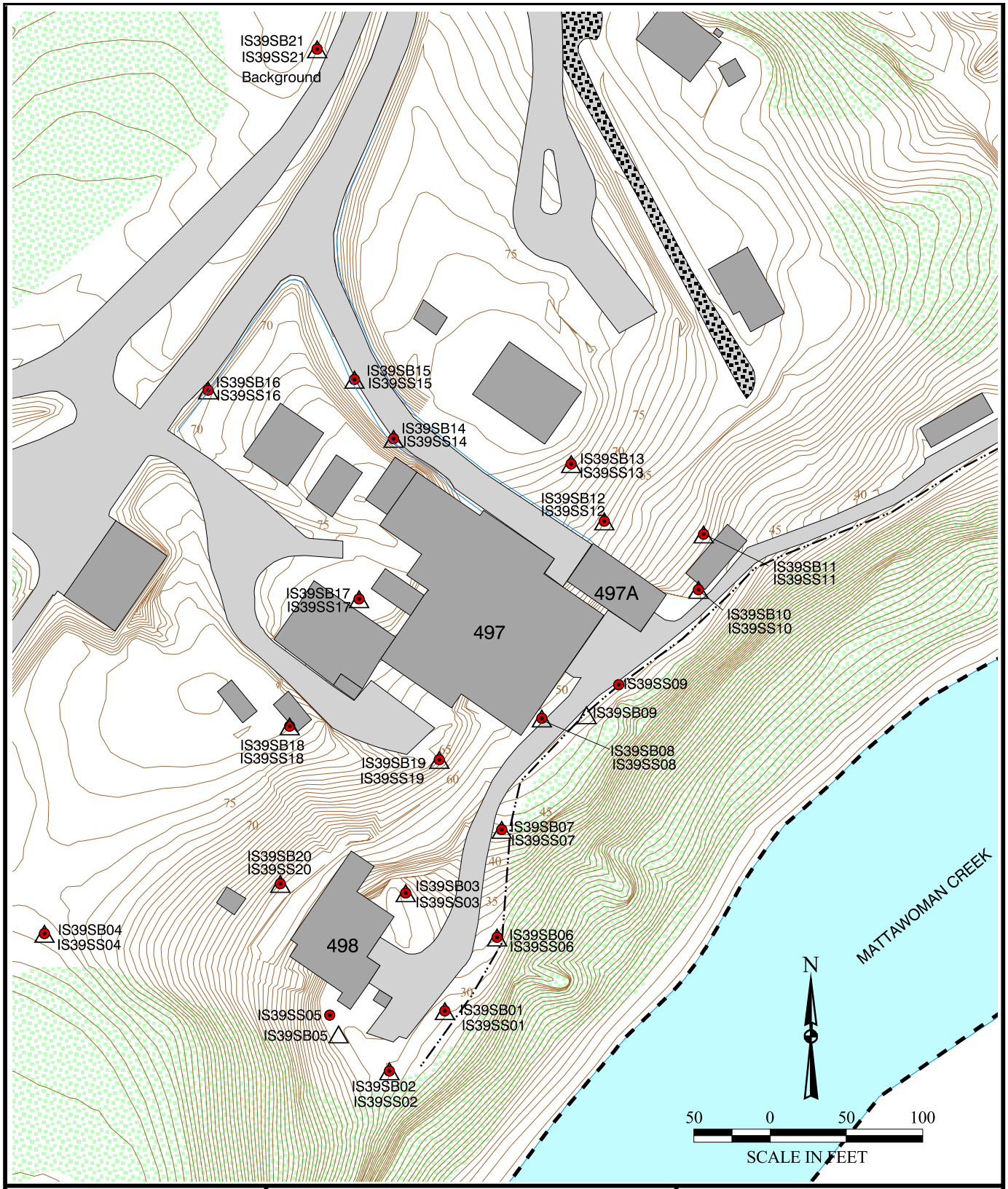
Created: 11/13/00 TH
Revised: 11/21/05 ASC
Source: CH2MHILL, HydroGeoLogic, Inc—GIS Database

HGL HydroGeoLogic, Inc

Legend

Base Boundary

Figure 2-1
Facility Map
Site 39 Record of Decision
NDWIH, Indian Head, MD



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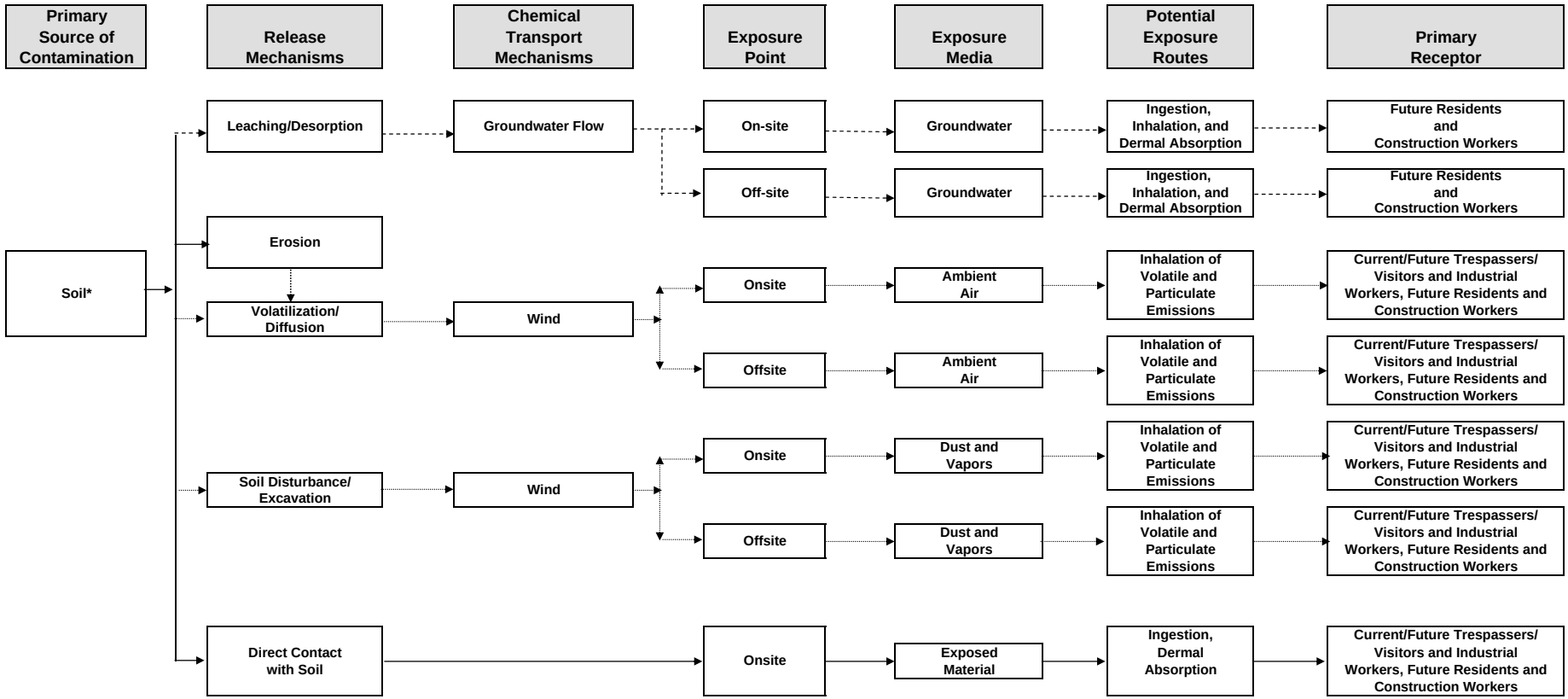
Project: CHM003-004-17
Created: 11/13/00 TH
Revised: 11/21/05 ASC
Source: CH2MHILL, HydroGeoLogic, Inc.

HGL HydroGeoLogic, Inc

Legend

- Base Boundary
- Building/Structure
- Paved Road
- Gravel Road
- Forested Area
- Fence
- Ground Elevation Contour (1ft.)
- Stormwater Ditch
- Surface Soil Sample
- Subsurface Soil Sample

Figure 2-2
Site 39 Topography and Sampling Locations
Site 39 Record of Decision
NDWIH, Indian Head, MD



* Current scenario is for surface soil and future scenarios are for surface and subsurface soil combined.

Complete Pathway
Pathway not evaluated because data indicated minimal potential for contamination of the shallow groundwater
Pathway not evaluated because no CPOCs identified

Figure 2-3
Conceptual Exposure Model for Potential Human Exposures-Site 39
Site 39 Record of Decision
NDWIH, Indian Head, Maryland

SECTION 3

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 November 17, 2004, in accordance with guidance in "Community Relations in Superfund: A Handbook" (EPA, 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 significant 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 further action decision for Site 39 began on October 19, 2004, and ended on November 17, 2004. A public meeting was held on October 21, 2004, at the Indian Head Senior Center, 100 Cornwallis Square, Indian Head, Maryland, to accept oral and written comments on this decision.

3.3 Summary of Comments Received During the Public Comment Period and Navy Responses

No significant comments were received during the public comment period.

SECTION 4

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Appendix A
Glossary

APPENDIX A

Glossary

This glossary defines terms used in this 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.

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 for the public to review and comment on various documents and actions taken, either by the Navy, EPA, or MDE. 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 NDWIH program to inform and involve the public in the Superfund process and respond to community concerns.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA): Comprehensive Environmental Response, Compensation, and Liability Act (1980), also known as the Superfund Law, as amended by the Superfund Amendments and Reauthorization Act of 1986. CERCLA provides the authority and procedures for responding to releases of hazardous substances, pollutants, and contaminants from inactive hazardous waste disposal sites.

Contamination: The presence of a chemical that is due to prior human activity, such as waste disposal or accidental releases. A metal is not considered to be a contaminant unless the site concentrations exceed what would be expected from the background conditions.

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. The information repository for NDWIH is at the NDWIH General Library, NDWIH, Building 620, 101 Strauss Avenue, Indian Head, Maryland.

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.

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 for 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. 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.

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 an NPL site. 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 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.

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.