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NSWC INDIAN HEAD
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RECORD OF DECISION UNEXPLODED ORDNANCE 32 (UXO 32) SCRAP YARD SOIL SURFACE WATER AND SEDIMENT AT NSWC INDIAN HEAD MD
03/01/2014
NAVAL SUPPORT ACTIVITY SOUTH POTOMAC

# RECORD OF DECISION

UXO 32 – Scrap Yard
*(Soil, Surface Water, and Sediment)*

at

Naval Support Facility Indian Head
Indian Head, Maryland

March 2014

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**APPENDICES**

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# ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| µg/kg | micrograms per kilogram |
| µg/dL | micrograms per deciliter |
| | |
| ARAR | applicable or relevant and appropriate requirement |
| | |
| BAP | benzo(a)pyrene |
| | |
| CERCLA | Comprehensive Environmental Response, Compensation, and Liability Act |
| CERCLIS | Comprehensive Environmental Response, Compensation, and Liability Information System |
| CFR | Code of Federal Regulations |
| COC | Chemical of Concern |
| COMAR | Code of Maryland Regulations |
| COPEC | Chemical of Potential Ecological Concern |
| COPC | Chemical of Potential Concern |
| cPAH | carcinogenic polycyclic aromatic hydrocarbons |
| CSM | conceptual site model |
| CTE | central tendency exposure |
| | |
| DoN | Department of the Navy |
| EPA | United States Environmental Protection Agency |
| EPC | exposure point concentration |
| ERA | ecological risk assessment |
| ER,N | Environmental Restoration, Navy |
| | |
| FS | Feasibility Study |
| | |
| HAZWOPER | Hazardous Waste Operations and Emergency Response |
| HI | [non-cancer] hazard index |
| HHRA | human health risk assessment |
| | |
| IAS | Initial Assessment Study |
| IEUBK | Integrated Exposure Uptake Biokinetic [model] |
| ILCR | incremental lifetime cancer risk |
| IRP | [Navy] Installation Restoration Program |
| | |
| LOAEL | Lowest Observed Adverse Effects Levels |
| LUC | land use control |
| | |
| MCL | Maximum Contaminant Level |
| MDE | Maryland Department of the Environment |
| MEC | munitions and explosives of concern |
| mg/kg | milligrams per kilogram |
| MRP | [Navy] Munitions Response Program |
| | |
| NCP | National Oil and Hazardous Substances Pollution Contingency Plan |
| NEESA | Navy Energy and Environmental Support Activity |
| ng/kg | nanogram per kilogram |
| NSF-IH | Naval Support Facility Indian Head |
| | |
| O&M | operation and maintenance |
| OMB | [White House] Office of Management and Budget |
| OSHA | Occupational Safety and Health Administration |
| OU | Operable Unit [No.] |

| | |
|---|---|
| PAH | polycyclic aromatic hydrocarbon |
| PCB | polychlorinated biphenyl |
| PRG | Preliminary Remediation Goal |
| PV | present value |
| RAB | Restoration Advisory Board |
| RAO | Remedial Action Objective |
| RME | reasonable maximum exposure |
| ROD | Record of Decision |
| RSL | [U.S. EPA] Regional Screening Level |
| SSL | Soil Screening Level |
| SVOC | semivolatile organic compound |
| TAL | Target Analyte List |
| TCDD, 2,3,7,8- | 2,3,7,8-tetrachlorodibenzo-p-dioxin |
| TCL | Target Compound List |
| TPH | total petroleum hydrocarbons |
| Tt | Tetra Tech, Inc. and/or Tetra Tech NUS, Inc. |
| UU/UE | unlimited use and unrestricted exposure |
| U.S. | United States |
| VOC | volatile organic compound |

# 1.0 DECLARATION

## 1.1 SITE NAME AND LOCATION

The site addressed herein is Munitions Response Program (MRP) Site **UXO 32 – Scrap Yard**, also identified previously as Installation Restoration Program (IRP) Site 41 – Scrap Yard, (referred to herein as UXO 32, Scrap Yard, or the site) at Naval Support Facility Indian Head (NSF-IH) located in the Town of Indian Head, Charles County, Maryland.

NSF-IH is tracked by the United States (U.S.) Environmental Protection Agency (EPA) under the Comprehensive Environmental Response, Compensation, and Liability Information System **(CERCLIS) ID No. MD7170024684** with facility name "**Indian Head Naval Surface Warfare Center**."

The Scrap Yard is tracked in CERCLIS as **EPA Operable Unit (OU) No. 3, "S41 IWO/Scrap Yard."** The Selected Remedy described herein is for **soil**. This ROD also documents that no action (NA) is necessary for surface water or sediment. Groundwater is being addressed separately as IRP Site 70 – Groundwater Contamination Along Water Works Way (EPA OU 26, "Site 70 GW Contamination").

## 1.2 STATEMENT OF BASIS AND PURPOSE

This Record of Decision (ROD) presents the Selected Remedy for soil, surface water, and sediment at UXO 32 (see Figure 1-1), which was chosen jointly by the U.S. Department of Navy (Navy) and EPA in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended, 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 the site (accessible via http://go.usa.gov/DyQF). The Maryland Department of the Environment (MDE) concurs with the Selected Remedy.

## 1.3 ASSESSMENT OF SITE

The response action selected in this ROD is necessary to protect the public health and welfare or the environment from actual or threatened releases of hazardous substances, pollutants, or contaminants into the environment. A CERCLA action is required because concentrations of arsenic, lead, polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), and dioxins/furans in soil pose an unacceptable risk to human health under construction worker and hypothetical future residential scenarios. Surface water and sediment require No Action and groundwater will be addressed in a separate ROD (as IRP Site 70).

## 1.4 DESCRIPTION OF SELECTED REMEDY

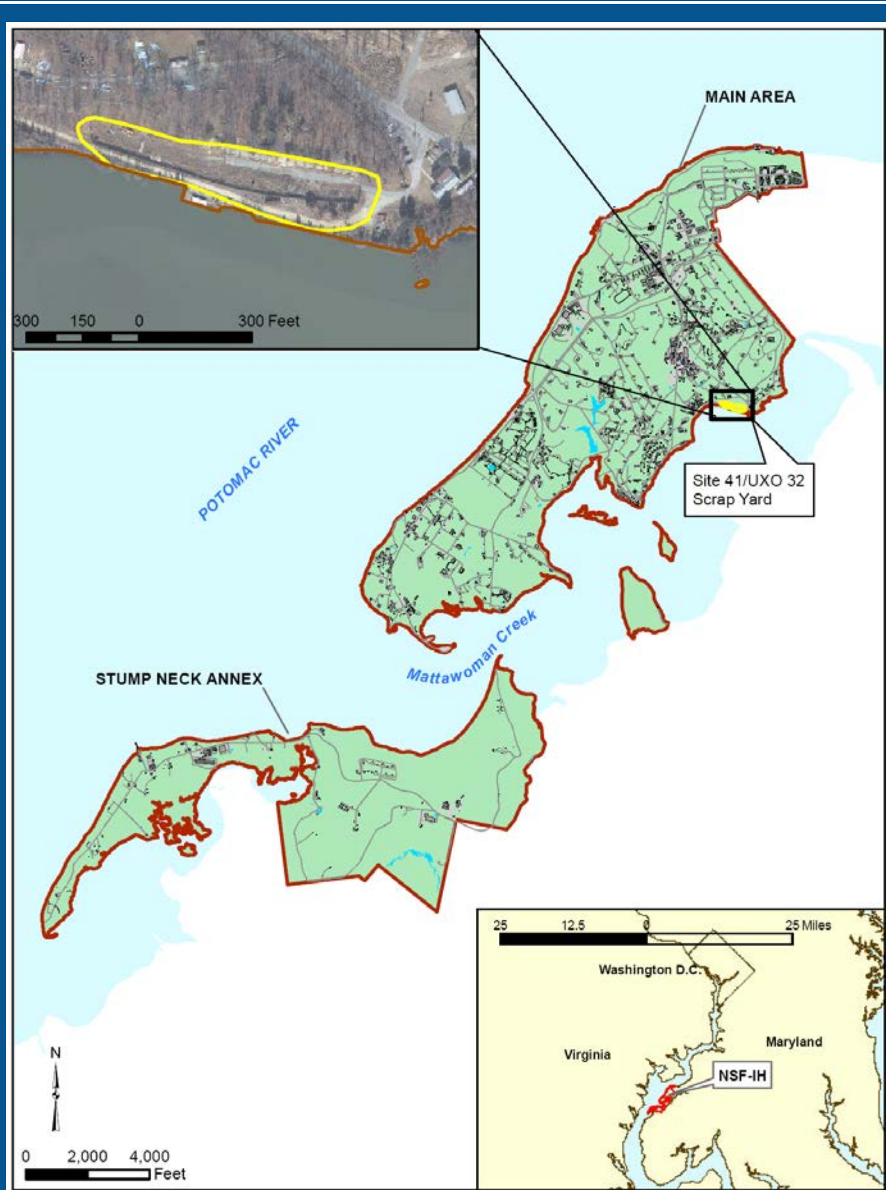
The Selected Remedy for soil is Land Use Controls (LUCs). The Selected Remedy for surface water and sediment is NA based on an evaluation of site conditions and the conclusion that exposure to surface water and sediment does not pose unacceptable risks to human health and welfare or the environment. Groundwater is being addressed as a separate OU (IRP Site 70; EPA OU 26), currently in an expanded Remedial Investigation (RI) phase to investigate upgradient source(s) of groundwater contamination. The major components of the Selected Remedy for UXO 32 soil include the following:

LUCs will be implemented and maintained to prohibit (i) residential development and (ii) construction activities without appropriate Occupational Safety and Health Administration (OSHA) Hazardous Waste Operations and Emergency Response (HAZWOPER) notification and the use of the proper personnel protective equipment and other mitigation measures unless the concentrations of hazardous substances allow for unlimited use and unrestricted exposure (UU/UE).

Five-year reviews will be conducted to evaluate compliance with environmental laws and regulations in effect at the time of the review, and provide direction for further action, if deemed necessary. These site reviews are required because the Selected Remedy allows hazardous substances to remain in soil above levels allowing for UU/UE.

The Interim Removal Action (IRA) in 2002 through 2011 (see Section 2.2) addressed site risks to human health and the environment from surface and shallow subsurface soils identified in previous investigations. Using LUCs, the Selected Remedy will address potential future unacceptable risk associated with exposure to soil. The Selected Remedy is expected to achieve substantial long-term risk reduction and to be protective under the current and reasonably anticipated future commercial/industrial use of the site. This ROD documents the final remedial action for UXO 32 soil, surface water, and sediment and does not include or affect any other sites at the facility. Implementation of this remedy will allow industrial/commercial use of the site consistent with the current use and overall cleanup strategy for NSF-IH of restoring sites to support base operations.

**FIGURE 1-1. SITE LOCATION MAP**



## 1.5 STATUTORY DETERMINATIONS

The Selected Remedy is protective of human health and the environment, is cost-effective, technically and administratively implementable, and utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable. There are no Federal or State of Maryland applicable or relevant and appropriate requirements (ARARs) for the Selected Remedy. There are no principal threats at the site that require treatment. The Selected Remedy does not satisfy the statutory preference for treatment as a principal element of the remedy, because it would be less cost-effective than the Selected Remedy. The contaminated soils, which were determined to be the source of the unacceptable site risks under current site usage, were removed as part of the previous IRA completed in 2011 via excavation and offsite disposal of contaminated soil and cleaning of the remaining concrete pad in order to meet industrial standards. The Selected Remedy restricts future site use to industrial usage, only.

The Selected Remedy for soil will result in hazardous substances, pollutants, or contaminants remaining on site in soil above levels that allow for UU/UE. Therefore, a statutory review will be conducted within 5 years after initiation of the remedial action and every 5 years thereafter to ensure that the remedy is, or will be, protective of human health and the environment.

## 1.6 ROD DATA CERTIFICATION CHECKLIST

The information required to be included in Section 2.0, Decision Summary, of the ROD are summarized in Table 1-1. Additional information can be found in the Administrative Record file for the site.

TABLE 1-1. ROD DATA CERTIFICATION CHECKLIST

| DATA | LOCATION IN ROD |
|---|---|
| Chemicals of concern (COCs) and their respective concentrations | Sections 2.5, 2.7, and 2.8 |
| Baseline risk represented by the COCs | Section 2.7 |
| Cleanup levels established for COCs and the basis for these levels | Section 2.7 and 2.8 |
| Principal Threats Waste | Section 2.11 |
| Current and reasonably anticipated future land use assumptions and current and potential future beneficial land uses used in the risk assessment | Section 2.6 |
| Potential land and groundwater uses that will be available at the site as a result of the Selected Remedy | Section 2.12.4 |
| Estimated capital, operation/operating and maintenance (O&M), and total present value (PV) costs; discount rate; and number of years over which the remedy costs are projected | Section 2.12.3 |
| Key factors that led to the selection of the remedy | Section 2.12.1 |

## 1.7 AUTHORIZING SIGNATURES

Peter R. Nette (signature)
9 May 14

P.R. Nette
Captain, U. S. Navy
Commanding Officer
Naval Support Facility Indian Head

Date

Cecil O. Rodrigues (signature)
5/22/2014

Cecil A. Rodrigues, Director
Hazardous Site Cleanup Division
United States Environmental Protection Agency Region III

Date

# 2.0 DECISION SUMMARY

## 2.1 SITE NAME, LOCATION, AND BRIEF DESCRIPTION

NSF-IH is located in northwestern Charles County, Maryland, and consists of the Main Installation on Cornwallis Neck Peninsula and the Stump Neck Annex on Stump Neck Peninsula. NSF-IH was established in 1890. It is the Navy's oldest continuously operating ordnance station. At various times during its operation, NSF-IH has served as a gun and armor proving ground, powder factory, propellant plant, and research facility. Current uses included operations and training; maintenance and utilities; research, development, and testing and evaluation; explosives storage; supply and non-explosives storage; administration; community facilities and services; housing; and open space.

UXO 32 is approximately 750 feet long and ranges from 75 to 100 feet wide. It is located in the southeastern portion of NSF-IH adjacent to Mattawoman Creek (see Figure 1-1). Prior to being designated as MRP Site UXO 32 in 2004 after the discovery of numerous ordnance and explosive items, the Scrap Yard was known as IRP Site 41. Initially, the site was the location of a coal storage facility dating from the early 1900s, but it has been used as a scrap yard since the 1960s. Discarded electrical transformers were stored at the northwestern end of the site from the 1960s until 1988. These transformers were believed to have leaked and contaminated the soil with polychlorinated biphenyls (PCBs) in this portion of the site. In addition, lead-acid batteries were stored in the Scrap Yard—these may have released lead to the soil.

NSF-IH is an active facility. Environmental investigations and remediation at the base are funded under the Environmental Restoration, Navy (ER,N) program. The Navy is the lead agency for CERCLA activities at the facility, the EPA is the lead regulatory agency, and MDE is the support regulatory agency.

## 2.2 SITE HISTORY AND ENFORCEMENT ACTIVITIES

Table 2-1 provides brief summaries of previous investigations and actions (and associated documents) conducted at UXO 32. Results of these investigations indicated that elevated concentrations of metals, cancerous polycyclic aromatic hydrocarbons (cPAHs), PCBs, and dioxins/furans were present in soil at the site, which were addressed to a great degree by the IRA. These investigations also indicated that elevated concentrations of volatile organic compounds (VOCs) and metals are present in groundwater at the site. However, groundwater will be addressed in a separate ROD. The nature and extent of soil contamination is discussed in Section 2.5.

**TABLE 2-1. PREVIOUS INVESTIGATIONS AND SITE DOCUMENTATION**

| INVESTIGATION | DATE | DESCRIPTION (REFERENCE) |
|---|---|---|
| Initial Assessment Study (IAS) | 1981-1983 | The IAS conducted a review of base-wide waste storage, and discussed the previous storage of discarded transformers at the Scrap Yard. Following the inspection in 1981, 17 transformers were identified as either containing or being contaminated with PCBs. The IAS did not include a recommendation concerning future actions at the Scrap Yard. (NEESA, 1983). |
| Preliminary Assessment (PA) | 1991-1992 | Site was designated IRP Site 41 – Scrap Yard starting with the PA, which provided a desktop review and site visit confirming the previous storage of nine discarded PCB-containing and eight PCB-contaminated transformers at the Scrap Yard. It was suspected that PCB-containing dielectric fluid was released to the soil. The PA Report recommended a Site Inspection (SI) to include soil sampling for PCBs. (NEESA, 1992). |

| TABLE 2-1. PREVIOUS INVESTIGATIONS AND SITE DOCUMENTATION | | |
|---|---|---|
| INVESTIGATION | DATE | DESCRIPTION (REFERENCE) |
| Site Inspection (SI) | 1992-1993 | The SI was conducted as follow up to the PA to determine if PCBs, solvents, and/or lead had contaminated soil, shallow groundwater, and/or Mattawoman Creek sediments. The SI included soil borings and soil sampling, soil gas sampling, creek sediment sampling, surface water (puddle at site entrance) sampling, monitoring well installation, and groundwater sampling. The SI documented observations of storage of metal materials and scraps, including empty storage drums, electrical transformers, spent batteries, and old office furniture. In addition, it confirmed with records and visual evidence (coal dust and chips) historical coal storage in northwest end of site. Samples were analyzed for Target Compound List (TCL) volatile organic compounds (VOCs), TCL semivolatile organic compounds (SVOCs), TCL pesticides/PCBs, Target Analyte List (TAL) metals, and total petroleum hydrocarbons (TPH).<br>The SI Report recommended further study to define the extent of contamination in surface soils, groundwater, and creek sediments. The report also recommended a multi-site sediment study for Mattawoman Creek. (Ensafe/Allen & Hoshall, 1994). |
| Remedial Investigation (RI) | 1997-1999 | The objectives of the RI at the Scrap Yard were to evaluate the 1992 SI data along with the 1997 RI data and determine the human health and environmental risks resulting from exposure to compounds determined to be present. The RI included soil sampling, creek sediment sampling, creek surface water sampling, and groundwater sampling from existing wells. Samples were analyzed for TCL VOCs, SVOCs, and pesticides/PCBs, TAL Metals, cyanide, TPH, and explosives.<br>A baseline human health risk assessment (HHRA) was conducted for current/future maintenance workers exposed to surface soil; current/future full-time employees exposed to surface soil; current/future adolescent trespassers exposed to surface soil; future construction workers exposed to surface/subsurface soil, groundwater, and sediment; hypothetical future residents exposed to surface/subsurface soil, groundwater, and sediment, and adult recreational user exposed to sediment. A human health risk screening was performed on the groundwater medium during the RI. (The HHRA since has been updated to reflect post-IRA site conditions [see below]). Unacceptable human health risks were determined for exposure to several human health Chemicals of Concern (COCs) in soil under all scenarios and in groundwater under non-industrial scenarios, only. No unacceptable human health risks were identified for creek sediment or surface water.<br>A screening-level ecological risk assessment (ERA) was conducted for creek sediment, creek surface water, and surface soil. Potential unacceptable ecological risks were determined for ecological receptor(s) exposure to Chemicals of Potential Ecological Concern (COPECs) in surface soil, sediment, and surface water.<br>The RI Report recommended a Feasibility Study (FS) to address the unacceptable human health risks for soil and groundwater and ecological risk for surface soil. However, additional ecological study was recommended for surface water and sediment in Mattawoman Creek (i.e., baseline ERA on wider multi-site area). (Tetra Tech [Tt], 1999). |

| TABLE 2-1. PREVIOUS INVESTIGATIONS AND SITE DOCUMENTATION | | |
|---|---|---|
| **INVESTIGATION** | **DATE** | **DESCRIPTION (REFERENCE)** |
| Feasibility Study (FS) | 1999-2001 | The FS evaluated remedial alternatives for mitigating potential risks associated with soil and groundwater determined in the RI. Pre-FS soil samples were collected in 1999 to fill data gaps from the RI and refine the COCs / COPECs. The COCs evaluated in the FS, considering only industrial usage, consisted of the following:<br>• HHRA COCs for Surface and [shallow] Subsurface Soil: arsenic, lead, PAHs (benzo[a]pyrene and dibenzo[a,h]anthracene), and PCBs (Aroclor-1260)<br>• Screening ERA COCs for Surface Soil: arsenic, cadmium, lead, and PCBs.<br>The industrial use human health Preliminary Remediation Goals (PRGs) were established for surface and subsurface soil generally based on a target carcinogenic risk of $1 \times 10^{-5}$ and Hazard Index (HI) equal to 1 for non-residential scenarios, only, and not less than established background concentrations. PRGs for surface soil ecological receptors were based on the Lowest Observed Adverse Effects Levels (LOAELs). No PRGs were developed for groundwater, because no unacceptable risk was identified under current conditions (i.e., groundwater not used as a potable source).<br>The Remedial Action Objective (RAO) was to remediate soil at the site to reduce COC concentrations to below PRGs. A secondary RAO was to ensure residential exposure to subsurface soil and groundwater does not occur. No alternatives were developed for groundwater due to the anticipated continued industrial land use. Instead, groundwater monitoring and aquifer use restrictions would be implemented with any of the selected alternatives. The alternatives evaluated were Alternative 1 – No Action and Alternative 2 – Soil Removal, LUCs, and [Groundwater] Monitoring. (Tt, 2001). |
| Proposed Remedial Action Plan (Proposed Plan) | 2001 | A Proposed Plan was prepared in 2001 to present the remedial alternatives evaluated in the FS and recommended remedial Alternative 2 – Soil Removal, LUCs, and [Groundwater] Monitoring. The recommended alternative consisted of soil excavation, concrete pad decontamination, potential asphalt cover (and potential pad and/or asphalt maintenance), groundwater monitoring, preventing residential development, and prevent aquifer usage. A public meeting was held in February 2001 to present the Proposed Plan. (Navy, 2001). |
| Record of Decision (ROD) | 2002 and 2005 | RODs reached draft final versions in May 2001 and April 2005. The 2001 version was not finalized due to issues related to LUC-implementation and -enforcement. The 2005 version of the ROD was not finalized because the results of the then-ongoing interim removal action (IRA) were changing site conditions (e.g., ecological risks would be fully addressed by the IRA; see below). |
| Engineering Evaluation and Cost Analysis (EE/CA) | 2002 | Prior to ROD finalization, the Navy elected to proceed with a CERCLA response using removal action authority. Navy developed a combined EE/CA and Action Memorandum in June 2002 by incorporating [by reference] the 1999 RI and 2001 FS Reports. The removal action alternative evaluated and selected was soil excavation, concrete pad decontamination, and LUCs. Groundwater monitoring was not included. Warning signage would be posted until groundwater was addressed. The Action Memorandum considered public comments from the 2001 Proposed Plan to specify the selected removal action alternative. (Navy, 2002). |
| Remedial Design | 2002 | The Remedial Design package, originally intended for the to-be-Selected Alternative in the ROD, was completed in August 2002 and used to implement the IRA. Other remedial/removal action work plans were generated to supplement or update the RD throughout the phased IRA. (Tt, 2002). |

**Table 2-1. Previous Investigations and Site Documentation**

| Investigation | Date | Description (Reference) |
|---|---|---|
| Mattawoman Creek Study | 2004 | The Mattawoman Creek Study investigated sediment and surface water as a whole site along the northern shoreline of the creek. The study utilized data collected throughout the area by the Navy and Tt in 2001, as well as previously collected RI data from Mattawoman Creek northern shoreline IRP Sites 11 (Caffee Road Landfill), 17 (Discarded Metal Parts Area), 28 (Original Burning Ground), 39 (Organics Plant), and 41 (Scrap Yard). The study evaluated ecological and human health risks based on this wider study area, and provided a refined macro-conceptual site model (CSM). The assessment determined moderate risk to benthic invertebrates from sediment samples near Site 41 (only Site 28 sediment was identified as high risk). Low to negligible risks were identified for wildlife, fish, and vegetation. Aquatic organism risk was increased due to cadmium in Creek-wide surface water, but there was uncertainty in the analytical results (data validation noted biased high concentrations and laboratory blank contamination), and the highest cadmium concentrations occurred at Site 28, upstream of UXO 32, and downstream at Site 11 where Mattawoman Creek meets the Potomac River. Human health risks exceeded acceptable risk ranges only for recreational fish consumption (Aroclor-1260); however, data uncertainties associated with background comparisons were thought to have caused the HHRA results to be overly conservative. Aroclor-1260 was detected consistently in fish tissue in all the study sub-areas and the species tested. In summary, the Mattawoman Creek Study did not attribute unacceptable human health or ecological risks to the Scrap Yard. (Tt, 2004). |
| Interim Removal Action (IRA) | 2002-2011 | The IRA began in November 2002 with scrap and debris removal, but was halted due to the discovery of numerous ordnance and explosive items. The site was transferred from the IRP (as Site 41) to the MRP in March 2004 and designated as UXO 32 – Scrap Yard. The IRA re-initiated under the MRP by removing all large potentially explosive items (September 2006 through March 2007). Remaining IRA components were completed by May 2011: scrap and debris removal, soil excavations (iterative process with verification sampling), and concrete pad decontamination/cleaning. Surface and shallow subsurface soils were excavated based on exceedances of the following PRGs (established in 2001 FS): |

| COC | Ecological PRG (mg/kg) | Human Health PRG (mg/kg) |
|---|---|---|
| Arsenic | 15 | 29 |
| Cadmium | 5 | N/A |
| Lead | 871 | 480 |
| Aroclor-1260 | 1 | 10 |
| Benzo(a)pyrene | NA | 0.33 |
| Dibenzo(a,h)anthracene | NA | 0.33 |

The human health PRGs were applied to the soil except in instances where the ecological PRGs were lower than those developed for human health. The ecological PRGs, however, were only applied to surface soil in the 0- to 6-inch depth range. Therefore, the PRGs based on depth were as follows:

| COC | Surface Soil (0-6 inches) (mg/kg) | Shallow Subsurface Soil (6-18 inches) (mg/kg) |
|---|---|---|
| Arsenic | 15 | 29 |
| Cadmium | 5 | N/A |
| Lead | 480 | 480 |
| Aroclor-1260 | 1 | 10 |
| Benzo(a)pyrene | 0.33 | 0.33 |
| Dibenzo(a,h)anthracene | 0.33 | 0.33 |

| TABLE 2-1. PREVIOUS INVESTIGATIONS AND SITE DOCUMENTATION | | |
|---|---|---|
| **INVESTIGATION** | **DATE** | **DESCRIPTION (REFERENCE)** |
| IRA (continued) | 2002-2011 | Approximately 4,900 tons of contaminated soil were removed and transported to an offsite disposal facility. Abandoned railroad tracks were removed, cleaned, and recycled. Approximately 185 tons of non-munitions-related scrap metal, 32 tons of demilitarized munitions debris scrap metal, and over 12,200 individual cartridge actuated devices and propellant actuated devices were removed from the site. The concrete pad was cleaned to remove residual soil and surface PCB contamination. Concrete chip and core verification samples showed that, following cleaning, no other action was required for the pad. Several asphalt areas (e.g., the access road) were re-paved. Clean fill and gravel were used to backfill excavated areas and re-grade the site for continued industrial [miscellaneous storage] use by the Navy.<br>The IRA fully addressed ecological risks by removing surface soils to the extent compliant with ecological PRGs. The IRA addressed current [non-residential] human health risks by removing surface and shallow subsurface soils to the extent compliant with industrial PRGs. Human health risks were re-evaluated/re-calculated based on post-IRA conditions in 2012 (see below). (Shaw, 2011). |
| Supplemental Groundwater Investigation | 2011 | Although the removal action addressed ecological risks and current human health risks in soil at the site, the groundwater contamination was not considered to be thoroughly understood and, subsequently, human health risks were not considered to be fully evaluated for groundwater. A supplemental RI effort was initiated in June 2011 to fully delineate groundwater contamination upgradient, side-gradient, and downgradient of the site. Results indicated potential upgradient source(s) of VOCs and metals. Therefore, the groundwater medium now is being addressed as a separate OU (IRP Site 70). Completion of the separate groundwater RI for Site 70 is anticipated in 2014. (Tt, 2011). |
| Updated HHRA | 2012 | The baseline HHRA for Scrap Yard soil and groundwater was updated with the post-IRA soil verification data (and historical data for undisturbed soils) and the June 2011 groundwater data to reflect current site conditions. The potential receptors and exposures evaluated in the updated HHRA were as follows:<br>• Current and future full-time industrial workers exposed to surface and subsurface soil and indoor vapors from groundwater.<br>• Current and future construction workers exposed to surface and subsurface soil and groundwater.<br>• Future child and adult recreational users exposed to surface and subsurface soil.<br>• Hypothetical future child and adult residents exposed to surface and subsurface soil, groundwater, and indoor vapors from groundwater.<br>The results indicate unacceptable risks for exposure to COCs in groundwater for future hypothetical residential scenario (arsenic, cobalt, tetrachloroethene [PCE], and trichloroethene [TCE]), in soil for future construction worker scenarios (arsenic and lead), and in soil for future hypothetical residential scenarios (arsenic, lead, PCBs [Aroclor-1260], dioxins/furans [2-3,7,8-TCDD (tetrachlorodibenzo-p-dioxin) equivalents], and carcinogenic PAHs [cPAHs] [benzo(a)pyrene (BAP) equivalents]).<br>Remedial Goal Options (RGOs) were calculated for soil and groundwater at target cancer risks (TCRs) of $10^{-6}$, $10^{-5}$, and $10^{-4}$ and non-cancer HI of 1 for both current/future construction workers and hypothetical future residents. Groundwater at the Scrap Yard is being addressed separately as IRP Site 70, and remaining risks posed by exposure to soil will be addressed by the Selected Remedy described herein (Alternative 2 – LUCs; see below). (Tt, 2012 and 2013). |

<table>
<tr><th colspan="3">TABLE 2-1. PREVIOUS INVESTIGATIONS AND SITE DOCUMENTATION</th></tr>
<tr><th>INVESTIGATION</th><th>DATE</th><th>DESCRIPTION (REFERENCE)</th></tr>
<tr><td>Focused FS</td><td>2013</td><td>A Focused FS Report was prepared to summarize and document the complicated site history and decisions, and to re-evaluate the LUCs alternative component from the 2001 FS considering post-IRA (i.e., current) site conditions, revised post-IRA HHRA results and conclusions, and current economic conditions (i.e., costing). No alternatives were evaluated for groundwater, because groundwater at the Scrap Yard now is being addressed separately as IRP Site 70. The IRA completed in 2011 addressed pre-IRA-current risks (excavation of soils exceeding the 2001 FS ecological and industrial human health PRGs). The RAO for soil is to reduce or eliminate human health risks associated with direct contact to soil (construction worker and hypothetical resident) (see Section 2.8 herein). The CERCLA COCs evaluated in the Focused FS (i.e., carried forward from the revised HHRA) and associated PRGs were as follows:
<table>
<tr><th colspan="3">CURRENT/FUTRE CONSTRUCTION WORKER</th></tr>
<tr><th>Chemical</th><th>PRG (mg/kg)</th><th>PRG Basis</th></tr>
<tr><td>2,3,7,8-TCDD Equivalents</td><td>0.002</td><td>TCR=1x10$^{-5}$</td></tr>
<tr><td>Arsenic</td><td>45</td><td>HI=1</td></tr>
<tr><td>Lead</td><td>800</td><td>EPA RSL</td></tr>
<tr><td>BAP Equivalents</td><td>21</td><td>TCR=1x10$^{-5}$</td></tr>
<tr><td>Aroclor-1260</td><td>76</td><td>TCR=1x10$^{-5}$</td></tr>
<tr><th colspan="3">FUTURE RESIDENT</th></tr>
<tr><th>Chemical</th><th>PRG (mg/kg)</th><th>PRG Basis</th></tr>
<tr><td>2,3,7,8-TCDD Equivalents</td><td>4.5E-05</td><td>TCR=1x10$^{-5}$</td></tr>
<tr><td>Arsenic</td><td>14.9</td><td>Background</td></tr>
<tr><td>Lead</td><td>400</td><td>EPA RSL</td></tr>
<tr><td>BAP Equivalents</td><td>0.584</td><td>Background</td></tr>
<tr><td>Aroclor-1260</td><td>2.2</td><td>TCR=1x10$^{-5}$</td></tr>
</table>
This ROD establishes Site Remediation Goals (SRGs) based on the RAOs and PRGs (see Section 2.8 herein) (Tt, 2013). The Area of Attainment(s) for soil are based on current/remaining COC concentrations (locations) in exceedance of SRGs.</td></tr>
<tr><td>Proposed Plan</td><td>2013</td><td>The Proposed Plan was issued in July 2013 to present the Preferred Remedy for soil (LUCs), sediment (No Action), and surface water (No Action). The LUCs restrict residential development and require construction worker notification prior to any intrusive activities. (Navy, 2013).</td></tr>
</table>

In September 1995, the NSF-IH facility was placed on the NPL. The Federal Facility Agreement (FFA) signed on December 9, 2000 (Navy, 2000), provides for CERCLA-directed enforcement activities at the Scrap Yard. As a result, an RI/FS, IRA, FFS, and Proposed Plan have been completed for the site.

## 2.3 COMMUNITY PARTICIPATION

The Navy performs public participation activities in accordance with CERCLA and the NCP throughout the site cleanup process at NSF-IH, including establishment of an Information Repository at three locations in the area of the facility for dissemination of information to the community. The NSF-IH Information Repository can be accessed at the following locations:

- Indian Head Town Hall, 4195 Indian Head Highway, Indian Head, Maryland 20640
- Charles County Public Library, 2 Garrett Avenue, La Plata, Maryland 20646
- NSF-IH General Library, Building 620, 4163 North Jackson Road, Indian Head, Maryland 20640

Documents and other relevant information relied on in the remedy selection process are available for public review at the Information Repositories, which include a copy of the Administrative Record. For access to the Administrative Record or additional information about the IRP or MRP at NSF-IH, contact Gary Wagner, Public Affairs Officer (Code 00P), 6509 Sampson Road, Suite 217, Dahlgren, Virginia, 22448, 540-653-1475, gary.wagner@navy.mil.

A Restoration Advisory Board (RAB) made up of community members and Navy, federal, and state officials was formed in 1994 and currently meets twice a year. The RAB is designed to act as a focal point for the exchange of information between NSF-IH and the local community regarding restoration activities at the base. The investigations at the Scrap Yard have been discussed at RAB meetings in the past.

In accordance with Sections 113 and 117 of CERCLA, the Navy provided a public comment period from July 29 to August 28, 2013, for the proposed remedial action described in the Proposed Plan for UXO 32. A public meeting to present the Proposed Plan was held on August 21, 2013, at the Indian Head Senior Center, 100 Cornwallis Square, Indian Head, Maryland. Public notice of the meeting and availability of documents was published in the *Maryland Independent* newspaper on July 26, 2013.

## 2.4 SCOPE AND ROLE OF OPERABLE UNIT

UXO 32 is part of a comprehensive environmental investigation and cleanup program currently being performed at NSF-IH under CERCLA. There are 56 IRP sites in various stages of investigation or remediation at Indian Head. RIs are underway for eight of these, one is undergoing a Site Screening Process Investigation, one is in the Remedial Design phase, and six are in the Remedial / Removal Action phase. Remedial Actions are complete on three sites where long-term monitoring still is required. There are eight sites that require no further action, but are included in Five-Year Reviews due to the presence of hazardous substances that remain at the site above levels that allow for UU/UE. Previous investigations have determined that the remaining sites require no further action. The *Site Management Plan* (Tt, 2012) further details the status and schedule for CERCLA activities and is updated annually.

Investigations and post-IRA results at UXO 32 indicate the presence of surface and subsurface soil contamination and the presence of groundwater contamination that poses unacceptable human health risk to future construction workers (subsurface soil) and hypothetical future residents (surface soil, subsurface soil, and groundwater used as a potable supply). The IRA completed in 2011 addressed (i.e., removed) ecological risks and industrial risks at the site posed by surface and shallow subsurface soil contamination. The Selected Remedy documented in this ROD will achieve the Remedial Action Objective (RAO) for UXO 32 surface and subsurface soil (see Section 2.8). Implementation of the Selected Remedy will allow industrial/commercial use of the site, which is consistent with current and reasonably anticipated future use and the overall cleanup strategy for NSF-IH of restoring sites to support base operations.

This is the only ROD contemplated for UXO 32 soil, surface water, and sediment. The Selected Remedy addresses risk from human exposure to soil at UXO 32. No human or ecological risks were identified from exposure to UXO 32 sediment or surface water. Therefore, NA is required for UXO 32 sediment and surface water. The groundwater operable unit at UXO 32 (IRP Site 70) will be addressed separately in a separate ROD issued in the future. Investigations and assessments are being conducted for the other IRP and MRP sites at NSF-IH in accordance with CERCLA, and separate RODs (or other CERCLA decision documents) have been or will be prepared for the other sites. Accordingly, this ROD only applies to UXO 32 soil, sediment, and surface water.

## 2.5 SITE CHARACTERISTICS

### 2.5.1 Physical Characteristics

UXO 32 currently is used for storage of miscellaneous equipment and materials. All previous scrap materials, ordnance and explosive items, and soils presenting unacceptable risk to industrial workers were removed during the IRA completed in 2011 (see Figure 2-1). The gated, fenced site is flat and approximately 80 percent covered with concrete and/or asphalt pavement (herein collectively referred to as the concrete pad or pad). It lies at the bottom of a topographic low with steep terrain immediately north.

**FIGURE 2-1. INTERIM REMOVAL ACTION EXCAVATION AREAS**


The fencing and locked gates are not related to preventing exposure to site contaminants—they are physical security measures. A gravel access road (Footbridge Road) is located on the southern portion of the site between the fenced Scrap Yard and Mattawoman Creek. Abandoned railroad tracks that were adjacent to the access road were removed during the IRA.

Portions of the decontaminated pad and all excavated areas inside the Scrap Yard were covered with clean fill material and gravel(s) during the IRA to provide a flat grade for conducive site usage (e.g., material and equipment staging and storage) by the Navy (see Figure 2-2). The area north of the site is wooded. Uncovered areas outside the Scrap Yard fence are native grasses and brush (excavated areas outside the physical Scrap Yard were restored [backfilled, top-soiled, and re-vegetated]. Although it is located along the shoreline of Mattawoman Creek, the site provides little ecological habitat of value.

Inset Picture (looking east): Post-IRA grading over pad inside Scrap Yard with gravel(s).

Native subsurface soil conditions generally consist of clayey sand interlayered with clayey gravel and sand lenses, underlain by a basal green-gray clay or brown sandy clay (greater than 5-feet thick under the site at approximately 12 to 15 feet below ground surface) (see Figure 2-3).

**FIGURE 2-2. POST-INTERIM REMOVAL ACTION CONDITIONS**


Remaining (post- IRA) impacted areas associated with the site include subsurface soil, mainly beneath the pad, as well as some undisturbed surface and shallow subsurface soil. These impacted soils have concentrations less than the IRA goals (i.e., 2001 ecological PRGs for surface soil and 2001 industrial PRGs for surface and shallow subsurface soil) and/or are beneath the pad. Overland runoff from the site flows south into Mattawoman Creek. Overland flow off the east side of the pad/site is intercepted by a French drain, which was installed during the IRA to address stormwater erosion issues during restoration.

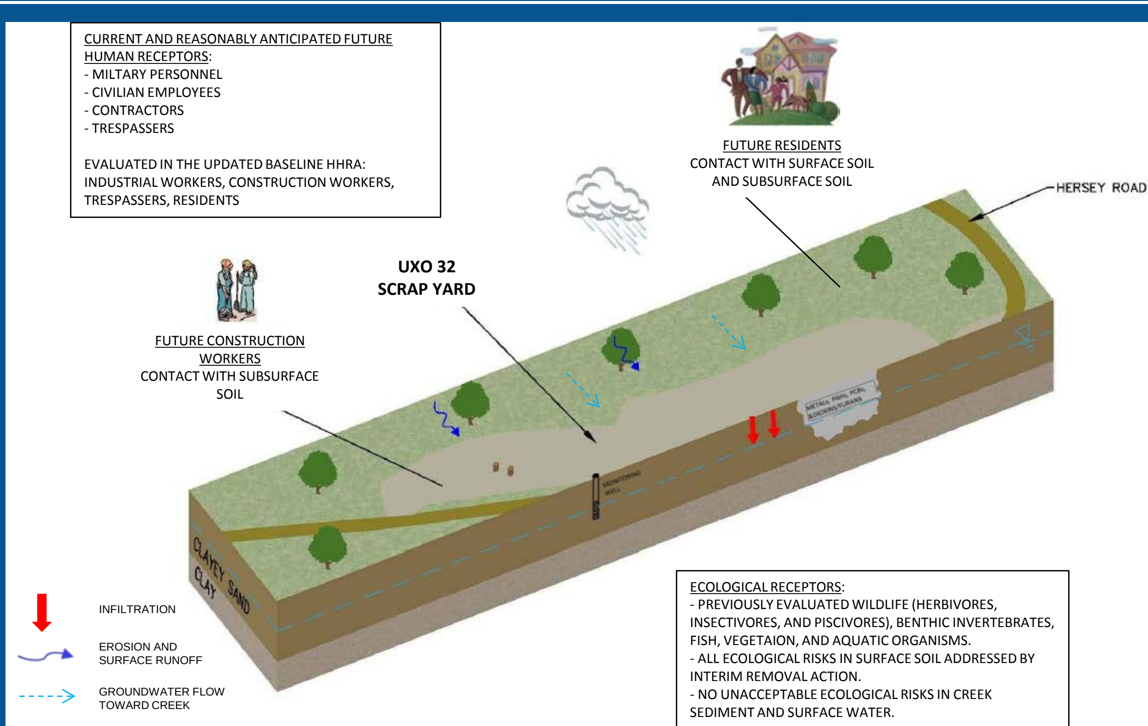
Inset Picture (looking south): French drain installed outside east side of Scrap Yard to address stormwater runoff erosion issues.

The shallow groundwater beneath the site occurs under unconfined (water table) conditions. Shallow groundwater flows toward and discharges into Mattawoman Creek. However, this creek is tidal, and during high tide, the water table may be slightly elevated near the creek and may change the groundwater flow pattern. The groundwater is primarily recharged by downward migration of precipitation through the unsaturated zone to the water table. Groundwater flow north of the site is affected greatly by surrounding topography, preventing groundwater inflow from the north, as determined during the FS for nearby IRP Site 57 (Tt, 2006). Groundwater (2 to 4 feet below ground surface) flows into the site from the west and west-northwest discharging to Mattawoman Creek. Precipitation either infiltrates into areas of pervious gravel/fill/soil or runs off into the creek.

### 2.5.1 Conceptual Site Model (CSM)

Figure 2-3 presents the overall conceptual site model (CSM) for UXO 32, which integrates information regarding the physical characteristics of the site, sources of contamination, contaminant mobility (fate and transport), and potentially exposed populations to identify exposure routes and receptors evaluated in the risk assessment(s). 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.

**FIGURE 2-3. CONCEPTUAL SITE MODEL**




The source of contamination for UXO 32 was the historical spills and leaks (releases) from materials stored in the Scrap Yard, scrap materials themselves, and the subsequently contaminated soil, almost all of which were removed during the 2002-2011 IRA. The remaining source of contamination is undisturbed contaminated surface and subsurface soils that did not present a risk to industrial receptors. Contaminants in surface soil could migrate to air through wind erosion or through volatile emissions. Contaminant migration from surface soil is mitigated by the concrete pad and asphalt pavement, clean fill, and gravel covering/graded over the site. Subsurface soil is not currently exposed at the site; however, if future construction occurs and brings subsurface soil to the surface, contaminants in subsurface soil could be released into the air through wind erosion or through volatile emissions. Contaminants can migrate from both surface and subsurface soil to groundwater through leaching (depth to groundwater at UXO 32 is approximately 4 feet below ground surface). The groundwater operable unit at UXO 32 (i.e., IRP Site 70) will be addressed separately in the future. Surface water runoff from UXO 32 flows southwest into Mattawoman Creek. Creek sediment and surface water is not contaminated [from historical contaminant releases and/or transport] at levels warranting action. Human health and ecological receptors are discussed in Sections 2.7.1 and 2.7.2, respectively.

### 2.5.2 Nature and Extent of Contamination

The source of contamination at UXO 32 was the scrap and debris, impacted soils, and contaminated concrete pad prior to the IRA completed in 2011. Various organic compounds (PAHs and PCBs [i.e., Aroclor-1260] in soil) and metals (arsenic, cadmium, and lead) were detected in soil [and groundwater samples] from the site as determined during the RI. The IRA removed (i.e., excavated) the majority of contamination, mitigating ecological risks and industrial human health risk. The current source is remaining soils above the current SRGs for the construction worker and hypothetical future resident.

Soil chemicals of potential concern (COPCs) have been identified based on the analytical data (historical RI/FS subsurface soil samples and 2010-2011 post-IRA verification sample data) and initial screening in the Updated Human Health Risk Assessment (HHRA) (Tt, 2012) (see Section 2.7). The occurrence and distribution of the COPCs for the IRA verification surface and subsurface soil sample data are provided in Table 2-2. These COPCs were retained as COCs in the Focused FS and this ROD depending on the degree of calculated risks (see primary risk drivers [COCs] and exposure point concentrations [EPCs] in Section 2.7.1 and Section 2.8). Additional details on the spatial distribution and concentrations of chemicals detected in all site media are contained in the pre-IRA Tt (1999) RI and (2001) FS Reports and Tt (2005) Remedial Design (pre-IRA), as well as the post-IRA Shaw (2011) Construction Completion, Tt (2012) Updated HHRA, and Tt (2013) Focused FS Reports.

## TABLE 2-2. CHEMICALS OF POTENTIAL CONCERN IN IRA VERIFICATION SOIL SAMPLES

| Soil | Chemical of Potential Concern (COPC) | Frequency of Detection | Minimum Concentration(1) | Maximum Concentration(1) | Location of Maximum Concentration | Background Concentration(2) | EPA Residential RSL (Adjusted)(3) (No. Exceedances) | | EPA Risk-Based Soil Screening Level (SSL)(3) (No. Exceedances) | |
|---|---|---|---|---|---|---|---|---|---|---|
| Surface Soil (0-2 feet) | DIOXINS/FURANS (nanograms per kilogram [ng/kg]) | | | | | | | | | |
| | 2,3,7,8-TCDD Equivalents(4) | 1/1 | 89.2 | 89.2 | U32SOS18 | NA | 4.5 C | 1 | 0.26 | 1 |
| | METALS (mg/kg) | | | | | | | | | |
| | Arsenic | 50/50 | 3.24 J | 423 J | U32SO02 | 14.9 | 0.39 C | 50 | 0.0013 | 50 |
| | Cadmium | 6/16 | 0.0213 J | 69 | U32SOS18 | 2.5 | 7 N | 1 | 1.4 | 3 |
| | Lead | 22/22 | 5.3 | 9800 | U32SOS18 | 62.5 | 400 | 1 | 14 | 14 |
| | Mercury | 1/1 | 3.3 J | 3.3 J | U32SOS18 | 0.16 | 2.3 N(5) | 1 | 0.03 | 1 |
| | Zinc | 1/1 | 3500 | 3500 | U32SOS18 | 37.5 | 2300 N | 1 | 680 | 1 |
| | PAHs (µg/kg) | | | | | | | | | |
| | BAP Equivalents(4) | 9/17 | 23.71 | 1200 | U32SO05 | NA | 15 C | 9 | 3.5 | 9 |
| | PCBs (µg/kg) | | | | | | | | | |
| | Aroclor-1260 | 25/31 | 5.8 J | 11000 | U32SBS0901 | NA | 220 C | 8 | 24 | 20 |
| Subsurface Soil (2-9 feet) | Dioxins/Furans (ng/kg) | | | | | | | | | |
| | 2,3,7,8-TCDD Equivalents(4) | NA | NA | NA | NA | NA | 4.5 C | NA | 0.26 | NA |
| | METALS (mg/kg) | | | | | | | | | |
| | Arsenic | 36/49 | 0.965 J | 328 J | 41SB0201 | 18.9 | 0.39 C | 1 | 0.0013 | 36 |
| | Cadmium | 2/22 | 1.2 | 2 | 41SB0201 | 0.61 | 7 N | 0 | 1.4 | 1 |
| | Lead | 26/26 | 1.7 | 46 J | 41SB0201 | 40.5 | 400 | 0 | 14 | 4 |
| | Mercury | 1/22 | 0.18 | 0.18 | 41SB0201 | 0.18 | 2.3 N(5) | 0 | 0.03 | 2 |
| | Zinc | 22/22 | 4.7 | 97.2 | 41SB0504 | 70.4 | 2300 N | 0 | 680 | 0 |
| | PAHs (µg/kg) | | | | | | | | | |
| | BAP Equivalents(4) | 2/22 | 346 | 480 | 41SB0402 | NA | 15 C | 2 | 3.5 | 2 |
| | PCBs (µg/kg) | | | | | | | | | |
| | Aroclor-1260 | 2/26 | 11 J | 67 | U32SBS133401 | NA | 220 C | NA | 24 | NA |

Notes

1 - Sample and duplicate are considered as two separate samples when determining the minimum and maximum concentrations.

2 - 95% UTL for surface soil and for clay-like subsurface soil from Background Soil Investigation Report for Indian Head and Stump Neck Annex, Naval Surface Warfare Center, Indian Head, Maryland (Tetra Tech, 2002).

3 - USEPA RSLs for Chemicals at Superfund Sites, November 2011. The noncarcinogenic values (denoted with a "N" flag) are the screening level divided by 10 to correspond to a target hazard quotient of 0.1. Carcinogenic values represent an incremental cancer risk of 1.0E-06 (carcinogens denoted with a "C" flag).

4 - Calculated using half the value of the detection limit for nondetects.

5 - The value is for mercuric chloride (and other mercury salts).

Arsenic (the main risk driver) remains elevated throughout site surface and shallow subsurface soils above the construction worker and hypothetical future resident SRGs following the IRA. Several PAHs remain at risk-driving concentrations at one location centrally located south of the Scrap Yard fencing. Aroclor-1260 is present throughout site soils; the most elevated [risk-driving] concentration occurred at one verification sample location within the central portion of the Scrap Yard. Risk-driving dioxins/furans and lead concentrations were detected in a verification sample from organic black coal/ash material beneath the concrete pad inside the southeast corner of the Scrap Yard. Dioxins/furans were analyzed only at this one location (only location where this material was specifically encountered), but they are presumed to be present with other COCs throughout the site for the purpose of the Selected Remedy. Lead is present throughout the site, but only at risk-driving concentration in the southeast corner of the Scrap Yard.

Inset Picture: Coal/ash material located below concrete pad in southeast corner of Scrap Yard interior.

Arsenic remains in the shallow subsurface soil at concentrations indicating a potential leaching issue to groundwater (i.e., arsenic concentrations above EPA's risk-based Soil Screening Level [SSL] of 1.3 micrograms per kilogram [µg/kg] and the Maximum Contaminant Level [MCL]-based SSL of 290 µg/kg). However, NSF-IH background arsenic soil values (14.9 and 18.9 µg/kg in surface and subsurface soil, respectively) exceed the EPA risk-based SSL. Further, groundwater data from the site do not indicate arsenic is a continuing source of contamination. Groundwater will be addressed separately in the future as IRP Site 70.

## 2.6 CURRENT AND POTENTIAL FUTURE SITE AND RESOURCE USES

UXO 32 is used currently for miscellaneous equipment and materials storage, and no longer receives scrap materials. The Defense Reutilization Management Office now manages scrap-like material for NSF-IH. The Navy has no future construction/other development plans for this area. Reasonable potential future land uses include continued industrial/commercial use as a secure storage area or equipment and materials/supplies, minor construction, and limited development. There are no plans for residential development of the site. However, hypothetical future residential use of the site was evaluated in the HHRA to determine if restrictions would be necessary (see Section 2.7.1). Shallow groundwater beneath the site is not used and will not likely be used for any beneficial uses in the future, and is not hydraulically connected to deeper aquifers that are the principal sources of water for domestic use at NDW-IH. Groundwater will be addressed separately in the future as IRP Site 70.

## 2.7 SUMMARY OF SITE RISKS

Risk assessments estimate what risks the site would pose if no action were taken, provide the basis for taking action, and identify the contaminants and exposure pathways that need to be addressed by the remedial action.

This section presents the results of the updated HHRA completed following the IRA (Tt, 2012 and 2013). Risks to human health and ecological receptors from exposure to contaminants in soils, groundwater, sediment, and surface water were determined originally in the 1999 RI and evaluated in the 2001 FS (See Section 2.2). No unacceptable risks were attributed to UXO 32 for Mattawoman Creek sediment and surface water. The IRA completed in 2011 mitigated potential risks associated with exposure to soil contaminants for human industrial receptors and ecological receptors.

### 2.7.1 Summary of Human Health Risk

The updated baseline HHRA was conducted using chemical concentrations detected in surface soil, subsurface soil, and groundwater following the IRA at UXO 32 (Tt, 2012). Groundwater will be addressed separately in the future as IRP Site 70.

Key steps in the risk assessment process included identification of chemicals of potential concern (COPCs), exposure assessment, toxicity assessment, and risk characterization. In accordance with EPA HHRA guidance, estimated risks initially were calculated using a reasonable maximum exposure (RME) scenario, which addresses the maximum human exposure reasonably expected to occur in a population. EPA guidance also allows evaluation based on a central tendency exposure (CTE), which essentially addresses average exposures, when RME scenarios are considered unacceptable. A CTE scenario is likely more representative of the actual risk to a majority of potential receptors. Calculated incremental lifetime cancer risks (ILCRs) are interpreted using EPA's TCR range of $1\times10^{-4}$ to $1\times10^{-6}$, and non-cancer HIs are evaluated using a value of 1.0. Current EPA policy regarding lead exposures is to limit the childhood risk of exceeding a 10 microgram per deciliter (µg/dL) blood-lead level to 5 percent.

Figure 2-4 shows the exposure pathway analysis for soil (i.e., the CSM for the HHRA). Risks were calculated for exposure to contaminants in soil for each of the following receptors.

- Construction Worker
- Industrial Worker
- Adult and Child Recreation Users (non-cancer risks, only)
- Adult and Child Residents (non-cancer risks, only)

- Lifelong Recreational User (cancer risk, only)
- Lifelong Resident (cancer risk, only)

**FIGURE 2-4. HUMAN HEALTH RISK ASSESSMENT CONCEPTUAL SITE MODEL**

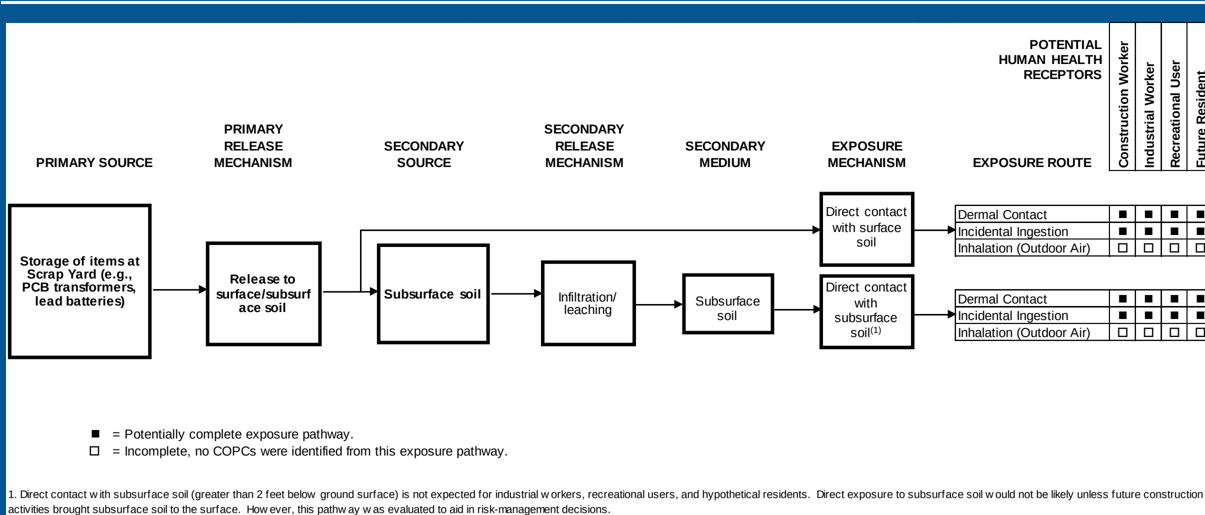



Table 2-3a and 2-3b summarize the Updated [Post-IRA] HHRA RME non-cancer HIs and cancer risks, respectively, for soil at the Scrap Yard. EPCs used for the risk calculations are summarized in Table 2-4. The soil risks were evaluated under four different exposure unit scenarios for each receptor:

- Surface Soil (current) – Top-most soil (0-2 feet) not covered by concrete pad
- Surface Soil (under cap) – Top most soil (0-2 feet) just under the concrete pad
- Surface Soil (future) – Combined Surface Soil (current) and Surface Soil (under cap)
- Subsurface Soil – Soil deeper than 2 feet down to 9 feet (lowest water table depth)

Table 2-3a shows the contaminants contributing to target organ-specific HIs greater than 1.0 (i.e., COCs, primary risk drivers) for each receptor and soil exposure unit. Chemicals are considered primary risk drivers if the cumulative HIs for the soil exposure unit exceed 1. The primary risk drivers listed in the following table are the predominant COPCs contributing to the exposure unit-specific cumulative risk estimates.

**TABLE 2-3A. CUMULATIVE NON-CANCER HAZARD INDICES FOR SOIL AT UXO 32**

| Receptor | Soil Exposure Unit | Hazard Index | Primary Risk Driver |
|---|---|---|---|
| Construction Worker | Surface soil (current) | *3* (1) | No COCs (2) |
| | Surface soil (under cap) | *2* | No COCs |
| | Surface soil (future) | *3* (3) | Arsenic |
| | Subsurface soil | *2* | No COCs |

| Table 2-3a. Cumulative Non-Cancer Hazard Indices for Soil at UXO 32 | | | |
|---|---|---|---|
| **Receptor** | **Soil Exposure Unit** | **Hazard Index** | **Primary Risk Driver** |
| Industrial Worker | Surface soil (current) | 0.4 | No COCs |
| | Surface soil (under cap) | 0.5 | No COCs |
| | Surface soil (future) | 0.7 | No COCs |
| | Subsurface soil | 0.4 | No COCs |
| Child Recreational User | Surface soil (current) | 0.8 | No COCs |
| | Surface soil (under cap) | 0.8 | No COCs |
| | Surface soil (future) | 1 | No COCs |
| | Subsurface soil | 0.8 | No COCs |
| Adult Recreational User | Surface soil (current) | 0.09 | No COCs |
| | Surface soil (under cap) | 0.09 | No COCs |
| | Surface soil (future) | 0.1 | No COCs |
| | Subsurface soil | 0.08 | No COCs |
| Child Resident | Surface soil (current) | 5 | Arsenic |
| | Surface soil (under cap) | 6 | Arsenic |
| | Surface soil (future) | 8 | Arsenic |
| | Subsurface soil | 5 | Arsenic |
| Adult Resident | Surface soil (current) | 0.6 | No COCs |
| | Surface soil (under cap) | 0.6 | No COCs |
| | Surface soil (future) | 0.9 | No COCs |
| | Subsurface soil | 0.6 | No COCs |

Notes
1 The total receptor- or exposure unit-specific HI >1, but target organ-specific HIs do not exceed 1 (HIs are italicized).
2 HIs calculated on a target organ-specific basis ≤1; therefore, no primary risk drivers were identified for the exposure unit.
3 The total receptor- or exposure unit-specific HI >1 and target organ-specific HI(s) >1 (HIs are bolded).

HIs calculated on a target organ-specific basis for the industrial worker, child recreational user, and adult recreational user do not exceed 1, indicating no adverse non-carcinogenic health effects under the conditions established in the exposure assessment.

HIs for construction workers exposed to COPCs in surface soil (future), HIs for child residents exposed to COPCs in all media, and HIs for adult residents exposed to COPCs in groundwater exceed 1 and target organ-specific HIs exceed 1. Arsenic was the major contributor to the elevated HIs in soil.

Table 2-3b lists contaminants contributing an incremental lifetime cancer risk (ILCR) greater than $1\times10^{-6}$ for each receptor and soil exposure unit. Chemicals are considered primary risk drivers (i.e., COCs) if the cumulative risk estimate for the exposure unit exceeds $1\times10^{-4}$. The primary risk drivers in the following table are the predominant COPCs contributing to the medium-specific cancer risk estimates.

| TABLE 2-3B. CUMULATIVE CANCER RISK ESTIMATES FOR SOIL AT UXO 32 | | | |
|---|---|---|---|
| RECEPTOR | SOIL EXPOSURE UNIT | CANCER RISK ESTIMATE | PRIMARY RISK DRIVER |
| Construction Worker | Surface soil (current) | $1 \times 10^{-5}$ | No COCs (1) |
| | Surface soil (under cap) | $8 \times 10^{-6}$ | No COCs |
| | Surface soil (future) | $1 \times 10^{-5}$ | No COCs |
| | Subsurface soil | $1 \times 10^{-5}$ | No COCs |
| Industrial Worker | Surface soil (current) | $7 \times 10^{-5}$ | No COCs |
| | Surface soil (under cap) | $6 \times 10^{-5}$ | No COCs |
| | Surface soil (future) | $1 \times 10^{-4}$ | No COCs |
| | Subsurface soil | $7 \times 10^{-5}$ | No COCs |
| Lifelong Recreational User | Surface soil (current) | $5 \times 10^{-5}$ | No COCs |
| | Surface soil (under cap) | $3 \times 10^{-5}$ | No COCs |
| | Surface soil (future) | $6 \times 10^{-5}$ | No COCs |
| | Subsurface soil | $5 \times 10^{-5}$ | No COCs |
| Lifelong Resident | Surface soil (current) | $3 \times 10^{-4}$ (2) | Arsenic, BAP equivalents |
| | Surface soil (under cap) | $2 \times 10^{-4}$ | Arsenic; Aroclor-1260; 2,3,7,8-TCDD equivalents |
| | Surface soil (future) | $4 \times 10^{-4}$ | Arsenic; Aroclor-1260, BAP equivalents; 2,3,7,8-TCDD equivalents |
| | Subsurface soil | $3 \times 10^{-4}$ | Arsenic, BAP equivalents |

Notes
1 ILCRs do not exceed $1 \times 10^{-4}$; therefore, no primary risk drivers were identified for the exposure unit.
2 The total receptor- or exposure unit-specific ILCR exceeds $1 \times 10^{-4}$ (ILCRs are bolded).

Cumulative cancer risk estimates for all receptors are less than or within EPA's TCR range of $1 \times 10^{-4}$ to $1 \times 10^{-6}$ with the exception of lifelong residents. Arsenic, cPAHs (measured as BAP equivalents), Aroclor-1260, and dioxins/furans (measured as 2,3,7,8-TCDD equivalents) were the major contributors to the elevated ILCRs for lifelong residential exposure to soil. Dioxins/furans were analyzed only at the one verification sample location in the southeast corner of the Scrap Yard interior (black coal/ash layer beneath the concrete pad).

**Lead Risks**

Lead was identified as a COPC in surface soil at UXO 32. The maximum detected concentration in surface soil (9,800 mg/kg) exceeded the OSWER soil screening level of 400 mg/kg for residential land use. Average soil lead concentrations were used as EPCs for each respective soil exposure unit (see Table 2-4).

Hypothetical residential exposures to lead in surface soil were evaluated using EPA's Integrated Exposure Uptake Biokinetic (IEUBK) lead model (EPA, 1994 and 2010c). The child resident is the receptor of concern. The model results indicated lead concentrations in surface soil (under cap) and surface soil (future) exceed the EPA goal of no more than 5 percent of children exceeding a 10-µg/dL blood-lead level. Risks to construction workers, industrial workers, and adult recreational users exposed to lead in soil were evaluated using a slope factor approach developed by the EPA Technical Review Workgroup for lead (EPA, 2003b, 2009b). The fetus of a pregnant worker is the ultimate receptor of concern for the Technical Review Workgroup model. Results of the modeling indicated a pregnant construction worker exposed to lead in surface soil (under cap) exceeds EPA's goal of no more than 5 percent of children (i.e., fetuses of exposed women) exceeding a 10 µg/dL blood-lead level.

Exposure point concentrations (EPCs) used to calculate the risks attributable to each COC in each soil exposure unit are provided in Table 2-4.

**TABLE 2-4. EXPOSURE POINT CONCENTRATIONS USED FOR RISK CALCULATIONS**

| COPC / COC | EPCs by Soil Exposure Unit (mg/kg) | | | | Retained as COC for FS/ROD? |
|---|---|---|---|---|---|
| | Surface Soil (Current) | Surface Soil (Under Cap) | Surface Soil (Future) | Subsurface Soil | |
| DIOXINS/FURANS | | | | | |
| 2,3,7,8-TCDD Equivalents | NA | 0.000089 (1) | 0.000089 (1) | NA | Yes |
| METALS | | | | | |
| Arsenic | 114 (2) | 68.1 (3) | 143 (4) | 110 (5) | Yes |
| Cadmium | 1.8 (6) | 69 (1) | 13.1 (6) | NA | No |
| Lead | 65.1 (7) | 1672 (7) | 503 (7) | NA | Yes |
| Mercury | NA | 3.3 (1) | 3.3 (1) | NA | No |
| Zinc | NA | 3500 (1) | 3500 (1) | NA | No |
| POLYCYCLIC AROMATIC HYDROCARBONS | | | | | |
| BAP Equivalents | 0.35 (8) | NA | 0.36 (8) | 0.48 (1) | Yes |
| PCBS | | | | | |
| Aroclor-1260 | 0.25 (9) | 8 (6) | 4.4 (10) | NA | Yes |

Notes:
NA - Not applicable. Not a COPC for this medium.
1 -Maximum detected concentration
2 - 95% Approximate Gamma UCL
3 - 95% Student's-t UCL
4 - 95% H-UCL
5 - 97.5% KM (Chebyshev) UCL
6 - 95% KM (t) UCL
7 - Arithmetic Mean
8 - 95% KM (BCA) UCL
9 - 95% KM (Chebyshev) UCL
10 - 99% KM (Chebshev) UCL

### 2.7.2 Summary of Ecological Risk

Ecological risks in surface soil were addressed by the IRA completed in 2011. The 1999 RI and the 2004 Mattawoman Creek Study collectively determined no unacceptable ecological risks attributable to the site in creek sediment and surface water (see Table 2-1). Therefore, there are no ecological risks to be addressed by the remedy.

### 2.7.3 Basis for Action

Unacceptable human health risks were estimated for hypothetical future residential exposure to arsenic, lead, cPAHs (measured as BAP equivalents), Aroclor-1260, and dioxins/furans (measured as 2,3,7,8-TCDD equivalents) in soil at UXO 32 – Scrap Yard. Because unacceptable risks were identified, the response action selected in this ROD is necessary to protect public health or welfare and the environment from actual or threatened releases of hazardous substances into the environment. Groundwater will be addressed separately in the future as IRP Site 70.

## 2.8 REMEDIAL ACTION OBJECTIVES (RAOS)

RAOs are medium-specific goals that help to define the objective of the remedial actions to protect human health and the environment. RAOs can specify the COCs, potential exposure routes and receptors, and acceptable concentrations (i.e., cleanup levels or SRGs) for a site and provide a general description of what the cleanup will accomplish. RAOs typically serve as the design basis for the remedial alternatives described in Section 2.8.

Based on the potential pathways, receptors of concern, and current and potential future land use scenarios, the RAO for UXO 32 soil is as follows:

Reduce or eliminate risk to human receptors posed by direct contact with contaminated soil. These risks are associated with human receptors exposed to surface and subsurface soil.

No RAOs are needed for sediment or surface water. Groundwater is being addressed separately in the future as IRP Site 70.

In the FFS, two remedial alternatives were developed to satisfy the RAO. Arsenic; lead; BAP equivalents; Aroclor-1260; and 2,3,7,8-TCDD equivalents are the COCs identified in soil. The SRGs are as follows Table 2-2a) for each COC for residential and construction worker exposures to soil.

| Selected Site Remediation Goals (SRGs) | | |
|---|---|---|
| Chemical | SRG (mg/kg) | SRG Basis |
| **Construction Worker** | | |
| 2,3,7,8-TCDD Equivalents | 2.0E-03 | TCR=$10^{-5}$ |
| Arsenic | 44.7 | HI=1 |
| Lead | 800 | EPA RSL |
| BAP Equivalents | 21.25 | TCR=$10^{-5}$ |
| Aroclor-1260 | 75.6 | TCR=$10^{-5}$ |
| **Hypothetical Future Resident** | | |
| 2,3,7,8-TCDD Equivalents | 4.5E-05 | TCR=$10^{-5}$ |
| Arsenic | 14.9 | Background |
| Lead | 400 | EPA RSL |
| BAP Equivalents | 0.584 | Background |
| Aroclor-1260 | 2.2 | TCR=$10^{-5}$ |

The selection of SRGs is presented in Table 2-5. The PRGs were selected from the following: (1) EPA RSLs for lead; (2) the most conservative RGO from the 2012 Updated HHRA, not less than background, based on a TCR of $1 \times 10^{-5}$ and HI equal to 1. Residential TCRs were based on lifelong residents, whereas the HIs were based on child resident.

**Table 2-5. Selection of Site Remediation Goals (SRGs) for Soil**

| Chemcial | EPA Industrial RSL (mg/kg) | NSF-IH Soil Background (mg/kg) | Target Cancer Risk Level $10^{-6}$ (mg/kg) | Target Cancer Risk Level $10^{-5}$ (mg/kg) | Target Cancer Risk Level $10^{-4}$ (mg/kg) | Hazard Index = 1 (mg/kg) |
|---|---|---|---|---|---|---|
| CONSTRUCTION WORKER | | | | | | |
| 2,3,7,8-TCDD Equivalents | 1.8E-05 | -- | 1.5E-04 | 2.0E-03 | 1.5E-02 | 5.6E-03 |
| Arsenic | 1.6 | 14.9 | 11.7 | 117 | 1173 | 44.7 |
| Lead | 800 | 62.5 | NA | NA | NA | NA |
| Benzo(a)pyrene Equivalents | 0.21 | 0.584 | 2.125 | 21.25 | 212.5 | NA |
| Aroclor-1260 | 0.74 | -- | 7.56 | 75.6 | 756 | NA |
| RESIDENT | | | | | | |
| 2,3,7,8-TCDD Equivalents | 4.5E-06 | -- | 4.5E-06 | 4.5E-05 | 4.5E-04 | 7.2E-05 |
| Arsenic | 0.39 | 14.9 | 0.39 | 3.9 | 39 | 21.6 |
| Lead | 400 | 62.5 | NA | NA | NA | NA |
| Benzo(a)pyrene Equivalents | 0.015 | 0.584 | 0.015 | 0.15 | 1.5 | NA |
| Aroclor-1260 | 0.22 | -- | 0.22 | 2.2 | 22 | NA |

The Area of Attainment is defined as the area over which the RAOs, and therefore the SRGs, are to be met. Figure 2-5 shows two Areas of Attainment: one considering the construction worker SRG exceedances and the other considering the residential SRG exceedances. The more conservative (larger) residential Area of Attainment, measuring 2.5 acres, will be retained as the LUC boundary associated with UXO 32 soil. Institutional controls will restrict this area from residential development and notify construction workers of potential risks.

**FIGURE 2-5. AREA OF ATTAINMENT FOR SOIL**


## 2.9 DESCRIPTION OF ALTERNATIVES

The UXO 32 remedial alternatives and components are presented in Table 2-6. More detailed descriptions can be found in the Tt (2013) Focused FS Report.

**TABLE 2-6. SUMMARY OF REMEDIAL ALTERNATIVES EVALUATED**

| ALTERNATIVE | COMPONENT | DETAILS | COST |
|---|---|---|---|
| **Alternative 1 – No Action**<br>*No action to address contaminated soil and no use restrictions* | None | No action; five-year reviews would be implemented because unacceptable risk would remain at the site. | **Capital:** $0<br>**Time frame to achieve RAO:** Not applicable |
| **Alternative 2 – LUCs**<br>*Implementation of LUCs prevent and/or restrict exposure to contaminants in soil* | LUCs | Implementation of LUCs to prevent residential development and to provide notifications to construction workers performing intrusive activities within the Area of Attainment. | **Capital**: $8,000<br>**30-Year PV of Periodic Costs (no O&M):** $223,000<br>**30-Year PV**: $231,000<br>**Time frame to achieve RAO**: ~3 months |
| | Five-Year Reviews | Site reviews to evaluate site status, review regulatory and toxicity value changes, and to provide direction for further action if required to ensure continued protectiveness of the remedy. | |

## 2.10 COMPARATIVE ANALYSIS OF ALTERNATIVES

Table 2-7 and subsequent text in this section summarize the comparison of the remedial alternatives with respect to the nine CERCLA evaluation criteria, which are categorized as threshold, primary balancing, and modifying, and are outlined in the NCP at 40 Code of Federal Regulations (CFR) 300.430(e)(9)(iii). Further information on the detailed comparison of remedial alternatives is presented in the UXO 32 FS.

**TABLE 2-7. SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES**

| CERCLA CRITERION | ALTERNATIVE 1<br>NO ACTION | ALTERNATIVE 2<br>LAND USE CONTROLS (LUCs) |
|---|---|---|
| Overall Protection of Human Health and the Environment | Not protective of human health. Ecological risks addressed previously by Interim Removal Action (therefore, no protection issue for environment). | Protective of human health, as land use restrictions would prevent or minimize future exposure to the contaminated soil. Ecological risks addressed previously by Interim Removal Action (therefore, no protection issue for environment). |
| Compliance with Applicable or Relevant and Appropriate Requirements (ARARs) | Not applicable. | Not applicable. There are no ARARs associated with this remedial alternative. |
| Long-Term Effectiveness and Permanence | There would be no reduction in risk to human or ecological receptors under this alternative. | The LUCs once in place are expected to be adequate and reliable, based on their continued implementation. Use restrictions, which prevent construction and other intrusive activities on the contaminated soil, must be enforced. |
| Reduction of Toxicity, Mobility, and Volume through Treatment | This alternative does not include treatment. | This alternative does not include treatment. |
| Short-Term Effectiveness | No impact to community, workers, and the environment from remedial activities because this alternative involves doing nothing. RAOs and remediation goals cannot be achieved within a reasonable time frame. | There are no construction activities associated with this alternative, and thus the short-term impacts on workers, the community, or the environment are minimal. The RAO will be achieved immediately upon implementation (~3 months following ROD). |
| Implementability | Has no ability to monitor the effectiveness of this remedy and ability to obtain approvals from other agencies is unlikely. | Easily implemented but requires long-term administrative commitment. |
| Total Cost<br>(Present Value [PV]) | $0 | Implementation / Capital Cost: $8,000<br>PV of Future Periodic Costs: $223,000<br>Total PV Cost of Remedy: $231,000<br>Cost is based on 30-year timeframe assumption. |

## Threshold Criteria

***Overall Protection of Human Health and the Environment.*** Alternative 2 would protect human health and the environment by eliminating the exposure route to soil contaminated above industrial standards. No unacceptable ecological risk remains following the IRA completed in 2011. The No Action alternative (Alternative 1) is not protective of human health and the environment because it does not prevent or limit any of the remaining unacceptable risks from exposure to COCs at the Site. Therefore, it cannot be selected as the preferred alternative and will not be considered further in this analysis

***Compliance with ARARs.*** No chemical-, location-, or action-specific federal or state ARARs apply to either alternative. Therefore, the evaluation of this criterion is not applicable.

## Primary Balancing Criteria

***Long-Term Effectiveness and Permanence***. LUCs are expected to be adequate and reliable, based on their continued implementation. Use restrictions, which prevent construction and other intrusive activities on the contaminated soil, must be enforced.

***Reduction in Toxicity, Mobility, or Volume Through Treatment***. None of the alternatives would use treatment to reduce the toxicity, mobility, or volume of hazardous substances.

***Short-Term Effectiveness***. There are no construction activities associated with Alternative 2, and thus the short-term impacts on workers, the community, or the environment are minimal. The RAO will be achieved almost immediately.

***Implementability***. Alternative 2 is easily implemented, but requires long-term administrative commitment. However, the LUCs could be strictly enforced because the site is located within a military facility.

***Cost***. The estimated present value cost of Alternative 2 is $231,000 (estimated for a 30-year timeframe, although LUCs will be maintained in perpetuity).

### Modifying Criteria

***State Acceptance***. State involvement has been solicited throughout the CERCLA process. MDE has indicated its support for Alternative 2; MDE concurs with the Selected Remedy (Appendix A).

***Community Acceptance***. Written questions received during the formal public comment period for the Proposed Plan and Navy responses are provided in Section 3.0. The questions raised at the public meeting on August 21, 2013, were general inquiries for informational purposes only; no objections to the proposed alternative were voiced.

## 2.11 PRINCIPAL THREAT WASTE

The NCP at 40 CFR 300.430(a)(1)(iii)(A) establishes an expectation that treatment will be used to address the principal threats posed by a site wherever practicable. Principal threat wastes are those source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained or that would present a significant risk to human health or the environment should exposure occur. A source material is a material that includes or contains hazardous substances, pollutants, or contaminants that act as a reservoir for migration of contamination to groundwater, surface water, or air, or acts as a source for direct exposure. Principal threat wastes are not present at UXO 32.

## 2.12 SELECTED REMEDY

The Selected Remedy for the UXO 32 is Alternative 2 – LUCs. Figure 2-5 shows the Area of Attainment for soil (i.e., LUC boundary to be enforced) based on exceedances of the more conservative residential-based SRGs. The Area of Attainment based on the construction worker SRGs also is shown for reference.

### 2.12.1 Rationale for Selected Remedy

The Selected Remedy for UXO 32 is Alternative 2 – LUCs, which was selected because it provides the best balance of tradeoffs with respect to the nine evaluation criteria. Based on the results of investigations and IRA conducted, the Navy, EPA, and MDE have determined that this alternative will be protective of human health and the environment through implementation and enforcement of land use restrictions and administrative inspection and reporting requirements.

The principal factors in the selection of this remedy included the following:

- It is the most effective solution that addresses the RAO and can be implemented in a short period (approximately 3 months) while allowing the Navy to continue to complete its mission.
- The remedy is consistent with the reasonably anticipated future non-residential use of the site.

### 2.12.2 Description of Selected Remedy

The Selected Remedy includes instituting LUCs to protect human health by ensuring that there is no residential development (i.e., including but not limited to single family homes, daycare centers, elementary and secondary schools, playgrounds, and nursing homes) and that construction workers are notified of potential risks prior to exposure to soil during intrusive activities. The boundary of the LUCs enforcement area will correspond to the Area of Attainment for residential risks (Figure 2-5). This larger residential Area of Attainment subsumes the smaller construction worker-specific Area of Attainment shown on Figure 2-5 for reference.

Consistent with the RAO developed for UXO 32 soil, the specific performance objectives for the LUCs to be implemented are to prohibit (i) residential development and (ii) construction activities—without appropriate HAZWOPER notification and the use of the proper personnel protective equipment—as long as contaminants at the site are at levels that do not allow for UU/UE, unless prior written approval is obtained from the Navy, EPA, and MDE.

The following generally describes those LUCs that will be implemented at UXO 32 to achieve the aforementioned LUC performance objectives:

- Incorporation of the LUCs and the associated site area into the facility's geographic information system.
- Incorporation of use restrictions into any real estate property documents (i.e., deeds or leases) associated with future sale or lease of the site.
- Annual inspections to ensure that there are no violations of these restrictions and to evaluate the effectiveness of the Selected Remedy. The Installation Commander will provide annual certification of the inspections to EPA and MDE.
- If a violation of the restrictions occurs, a description of the violation and the corrective actions to be taken to restore protectiveness will be reported to EPA and MDE.

LUCs will be required as long as soil contamination remains in place at the site at levels that do not permit UU/UE. The Navy is responsible for implementing, maintaining, reporting on, and enforcing the LUCs described in this ROD. Although the Navy may later transfer these procedural responsibilities to another party by contract, property transfer agreement, or through other means, the Navy shall retain ultimate responsibility for the remedy integrity.

The LUC implementation actions including enforcement requirements will be provided in an LUC RD that will be prepared by the Navy. Within 90 days of ROD signature, the Navy shall prepare and submit to EPA and MDE for review and comment (pursuant to those Primary Document review procedures stipulated in the FFA) the LUC RD for UXO 32 that shall contain implementation and maintenance actions, including periodic inspections. The Navy will maintain, monitor, and enforce the LUCs according to the ROD and LUC RD. Implementation of this remedy will require annual visual inspections and reporting, as well as five-year reviews.

At least every 5 years, a site review would be conducted to evaluate the site status and to determine whether further action is necessary. The site reviews are required because this alternative would allow soil contaminants to remain at the site in excess of levels that allow for UU/UE.

### 2.12.3 Summary of Estimated Remedy Costs

The cost estimate for the Selected Remedy is provided in Table 2-8 and summarized below.

| Alternative 2 – LUCs | |
|---|---|
| Implementation/Capital Cost | $8,000 |
| PV Future Costs | $223,000 |
| Total PV Cost | $231,000 |

The implementation, or capital, cost of approximately $8,000 is associated with generating and implementing the LUC Remedial Design. There are no actual O&M activities, but rather the ancillary task and cost of maintaining the LUC boundaries on the facility GIS and coordinating the independent work permitting process at NSF-IH. Future periodic costs incurred are associated with annual LUC inspections and the Five-Year Reviews. Although the RAO would be achieved immediately upon implementation, the LUCs must remain in place until contamination levels allow for UU/UE. Therefore, the future periodic costs are estimated over a 30-year duration for the purpose of cost estimating, per EPA guidance. The Present Value for this timeframe is approximately $223,000, calculated using a real discount rate of 1.1 percent, per the White House Office of Management and Budget (OMB) (2012). The total present value of this alternative is estimated at $231,000.

### 2.12.4 Expected Outcomes of Selected Remedy

Current industrial/commercial land use, which will be supported by the Selected Remedy, is expected to continue at UXO 32, and there are no other planned land uses in the foreseeable future. The IRA addressed risks in soil for current industrial workers. Groundwater is being addressed separately as IRP Site 70. The remaining human health risks for soil are for the hypothetical future residential scenario and the construction worker scenario. LUCs will prevent residential development at the Site, and will provide notification to construction workers of potential HAZWOPER issues prior to any intrusive activities (e.g., utility maintenance). Because there is no unacceptable risk to ecological receptors (the IRA addressed ecological risks), they will remain unaffected.

There are no anticipated socio-economic, community revitalization, or economic impacts associated with the Selected Remedy. It is estimated that the RAO will be achieved immediately upon implementation of the remedy. Because soil contamination will remain at the site, LUCs are expected to be required until contamination levels allow for UU/UE.

## TABLE 2-8. COST ESTIMATE FOR ALTERNATIVE 2 – LUCS

| Item/Activity | Qty | Unit | Unit Cost | Cost | Notes & Comments |
|---|---|---|---|---|---|
| **Implementation/Capital Cost** | | | | | |
| Institutional Controls / Land-Use Controls | | | | | |
| LUC Remedial Design and implementation into Navy's *LUC Tracker* | 1 | each | $8,000 | $8,000 | Includes Draft and Final LUC Plans. Assume contractor prepares LUC RD. No survey plat requiried. |
| **Total Implementation Cost** | | | | **$8,000** | Capital Cost |
| **Future Periodic Costs (30 years) [No O&M]** | | | | | |
| LUCs (Years 1-30) | | | | | |
| Annual Inspections and reporting (1 per year) | 30 | year | $6,000 | $180,000 | 1 inspection per year at $6,000 per inspection -- for 30 yrs. Includes contractor performing site inspections and reporting. Includes miscellaneous maintenance. |
| *Subtotal* | | | *$6,000* | *$180,000* | |
| | | | | | |
| *Project Management* | *10%* | | *$600* | *$18,000* | |
| *Subtotal* | | | *$6,600* | *$198,000* | |
| | | | | | |
| LUCs Future Annual Cost | | | $6,600 | | |
| LUCs Total Future Cost | | | | $198,000 | |
| | | | | | |
| *Present Value (1.1%) of Future Cost of LUCs* | 30 | *year* | *1.1%* | *$167,868* | *Y2013 PV calculated for future cost using Real Discount Rate per OMB (2012).* |
| 5-Year Reviews (Years 5, 10, 15, 20, 25, and 30) | | | | | |
| 5-Year Review | 6 | each | $10,000 | $60,000 | 5YR conducted once every 5 years. To be conducted in conjunction with other post-ROD sites at NSF Indian Head. Years, 5, 10... and 30. Includes pre-draft, draft, and final 5YR, summary fact sheet, and public notices. |
| *Subtotal* | | | *$10,000* | *$60,000* | |
| | | | | | |
| *Project Management* | *10%* | | *$1,000* | *$6,000* | |
| *Subtotal* | | | *$11,000* | *$66,000* | |
| | | | | | |
| 5YR Future Annual Cost at Years 5, 10... and 30 | | | $11,000 | | |
| 5YR Total Future Cost | | | | $66,000 | |
| | | | | | |
| *Present Value (1.1%) of Future Cost of 5YRs* | 30 | *year* | *1.1%* | *$54,738* | *Y2013 PV calculated for future cost using Real Discount Rate per OMB (2012).* |
| **Total Present Value of Future Periodic Costs** | | | | **$222,606** | Y2013 PV calculated for 30-yrs-future-cost using Real Discount Rate of 1.1% per OMB (2012). |
| | | | | | |
| Total Present Value Cost | | | $230,600 | | Total Lifetime Cost (not Present Value) = $272,000 |
| | | | -30% = | $161,400 | |
| | | | +50% = | $345,900 | |

**Notes:**

Assumptions: LUC RD prepared by contractor. 5-Year Review (5YR) performed with other post-remedy 5YR sites at NSF Indian Head. Annual inspections and reports performed by contractor. No operation and maintenance (O&M) is associated with this remedial alternative.

The 30-year timeframe is evaluated for purpose of costing -- LUCs will need to be maintained in perpetuity.

The "Real" Discount Rate used to calculate the Present Value (PV) is timeframe dependent per the Office of Management and Budget (OMB), *Circular A-94, Appendix C, Revised December 2012, "Discount Rates for Cost Effectiveness, Lease Purchase, and Related Analysis" for Calendar Year 2013* ,

*The Real Discount Rates are a forecast of real interest rates from which the inflation premium has been removed and based on the economic assumptions from the 2014 Budget Baseline. These real rates are to be used for discounting constant-dollar flows, as is often required in cost-effectiveness analysis.*

EPA. 1988. *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA* . OSWER Directive 9355.3-01. EPA/540/G-89/004. October.

EPA. 2000. *A Guide to Developing and Documenting Cost Estimates During the Feasibility Study* . With the U.S. Army Corps of Engineers. OSWER 9355.0-75. EPA 540-R-00-

The information in this cost estimate is based on the best available information regarding the anticipated scope of the remedial alternative. Changes in the cost elements can occur as a result of new information and data. This is an order-of-magnitude engineering cost estimate that is expected to be within -30 to +50 percent of the actual project cost (per EPA, 1988 and 2000).

## 2.13 STATUTORY DETERMINATIONS

Remedial actions must meet the statutory requirements of Section 121 of CERCLA. Remedial actions undertaken at NPL sites must achieve adequate protection of human health and the environment, comply with ARARs, be cost-effective, and use to the maximum extent practicable permanent solutions and alternative treatment or resource recovery technologies. In addition, CERCLA states a preference for remedies that employ treatment that permanently and significantly reduces the volume, toxicity, and/or mobility of hazardous waste as the principal element and a bias against offsite disposal of untreated wastes. The Selected Remedy meets the following statutory determinations:

- **Protection of Human Health and the Environment** – The Selected Remedy will protect human health through implementation of LUCs prohibiting residential development (i.e., preventing residential exposure) and providing for notice to construction workers of potential risks prior to any intrusive activities.

- **Compliance with ARARs** – Not applicable, as there are no ARARs associated with the Selected Remedy.

- **Cost-Effectiveness** – The Selected Remedy is a cost-effective alternative that protects human health and the environment and maximizes continued property usage for the Navy.

- **Utilization of Permanent Solutions and Alternative Treatment Technologies or Resource Recovery Technologies to the Maximum Extent Practicable** – The Navy, EPA, and MDE have concluded that the Selected Remedy represents the maximum extent to which permanent solutions and treatment technologies can be used in a practical manner at UXO 32. Based on the type and volume of contamination remaining at UXO 32 following the IRA (i.e., large volume of contaminated soil posing a relatively low long-term threat), no treatment alternatives were evaluated for UXO 32 in the FS (Tt, 2001) and the Focused FS (Tt, 2013). The Navy, EPA, and MDE believe that the Selected Remedy provides the best balance of tradeoffs in terms of the balancing criteria, while also considering state and community acceptance.

- **Preference for Treatment as a Principal Element** – Treatment is not an element of the Selected Remedy for soil at UXO 32 because there are no principal threat wastes at the site. Considering the IRA, LUCs provides the best balance of tradeoffs with respect to long-term effectiveness and permanence at a reasonable cost.

- **Five-Year Review Requirement** – Because this remedy will result in hazardous substances, pollutants, or contaminants remaining on site in excess of levels that allow for UU/UE, a statutory remedy review will be conducted within 5 years after initiating the remedial action (and every 5 years thereafter) until site conditions allow for UU/UE to ensure that the remedy continues to provide adequate protection of human health and the environment.

## 2.14 DOCUMENTATION OF SIGNIFICANT CHANGES

CERCLA Section 117(b) requires an explanation of significant changes from the Selected Remedy presented in the Proposed Plan that was published for public comment.

Several general questions were asked during the public meeting held on August 21, 2013, and formal comments were received from the public during the comment period. No significant changes to the remedy, as originally identified in the Proposed Plan, were necessary or appropriate.

# 3.0 RESPONSIVENESS SUMMARY

## 3.1 STAKEHOLDER COMMENTS AND LEAD AGENCY RESPONSES

The 30-day public comment period for the Selected Remedy for UXO 32 began on July 29, 2013, and ended on August 28, 2013. A public meeting was held on August 21, 2013, at the Indian Head Senior Center, 100 Cornwallis Square, Indian Head, Maryland, to accept oral and written comments on this decision. A summary of the oral and written comments received during the public comment period, and responses to those comments, are included as Appendix B.

## 3.2 TECHNICAL AND LEGAL ISSUES

No technical or legal issues have been identified for UXO 32 with respect to this ROD.

# REFERENCES


CFR (Code of Federal Regulations). Codification of the general and permanent rules published in the Federal Register by the executive departments and agencies of the U.S. Federal Government. http://www.gpoaccess.gov/cfr/index.html.

DoD (Department of Defense), 2004. *Memorandum: CERCLA ROD and Post-ROD Policy*. January 16.

E/A&H (Ensafe/Allen & Hoshall), 1994. *Final SI Report, Phase II, Indian Head Division, Naval Surface Warfare Center.* March.

EPA (U.S. Environmental Protection Agency), 1988. *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA*.

EPA, 1992. *CERCLA/SUPERFUND Orientation Manual*. EPA-542-R-92-005. October.

EPA, 1993. *Guidance on Conducting Non-Time Critical Removal Actions Under CERCLA*. EPA-540-R-93-057. August.

EPA, 1994. *Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities*. Office of Solid Waste and Emergency Response, Washington, D.C. Directive 9355.4-12, July.

EPA. 1997. *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments*. Interim Final. EPA-540-R-97-006.

EPA, 2000. *A Guide to Developing and Documenting Cost Estimates During the Feasibility Study*. With the U.S. Army Corps of Engineers. OSWER 9355.0-75. EPA-540-R-00-002. July.

EPA, 2003. *Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil*. EPA-540-R-03-001. December 1996 finalized January.

EPA, 2005. *Superfund Community Involvement Handbook*. EPA-540-K-05-003. April.

EPA, 2009. *Update of the Adult Lead Methodology's Default Baseline Blood Lead Concentration and Geometric Standard Deviation Parameters*. Office of Superfund Remediation and Technology Innovation, Washington, D.C. OSWER 9200.2-82.

EPA, 2010. Integrated Exposure Uptake Biokinetic Model for Lead in Children, Windows® version (IEUBKwin v 1.1 Build 11). February.

Navy (Department of Navy), 1999. *Navy Policy for Conducting Ecological Risk Assessments*. Chief of Naval Operations. April 5.

Navy, 2000. *Federal Facility Agreement* Under CERCLA Section 120, Administrative Document No. III-FCA-CERC-018. Signed by Navy and U.S. EPA. December 9.

Navy, 2001. *Proposed Plan for Site 41 – Scrap Yard, Indian Head Division, Naval Surface Warfare Center, Indian Head, Maryland*. February.

Navy, 2002. *Action Memorandum and Engineering Evaluation Cost Analysis (EE/CA), Removal Action at Site 41 - Scrap Yard, Indian Head Division, Naval Surface Warfare Center, Indian Head, Maryland*. June 27.

Navy, 2006. *Department of the Navy Environmental Restoration Program (NERP) Manual*. August.

Navy, 2013. *Proposed Plan for UXO 32 – Scrap Yard (Soil, Sediment, and Surface Water), Naval Support Facility Indian Head, Maryland*. July.

NEESA (Navy Energy and Environmental Support Activity), 1983*. Initial Assessment Study (IAS) of Naval Ordnance Station, Indian Head, Indian Head, Maryland.* Prepared by Fred C. Hart Associates, Inc. May.

NEESA. 1992. *Preliminary Assessment (PA), NSWC, Indian Head Division, Indian Head, Maryland.* Addendum to the Initial Assessment Study (IAS). January.

Shaw, 2011. *Final Construction Completion Report Remedial/Removal Action at Unexploded Ordnance 32 Scrap Yard, Indian Head Division, Naval Surface Warfare Center, Indian Head, Maryland*. August.

Tt (Tetra Tech), 1999. *Remedial Investigation (RI) Report, Site 12 (Town Gut Landfill), Site 39/41 (Organics Plant/Scrap Yard), Site 42 (Olsen Road Landfill), and Site 44 (Soak Out Area), Indian Head Division, Naval Surface Warfare Center, Indian Head, Maryland*. July.

Tt, 2001. *Feasibility Study (FS) Report, Site 12 (Town Gut Landfill) and Site 41 (Scrap Yard), Indian Head Division, Naval Surface Warfare Center, Indian Head, Maryland*. January.

Tt, 2002a. *Remedial Action Design for Site 41 – Scrap Yard, Indian Head Division, Naval Surface Warfare Center, Indian Head, Maryland*. August.

Tt, 2002b. *Background Soil Investigation Report for Indian Head and Stump Neck Annex, Indian Head Division, Naval Surface Warfare Center, Indian Head, Maryland*. October.

Tt, 2004. *Mattawoman Creek Study, Indian Head Division Naval Surface Warfare Center Indian Head, Maryland*. January.

Tt, 2006. *Feasibility Study Report for Site 57 – Building 292 TCE Contamination, Naval Support Facility Indian Head, Maryland*. July.

Tt, 2011. *Uniform Federal Policy – Sampling and Analysis Plan (UFP-SAP), CERCLA Groundwater Remedial Investigation for UXO 32, Site 41 – Scrap Yard, Naval Support Facility Indian Head, Maryland*. June.

Tt, 2012a. *Human Health Risk Assessment for UXO 32 – Scrap Yard, Naval Support Facility Indian Head, Indian Head, Maryland*. February.

Tt, 2012b. *Site Management Plan for Fiscal Year 2012-2013, Naval Support Facility Indian Head, Indian Head, Maryland*. September.

Tt, 2013. *Focused Feasibility Study, UXO 32 –Scrap Yard (Soil), Naval Support Facility Indian Head, Indian Head, Maryland*. July.

USC (United States Code). Codification by subject matter of the general and permanent laws of the U.S. Federal Government published by the Office of the Law Revision Counsel of the U.S. House of Representatives. http://www.gpoaccess.gov/uscode/index.html.

# Appendix A
# Concurrence Letter from the Maryland Department of the Environment

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**MARYLAND DEPARTMENT OF THE ENVIRONMENT**
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March 19, 2014

Mr. Joseph Rail, P.E.
NAVFAC Washington
Washington Navy Yard, Bld. 212
1314 Harwood Street SE
Washington, DC 20374-5018

Re: Final Record of Decision UXO 32 – Scrap Yard (Soil, Surface Water, and Sediment), Naval Support Facility Indian Head – March 2014

Dear Mr. Rail:

The Federal Facilities Division (FFD) of the Maryland Department of the Environment's Land Restoration Program has completed its review of the above referenced document. This Record of Decision documents the Navy's selected remedy for UXO 32 – Scrap Yard, which is located on the Main Area of the Naval Support Facility Indian Head. The selected remedy is entitled, "Land Use Controls". The remedy consists of the following elements: (1) incorporation of the land use controls and the associated site area into the facility's geographic information system to prohibit residential development and construction activities without prior approval (2) incorporation of use restrictions into any real estate property documents (i.e., deeds or leases) associated with future sale or lease of the site (3) annual inspections, including 5-year reviews, to ensure that there are no violations of these restrictions. It is important to note that this Record of Decision covers only soil, surface water and sediment at UXO – 32. Groundwater will be addressed separately in a future document.

The selected remedy is based upon the human health and ecological risk assessments performed during previous investigations. The remedy selected by the Navy is in compliance with the Comprehensive Environmental Response, Compensation and Liability Act.

On August 21, 2013, the Navy held a public meeting to present the findings in the Proposed Plan (PP). Several questions were asked during the public meeting and multiple comments were received during the public comment period. No changes were made to the PP as a result of these comments. Based upon the acceptable level of protection to human health and the environment provided by the remedy, the FFD concurs with the Navy's selected remedy for UXO 32 – Scrap Yard.

If you have any questions, please contact me at (410) 537-3791.

Sincerely,

Curtis DeTore
Geological Supervisor
Federal Facilities Division

CD:cd

cc: Mr. Dennis Orenshaw
Mr. Horacio Tablada
Mr. James Carroll

# Appendix B
# Responses to Public Comments on the UXO 32 Proposed Plan

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APPENDIX B

# Responses to Public Comments on the UXO 32 Proposed Plan

The 30-day public comment period for the Selected Remedy for UXO 32 began on July 29, 2013, and ended on August 28, 2013. A public meeting was held on August 21, 2013, at the Indian Head Senior Center, 100 Cornwallis Square, Indian Head, Maryland, to accept oral and written comments on this decision. Several questions were raised during the open discussion at the August 21, 2013 public meeting on the UXO 32 Proposed Plan; these are paraphrased below along with the Navy, EPA, and MDE's consolidated response in italics. In addition, several other questions and comments were received during the public comment period. These comments are presented below as received, and include Navy, EPA, and MDE's consolidated response in italics.

## Comments during Public Meeting - Received on August 21, 2013

1. Why isn't groundwater being addressed as part of UXO 32?

***Response:*** *Navy, EPA, and Maryland Dept. of Environment concur that moving forward with a CERCLA response for groundwater at UXO 32 based on the current data is not feasible. The current data suggest an upgradient source or sources of chlorinated solvents and some metals that may not be related or solely attributed to UXO 32. Therefore, the Team decided to designate a new site called Site 70-Groundwater Contamination Along Water Works Way and complete a Remedial Investigation for groundwater.*

2. Are scrap materials currently being stored or sent to the Scrap Yard-UXO 32?

***Response****: No, scrap materials no longer are stored or sent to UXO 32 – Scrap Yard. The area is used for equipment and materials storage.*

3. What is the difference between an institutional control (IC) and land use control (LUC)? Are they the same? What are examples of each?

***Response****: LUCs collectively refer to (a) Institutional Controls (ICs) and/or (b) engineering controls, both of which are used to minimize the potential for human exposure to contamination by limiting land and resource use. ICs are administrative and/or legal tools that do not involve construction or physically changing the site. They include legal deed restrictions and property-owner/controller-enforced environmental use restrictions to minimize exposure to environmental medium (e.g., soil or groundwater) by certain receptors (e.g., residential or industrial/commercial). Engineering controls include physical solutions such as fencing or a barrier (e.g., landfill cap) to restrict access to a contaminated medium. ICs are the only component of LUCs to be implemented at UXO 32. The concrete pad and fencing at UXO 32 are not specific engineering controls to be maintained for protectiveness. The concrete pad was left in place for convenience and the fence is a best management practice for the Navy to secure storage areas.*

4. Why wasn't the concrete pad completely removed, all residual contamination addressed and/or removed, and a new concrete pad installed?

***Response**: The pad existed prior to any investigation or removal at the site. The pad was fully uncovered and evaluated during the investigations and removal action. It was decontaminated and left in place for convenience, as a cost savings, and for sustainability (not to dispose of concrete unnecessarily). Clean fill and gravel were imported to re-grade the site (excavated areas and uneven/sloped portions of the pad) to make it usable again for the Navy. The pad is not a specific engineering control to be maintained for protectiveness. Navy, EPA, and Maryland Dept. of Environment concur that full excavation of all residual contamination was not necessary considering the Navy's continued industrial/commercial use of the site.*

5. Is residual contamination that's present underneath the concrete pad migrating to and contaminating the Mattawoman Creek? If not, what prevents it from doing so?

***Response**: Based on the historical investigations, interim removal action observations, risk assessments, and the conceptual site model (CSM), remaining residual contamination and soils are not migrating beneath the concrete pad to Mattawoman Creek; and contaminated groundwater is not discharging to the creek at levels warranting any action. The groundwater is under additional investigation as a new site called Site 70 – Groundwater Contamination Along Water Works Way.*

## Email Comments from ARARAT – Received on August 13, 2013

1. Was the concrete pad put in after the removal of the contaminated soil?

***Response**: No. The pad existed prior to any investigation or removal at the site. Over many years, scrap metal, munitions, and soil were dumped on top of the concrete pad. The pad was fully uncovered and evaluated during the investigations and removal action. It was decontaminated and soils were removed outside its footprint to meet industrial standards. Then clean fill and gravel were imported to re-grade the site to make it usable again for the Navy.*

2. Why do we have a fence around some contaminated areas and not around others? (Possibly due to their closeness to Mattawoman activity--boating, fishing, etc.??)

***Response**: The fence surrounds the storage area only -- it is not meant to be an engineering control to prevent exposure to Site soils, rather, it's a physical safety and security feature.*

3. Why is the groundwater issue for UXO 32 being deferred to another day?

***Response**: Navy, EPA, and Maryland Dept. of Environment concur that moving forward with a CERCLA response for groundwater at UXO 32 based on the current data is not feasible. The data suggest an upgradient source or sources of chlorinated solvents and some metals that may not be related to UXO 32 also contribute to groundwater contamination in the vicinity of the site. Therefore, the Team decided to designate a new site called Site 70-Groundwater Contamination Along Water Works Way and complete a Remedial*

*Investigation for groundwater. It's not meant to extend the duration to complete site closure, but rather to identify the relevant source and remediate as appropriate.*

## Letter Comments from ARARAT – Received on August 27, 2013

1. We would like to know more specifically what safeguards (clothing, masks, gloves, etc.) employees had to comply with [during the interim removal action]. We would also like to know if there was and is an identifier (sign) for the site that indicates the level of contamination and what employees must adhere to before entering the area?

***Response:*** *Work zones and Personal Protective Equipment (PPE) during the removal action construction were specified for (a) protection from explosive materials and (b) minimizing exposure to environmental contaminants/materials in the scrap, soil, concrete, rubble, etc., and (c) appropriate decontamination. Additional details can be found in the Shaw (2010) Removal Action Work Plan (Appendix E is the Site Specific Health and Safety Plan). Following the removal of all scrap (performed as if all were potentially explosive items), the traditional dig and haul portion of construction continued, depending on work component/activity, under HAZWOPER PPE Level D, modified Level D, and/or Level C. Level D consists of hard hat, steel-toe work boots, safety eyewear, gloves, and hearing protection. Modified level D adds Tyvek coveralls. Level C adds air-purifying respirator if dust levels or vapor levels exceed a certain threshold. The current work permit approval process for any location at the facility (including non-IR sites) provides for worker notification of potential contaminant exposure during intrusive activities. Formal implementation of LUCs will continue this process.*

2. I was surprised to find that the Site is currently being used (page 2-Site Characteristics) for miscellaneous equipment and materials storage. This is being done before the Site Plan has been approved. Although I support Alternative 2 that calls for the use of LUC's I would expect the Plan to be approved before use is made of the site. I further suggest the groundwater medium study, that may identify a new site, be addressed as soon as possible.

***Response:*** *Whenever possible, the Navy mission is not interrupted for CERCLA response actions. In this case, use of portions of the site temporarily were suspended during the removal action. Following the removal action, which included verification sampling, Navy [industrial/commercial] use resumed. Navy has taken care not to store materials or equipment at the site that would re-contaminate or exacerbate conditions (i.e., scrap materials and transformers are not disposed or stored at the site).*

## Letter Comments from Mattawoman Watershed Society – Received on September 4, 2013

1. Public understanding of the Proposed Plan would be strengthened if a timeframe were given for addressing the contaminated groundwater. The Plan implies that the upslope area, perhaps including some of UXO-32 itself, constitutes Site 70 of the IRP (p. 4; Scope and Role). Providing a timeframe for addressing the issue seems reasonable.

***Response:*** *New Site 70 – Groundwater Contamination Along Waterworks Way includes the groundwater beneath the Scrap Yard and an as-of-yet undetermined area upgradient. The Site 70 Remedial Investigation (RI) scoping and work planning is underway with RI field* *activities anticipated in fall 2013. Based on groundwater flow (as determined by previous investigations at the Scrap Yard and adjacent IR Sites), the upgradient source(s) currently are thought to be located west-northwest of the Scrap Yard. The RI is anticipated to be completed in spring 2014. The follow-on Feasibility Study, Proposed Plan, and Record of Decision would be prepared throughout 2014 and 2015. Depending on the outcome and funding availability, a remedial action could occur as early as 2015.*

2. The discussion of Ecological Risks (p. 6) needs strengthening, clarification, or revision. Here it is stated that a 2004 Ecological Risk Assessment (ERA) did not identify any risks to ecological receptors. However, shallow groundwater from the site discharges to the Mattawoman estuary (Site Characteristics, p. 3). The groundwater evidently contains numerous Contaminants of Concern (Additional Groundwater Investigation, p. 4). Given these facts, it is reasonable to ask whether contaminants are reaching the creek in levels to be of concern. It is not clear from the text if the ERA pertained solely to soils, or if contaminant transport via groundwater was considered and measured.

***Response:*** *The Proposed Plan is meant to provide a brief summary of the risk assessment (and other historical investigation) results and conclusions. Expanded summaries of the ERA and the Mattawoman Creek Study are provided in the Record of Decision and the historical report documents, themselves. The ERA contained in the 1999 Remedial Investigation Report evaluated surface soil samples and Creek sediment and surface water samples. Groundwater discharge to the Creek was part of the conceptual site model evaluated. No specific ecological risks were attributed to the Scrap Yard at that time, because additional ecological risk assessment was recommended for the Creek as a whole along the facility (not to be limited to one specific site). This recommendation was addressed later by the 2004 Mattawoman Creek Study. Ecological risks identified in the surface soil during the RI were addressed by the interim removal action completed in 2011. The Mattawoman Creek Study (for sediment, surface water, and biota) did not attribute unacceptable human health or ecological risks to the Scrap Yard. COCs in groundwater discharging to the Creek (large water body) are diluted to a great degree, which lowers anticipated risks. Groundwater at the Scrap Yard (and upgradient) is being evaluated further as new Site 70 – Groundwater Contamination Along Waterworks Way (see above). It is noted that the COCs in groundwater mentioned in the comment and Proposed Plan pertain to human health exposure.*

3. On p. 3, it is stated that "there is no known hydrogeologic connection between the shallow water table" and deeper confined aquifers used for drinking water. As with Site 28, testing the USGS well there, or other wells in the vicinity, for contaminants could bolster this claim and assuage potential public concern.

***Response:*** *The potable well northwest of the Scrap Yard is sampled as part of the potable water monitoring program performed by the facility for facility customers. More information about these wells can be found in the annual Consumer Confidence Report for Naval Support Activity South Potomac, Naval Support Facility Indian Head, Maryland, under Maryland Public Water System IDs 0080058 and 1080039. Maryland also performed a Source Water Assessment (see http://www.mde.maryland.gov/programs/water/water_supply/source_water_assessment_program/pages/programs/waterprograms/water_supply/sourcewaterassessment/factsheet.aspx). Historical results from this well indicate the deeper aquifer has not been impacted by UXO 32.*

*For additional information on facility water quality, please contact the Environmental Program Office of NSF-IH via Mr. Gary Wagner of Public Affairs.*

4. We note that Site 28 employs Institutional Controls, while UXO-32 employs Land Use Controls. Both are equivalent, according to the glossary, but technically this may not be so, and it is somewhat confusing to see different approaches being employed. The difference may relate to the concern for Site 28 being confined to groundwater, while UXO-32 has both soil and groundwater, though the LUC is evidently constrained only to address soils.

***Response:*** *LUCs collectively refer to (a) Institutional Controls (ICs) and/or (b) engineering controls, both of which are used to minimize the potential for human exposure to contamination by limiting land and resource use. The ICs portion is administrative and/or legal tools that do not involve construction or physically changing the site. They include legal deed restrictions and property-owner/controller-enforced environmental use restrictions to minimize exposure to environmental medium (e.g., soil or groundwater) by certain receptors (e.g., residential or industrial/commercial). Engineering controls components include physical solutions such as fencing or a barrier (e.g., landfill cap) to restrict access to a contaminated medium.*

*The concrete pad and fencing at UXO 32 are not specific engineering controls to be maintained for protectiveness. The concrete pad was left in place for convenience and the fence is a best management practice for the Navy. ICs are the only component of LUCs to be implemented at UXO 32. The Preferred Alternative for UXO 32 is called "Land Use Controls," but could have been named Institutional Controls.*