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FINAL RECORD OF DECISION OPERABLE UNIT 4 (OU 4) SITE 1 SOIL ALLEGANY BALLISTICS LABORATORY ROCKET CENTER WV

09/01/2014

CH2M HILL

Final

Record of Decision
Operable Unit 4
Site 1 Soil

Allegany Ballistics Laboratory
Rocket Center, West Virginia

Contract Task Order WE37

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Prepared for

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Mid-Atlantic

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Acronyms and Abbreviations

ABG	Active Burning Ground
ABL	Allegany Ballistics Laboratory
AOC	area of concern
ARAR	applicable or relevant and appropriate requirement
ATK	Tactical Systems Company LLC
BERA	baseline ecological risk assessment
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
COC	constituent of concern
CS	confirmation study
CSM	conceptual site model
CTE	central tendency exposure
DCE	1,2-dichloroethene
DNAPL	dense non-aqueous phase liquid
EE/CA	Engineering Evaluation and Cost Analysis
ERA	ecological risk assessment
ESS	Explosive Safety Submission
FDP	Former Disposal Pit
FFA	Federal Facility Agreement
FLUTe	Flexible Liner Underground Technologies, LLC
FS	Feasibility Study
HHRA	human health risk assessment
HMX	octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine
IAS	Initial Assessment Study
IEUBK	Integrated Exposure Uptake Biokinetic
IRP	Installation Restoration Program
LTMgt	long-term management
LUC	land use control
MIP	membrane interface probe
mg/kg	milligrams per kilogram
MPPEH	material potentially presenting an explosive hazard
NACIP	Navy Assessment and Control of Installation Pollutants Program
Navy	United States Department of the Navy
NCP	National Oil and Hazardous Substances Pollution Contingency Plan

NG	nitroglycerin
NPL	National Priorities List
NTCRA	non-time-critical removal action
O&M	operation and maintenance
OABG	Outside Active Burning Ground
OU	operable unit
PAH	polycyclic aromatic hydrocarbon
PCE	tetrachloroethene
PRG	preliminary remediation goal
RAO	Remedial Action Objective
RCRA	Resource Conservation and Recovery Act
RD	remedial design
RDX	hexahydro-1,2,5-trinitro-1,3,5-triazine
RI	Remedial Investigation
RME	reasonable maximum exposure
ROD	Record of Decision
SRG	site remediation goal
SSL	Soil Screening Level
SVOC	semivolatile organic compound
SWMU	solid waste management unit
TCE	trichloroethene
TEQ	toxic equivalency quotient
USEPA	United States Environmental Protection Agency
UU/UE	unlimited use and unrestricted exposure
UXO	unexploded ordnance
VOC	volatile organic compound
WVDEP	West Virginia Department of Environmental Protection

1 Declaration

1.1 Site Name and Location

Site 1 (Operable Unit [OU] 4) at Allegany Ballistics Laboratory (ABL) in Rocket Center, West Virginia.
National Superfund Database Identification Number: WV0170023691.

1.2 Statement of Basis and Purpose

ABL was placed on the National Priorities List (NPL) in May 1994. As a result of the NPL listing and pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, (CERCLA), the United States Environmental Protection Agency (USEPA) Region 3, the West Virginia Department of Environmental Protection (WVDEP), and the United States Department of the Navy (Navy), entered into a Federal Facility Agreement (FFA) for ABL in 1998. In the FFA, Site 1 comprises several solid waste management units (SWMUs), specifically SWMU 1, SWMU 7, SWMU 8, SWMU 11, and SWMU 20. Because of its complexity, Site 1 has been investigated under two OUs: OU-3 for groundwater, surface water, and sediment and OU-4 for soil. A Record of Decision (ROD) for OU-3 was signed in 1997.

The remedy for OU-4 was selected in accordance with CERCLA, the Defense Environmental Restoration Action (10 U.S.C. section 2711 et. seq.), 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.

The Navy is the lead agency and provides funding for environmental restoration activities at ABL. The Navy and the USEPA, the lead regulatory agency, issue this ROD jointly. The WVDEP, the support regulatory agency, participated throughout the investigation process, has reviewed this ROD and the materials on which it is based, and concurs with the Selected Remedy.

1.3 Assessment of Site

The response action selected in this ROD is necessary to protect public health, welfare, and the environment from actual or threatened releases of hazardous substances from the site.

1.4 Description of Selected Remedy

The Selected Remedy, as documented in this ROD, addresses all potential risks from exposure to residual contaminants remaining in place. Contaminants in soil that pose potential human health and ecological risks have impacted OU-3, Site 1, groundwater, surface water, and sediment. Therefore, the remedy to address the contaminants in soil is also expected to decrease the level of contaminants entering the groundwater, surface water, and sediment media, which are being addressed under the OU-3 ROD.

Because of historical site activities, Site 1 has been separated into two geographical divisions: the Active Burning Ground (ABG) and the Outside Active Burning Ground (OABG). The Site 1 constituents of concern (COCs) for the ABG and OABG consist of select volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), dioxins, explosives, and metals (see Section 2.5 for the detailed list of COCs). The site-specific Remedial Action Objectives (RAOs) for soil at Site 1 are as follows:

- Prevent or minimize direct contact with soil COCs at concentrations above site remediation goals (SRGs) as described in Section 2.8 that pose unacceptable risks to current and future industrial workers, trespasser/visitor adolescents, construction workers, hypothetical future residents, and ecological receptors;
- Prevent or minimize overland migration of COCs at concentrations above SRGs to the North Branch Potomac River;
- Prevent or minimize migration of COCs at concentrations above SRGs from soil to groundwater, in order to enhance the ability of the groundwater remedy to restore the aquifers to beneficial use;
- Render area free of surficial debris (including partially exposed debris) from within the boundaries of the OABG; and
- Control erosion and riverbank scour to prevent subsurface debris from becoming exposed.

The Selected Remedy for the ABG consists of:

- Excavation and offsite disposal of contaminated soil from the Areas of Concern (AOCs);
- Land use controls (LUCs) to be implemented to prevent unrestricted land use by (1) prohibiting the development and use of the property for residential housing, elementary and secondary schools, child care facilities and playgrounds, and (2) restricting intrusive activities to minimize the potential for human exposure to contamination presenting an unacceptable risk; and
- Long-term management (LTMgt).

The Selected Remedy for the OABG consists of:

- Removal of surface debris;
- Excavation and offsite disposal of contaminated soil;
- LUCs to be implemented to prevent unrestricted land use by (1) prohibiting the development and use of the property for residential housing, elementary and secondary schools, child care facilities and playgrounds, and (2) restricting intrusive activities to minimize the potential for human exposure to contamination presenting an unacceptable risk; and
- LTMgt.

1.5 Statutory Determinations

The Selected Remedy is protective of human health and the environment, complies with Federal and State requirements that are applicable or relevant and appropriate to the remedial action, is cost-effective, and uses permanent solutions and alternative treatment technologies to the maximum extent practicable. This remedy does not satisfy the statutory preference for treatment as a principal element of the remedy. Treatment was determined to be impracticable because of the variety of contaminants in place and the complexity of the multiple technologies which might be required to achieve clean up objectives, in addition to the uncertainty whether these technologies would be able to clean up emerging contaminants in the long term. Because the remedy will result in hazardous substances, pollutants, or contaminants remaining onsite above levels that allow for unlimited use and unrestricted exposure, a statutory review will be conducted within 5 years of the initiation of the remedial action (and every 5 years thereafter). This is to ensure that the remedy is, or will be, protective of human health and the environment.

1.6 Record of Decision Data Certification Checklist

The following information is included in the Decision Summary section of this ROD. The relevant section of the ROD where the information can be found is also provided. Additional information can be found in the Administrative Record file for this Site.

Site 1 Data	Section in ROD
COCs and their respective concentrations	2.5
Baseline Risk represented by the COCs	2.7
Cleanup levels established for COCs and the basis for these levels	2.8
How source materials constituting principal threats are addressed	2.11
Current and reasonably anticipated future land-use assumptions used in the risk assessment	2.6, 2.7
Potential land use that will be available at the sites as a result of the Selected Remedy	2.12.4
Estimated capital, annual operation and maintenance (O&M), and total present-worth costs, and the number of years over which the remedy cost estimates are projected	2.9.1
Key factors that led to selecting the remedy	2.12.1

1.7 Authorizing Signatures

The Navy and USEPA selected this remedy with the concurrence of the WVDEP.

Michael Sydla
Director
Program Management Office - Information Technology
(SEA 04I)

Date

Cecil Rodrigues, Director
Hazardous Site Cleanup Division
USEPA, Region III

9/22/2014
Date

Patricia Hickman, Interim Director
Division of Land Restoration
WVDEP

9-15-14
Date

2 Decision Summary

2.1 Site Name, Location, and Brief Description

The ABL covers approximately 1,634 acres located in Rocket Center, West Virginia, and is situated along the North Branch Potomac River, which separates West Virginia and Maryland (**Figure 1**). Operations at the facility are divided between two distinct operating plants, Plant 1 and Plant 2. Plant 1 (owned by the United States Department of the Navy [Navy] and operated by ATK Tactical Systems Company LLC [ATK]) occupies approximately 1,577 acres and includes a large undeveloped area northwest of Knobly Mountain. Plant 2, which occupies the remaining 57 acres, is both owned and operated by ATK. In May 1994, Plant 1 at ABL was listed on the NPL. Plant 2 is not listed on the NPL. The National Superfund Database Identification Number for Plant 1 at ABL is WV 0170023691.

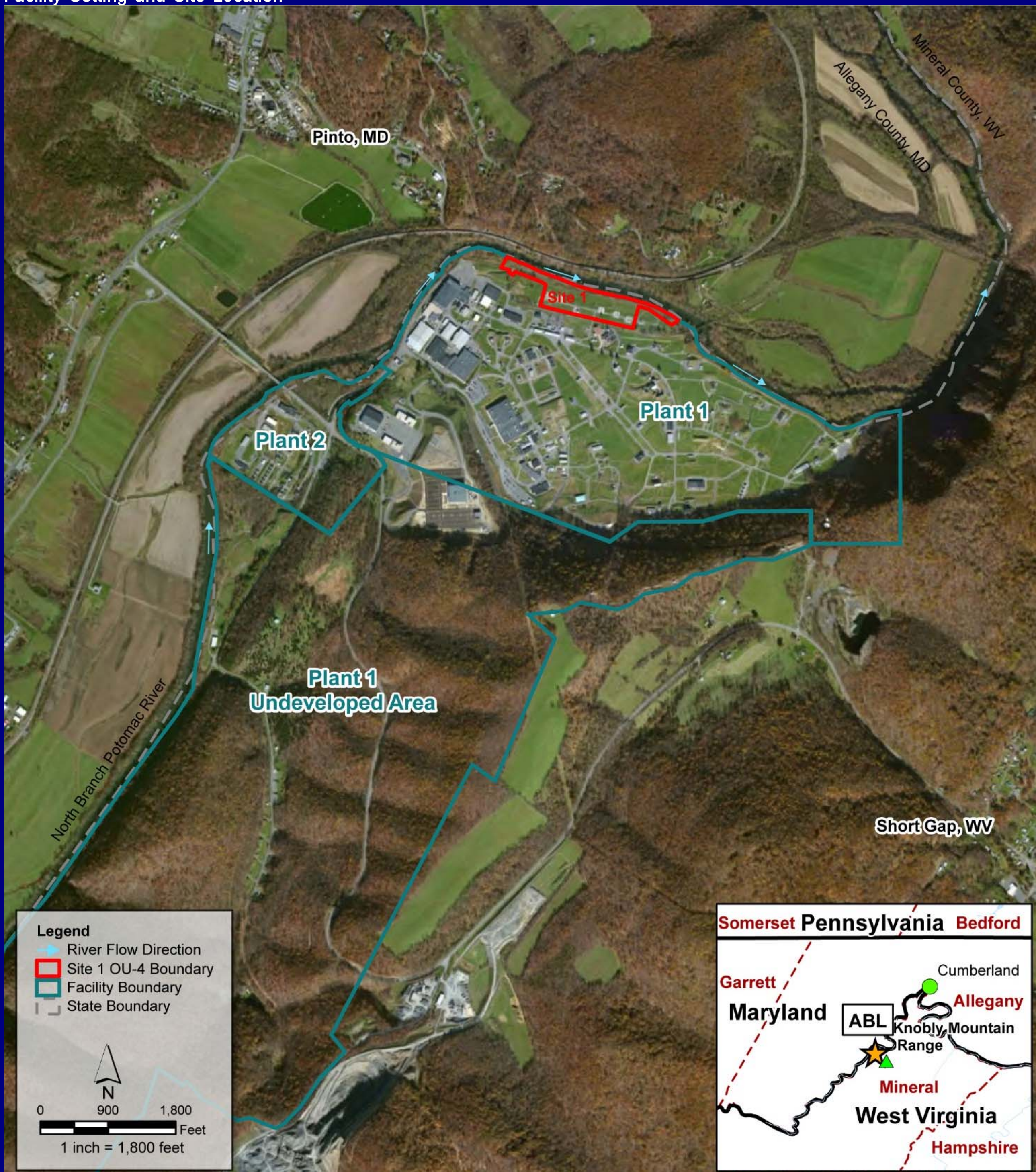
ABL Plant 1 is a research, development, testing, and production facility, producing solid propellants and motors for ammunition, rockets, and armaments. ABL Plant 1 was initially constructed in 1942 as a loading plant for 0.50-caliber machine gun ammunition for the United States Army. The Navy took ownership of Plant 1 in 1945. The facility currently operates as a highly automated production facility for tactical propulsion systems and composite and metal structures.

This ROD addresses OU 4, Site 1 soil. Site 1 is situated adjacent to the North Branch Potomac River, along the northern border of the developed portion of Plant 1 at ABL (**Figure 1**). The 13.9-acre[1] area was used since the early 1940s for various types of waste-burning and disposal activities.

The Navy is the lead agency and provides funding for environmental restoration activities at ABL. The Navy and the USEPA, the lead regulatory agency, issue this ROD jointly. The WVDEP, the support regulatory agency, participated throughout the investigation process, has reviewed this ROD and the materials on which it is based, and concurs with the Selected Remedy.

[1] Although historical documents indicate that Site 1 is an 11-acre area (ABG = 8 acres; OABG = 3 acres), the site boundary encompasses 13.9 acres (ABG = 8.5 acres; OABG = 5.4 acres).

FIGURE 1
Facility Setting and Site Location



2.2 Site History and Enforcement Activities

Because of its complexity, Site 1 has been investigated under two OUs: OU-3 for groundwater, surface water, and sediment, and OU-4 for soil. A ROD was signed in May 1997 for OU-3. The selected remedy for OU-3 is composed of an extraction system for contaminated groundwater from the site-wide alluvial and bedrock aquifer to prevent contaminant migration to the river, and treatment of the extracted groundwater, as well as a long-term monitoring plan, and land use controls.

OU-4, Site 1 Soil, is composed of surface and subsurface soil at Site 1 and is the focus of this ROD. Based on current and historical site activities, the site has been divided into two geographical divisions, the ABG and the OABG (**Figure 2**). Additional detail is provided in Sections 2.2.1 and 2.2.2, below, and the Site 1 Focused RI report in the Administrative Record.

2.2.1 Active Burning Ground

The ABG is currently used for burning reactive wastes and is regulated under a RCRA permit (WV0170023691). The ABG includes the following three SWMUs: 6 (Current Burning Ground); 8 (Acid Disposal Pits); and 20 (Solvent Disposal Pit). An 8-foot-tall locked fence surrounds the 8.5-acre area, which is mostly covered by mowed grass. An asphalt road spans the east-west length of the fenced area. Although the ABG is operating under a RCRA permit, it includes several historical disposal units and it was determined by the Navy and regulatory agencies that this area potentially includes contamination attributed to historical waste burning; therefore, the ABG is being addressed under the Comprehensive Environmental Response Compensation, and Liability Act, as amended, (CERCLA).

The burning of reactive material at the ABG began in 1959 and continues today. Eight earthen burn pads, operated from 1959 until the mid-1990s, were used to burn solvents and explosive waste generated at ABL (**Figure 2**). The former earthen burn pads are not currently used and have been overgrown by vegetation. Six steel burn pans, which were located on earthen or asphalt burning pads, replaced the eight former earthen burn pads in the mid-1990s (**Figure 2**). These have since been replaced by six large concrete burn pads, labeled in **Figure 2** as Pad A through Pad F, going from east to west.

Historical disposal of spent acids and solvents generated by plant operations occurred in three disposal pits (Former Disposal Pit [FDP] 1, FDP 2, and FDP 3) constructed as unlined, crushed-limestone-filled earthen pits **(Figure 2**). After the materials percolated into the ground, it was reported that the pits were ignited to burn off remaining filtrate. The pits were operated during the 1970s and 1980s and have since been backfilled. Reportedly, trichloroethene (TCE) was the primary spent solvent that was disposed in the pits, two of which are known to be a source of contamination to groundwater. TCE has been detected at elevated concentrations in the unsaturated soil beneath FDPs 1 and 3. FDP 2 does not contain detectable chlorinated solvents and is not considered a source of contamination to groundwater. The size and location of the FDPs are based upon historical boundaries using visual observation of ground scarring, as well as the results of a geophysical investigation. The former pits are located in the southwestern portion of the ABG and are described as having been approximately 10 feet wide and ranging in length from approximately 15 to 40 feet (**Figure 2**). The depths of the pits were estimated at 3 to 5 feet below ground surface (bgs). An Engineering Evaluation and Cost Analysis (EE/CA) and Action Memorandum were prepared, and a non-time-critical removal action (NTCRA) was completed in January 2014 to address potential sources of groundwater contamination in the unsaturated soil at FDPs 1 and 3. Residual contamination in place post-NTCRA will be addressed as part of this ROD.

2.2.2 Outside Active Burning Ground

The OABG consists of a 5.4-acre parcel outside of the fenced area which was historically used for the disposal of various wastes (demolition debris, drums, and rocket casings), as well as for burning waste and spreading ash, from the early 1960s until approximately 1981. The OABG is no longer in use and the area is not included within the boundaries of the active RCRA permit. The western portion of the OABG includes the following four SWMUs: 1 (Former Hazardous Waste Storage Area 1); 11 (Former Burn Cages and Ash Landfill); 22C (Pilot Fluidized Bed

Incinerator); and 22D (Non-Explosive Combustible Incinerator). It also includes the former open burn area, former drum storage pad, and western drainage ditch. The former open burn area, reportedly operated during the 1960s, was enclosed behind a chain-link fence where the solid wastes were burned. The resulting ash was spread along the lower floodplain area in a portion of the western OABG. The drum storage pad, reportedly operated from 1979 to 1981, stored 55-gallon drums containing spent solvents and bottom sludge from solvent recovery stills. The asphalt drum storage pad did not have berms or sumps for containment. The western drainage ditch is an earthen drainage culvert that cuts through the disposal area and drains surface/stormwater from Plant 1. Debris materials, including ash buried during successive disposal events, are exposed in the walls of this culvert. Surface and subsurface debris is present throughout the western OABG. The area is currently covered by vegetation. The eastern portion of the OABG is also known as the Inert Burning Ground (SWMU 7). Ash from burning in this area was spread and buried during successive disposal events. Surface and subsurface debris are present throughout the eastern OABG. The area is currently covered by vegetation.

Investigation efforts for Site 1 are summarized in **Table 1**. No enforcement actions have occurred for Site 1 soil.

FIGURE 2
Site 1 and Associated Features

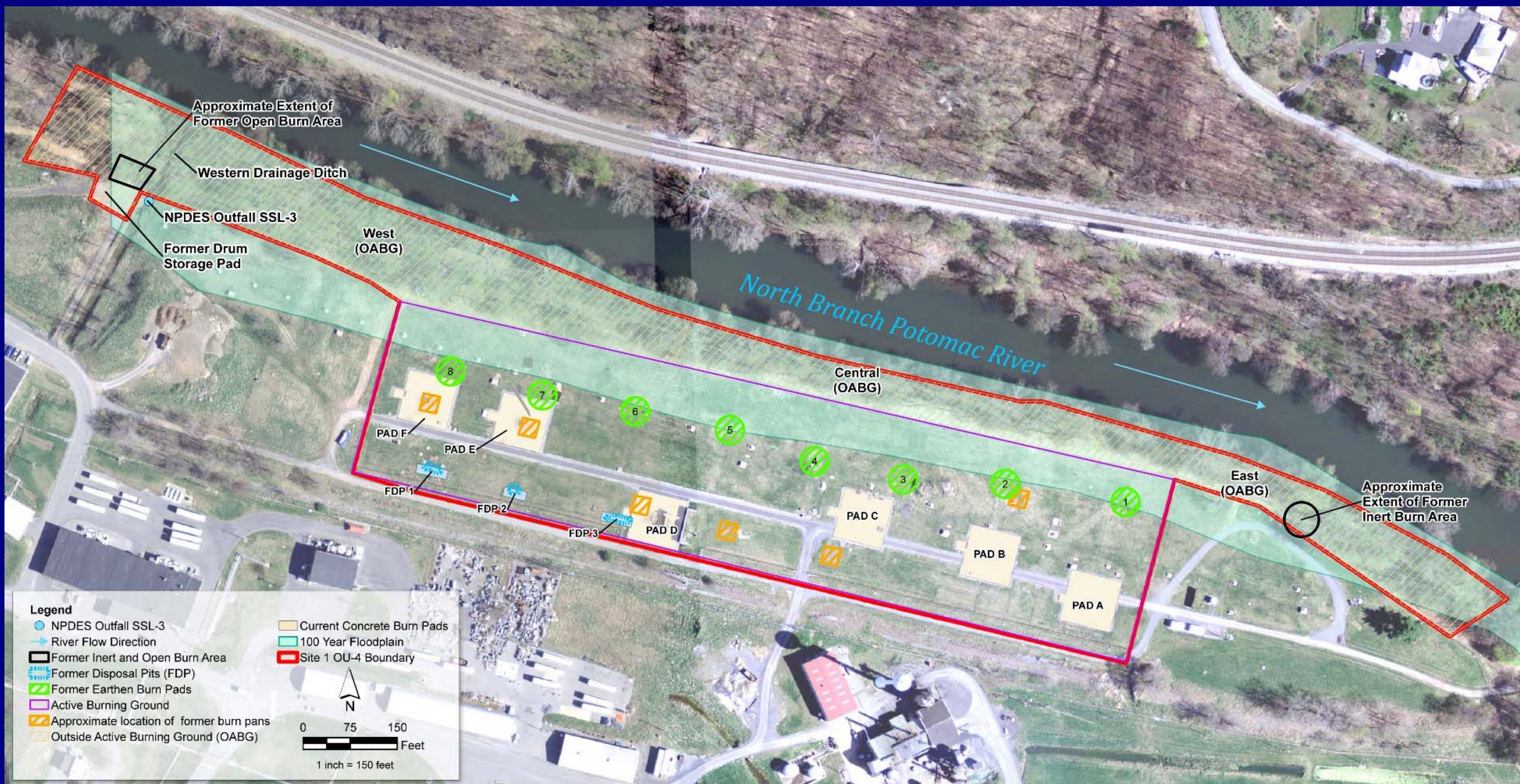


TABLE 1
Site 1 Previous Investigation Summary

Investigation and/or Remediation Activities	Results Summary
Initial Assessment Study (1983)	An Initial Assessment Study (IAS) was performed at ABL in 1983 under the Navy Assessment and Control of Installation Pollutants Program (NACIP). The purpose of the IAS was to identify and assess sites that might pose a threat to human health or the environment as a result of the former hazardous materials handling and operations. Nine potentially contaminated sites, including Site 1, were identified based on information obtained from historical records, photographs, site inspections, and personnel interviews. The IAS concluded that these sites did not pose an immediate threat. However, results of the IAS indicated the need for a confirmation study (CS) at seven of the nine sites, including Site 1, to assess the potential impacts on human health and the environment by suspected contaminants.
Confirmation Study (1987)	Based on the IAS recommendations and in accordance with the NACIP, a CS was initiated in June 1984 and completed in August 1987. The CS focused on identifying the existence, concentration, and extent of contamination at the seven sites recommended for further investigation in the IAS. Field activities conducted under the CS included monitoring well installation; groundwater, surface water, sediment, and soil gas sample collection and analysis; and a geophysical survey inside the ABG area at Site 1.
Interim Remedial Investigation (1989)	As a result of the Superfund Amendments and Reauthorization Act amendments to CERCLA in 1986, the Navy changed its NACIP terminology and scope under the Installation Restoration Program (IRP) to follow the rules, regulations, guidelines, and criteria established by USEPA for the Superfund program. Accordingly, the results of the CS were documented in the Interim RI report, which recommended further RI activities for six of the seven sites identified in the IAS, including Site 1.
Remedial Investigation (1996)	Based on the recommendations of the Interim RI report and in accordance with the Navy's modified IRP policy, Hercules Aerospace Company (former ABL operator) contracted CH2M HILL to conduct an RI. Field work was completed in 1992; however, the RI report was not finalized until 1996. VOCs, particularly TCE, were the primary constituents detected in soil, groundwater (in both alluvial and bedrock aquifers), surface water, and sediment samples collected at and adjacent to Site 1. The three FDPs were found to be the primary source of VOC contamination at Site 1. SVOCs, explosives, metals, and dioxins were also detected in soil and ash samples. The 1996 RI report recommended additional investigation at Site 1 to evaluate further the nature and extent of contamination in soil, groundwater, surface water, and sediment. The results of the 1992 RI are presented in the *Remedial Investigation of the Allegany Ballistics Laboratory* report.
Focused Remedial Investigation (1995)	A focused RI was conducted in 1994 to supplement the Site 1 data collected in 1992 and to re-evaluate potential risks to human health and the environment from contaminants in Site 1 media. The results are presented in the *Focused Remedial Investigation of Site 1 at Allegany Ballistics Laboratory Superfund Site* report. The results of the focused RI confirmed that VOCs were the primary contaminants detected in Site 1 media, with TCE detected most often and at the greatest concentrations in soil and groundwater. The focused RI identified specific areas and media at Site 1 for which remedial action alternatives should be evaluated in a focused feasibility study (FS). These were the areas of contaminated soil around the FDPs, north of the east and west ends of the ABG area along the river, and in the open and former inert burn disposal areas; contaminated groundwater in both alluvial and bedrock aquifers; and contaminated surface water and sediment in the North Branch Potomac River adjacent to Site 1.
Focused Feasibility Study (1995)	A focused FS was conducted in 1995 to evaluate remedial alternatives to address risks associated with contamination detected at Site 1. The draft report summarized the focused RI and that information was used as a basis for developing and evaluating cost-effective remedial alternatives to address contamination at Site 1. The study developed seven remedial alternatives to address both soil and groundwater contamination across the site, which are documented in the *Draft Site 1 Focused Feasibility Study at Allegany Ballistics Laboratory Superfund Site* report. The document was not finalized as the soil media was later separated from the groundwater, sediment, and surface water OU.

TABLE 1
Site 1 Previous Investigation Summary

Investigation and/or Remediation Activities	Results Summary
Soil Level Delineation (1998)	Based on soil data gathered during the focused RI and previous investigations, supplemental soil sampling was conducted in October 1998 to delineate further the potentially contaminated areas at Site 1. The soil level delineation was conducted in accordance with the *Site 1 Soil Level Delineation – Final* memorandum, which defined the scope and rationale for sample collection and referenced the *Sampling and Analysis Plan for the Focused Remedial Investigation/Feasibility Study for Site 1 at the Allegany Ballistics Laboratory Superfund Site* as the methodology protocol. A formal report of the supplemental soil sampling was not generated; however, these and other historical data were evaluated to assess whether sufficient information existed to establish preliminary remediation goals (PRGs) for Site 1 soil. This evaluation resulted in the identification of additional data requirements and the need to refine the human health risk assessment (HHRA) and ecological risk assessment (ERA) in accordance with current regulatory guidance.
Soils Supplemental Investigations (2001 and 2004)	The results of the 1992 RI, focused RI, focused FS, and the soil level delineation indicated that additional data needed to be collected to delineate adequately the nature and extent of soil contamination at Site 1 and to assess the associated potential risks. Details regarding the supplemental investigations can be found in *Draft Ecological Risk Assessment for the Burning Grounds at Allegany Ballistics Laboratory* and the *Final Work Plan Addendum for Supplemental Investigation of Site 1 Soil in Support of Human Health and Ecological Risk Assessment, Allegany Ballistics Laboratory, Rocket Center, West Virginia*. In February and October 2001, a soil investigation was conducted to assess current conditions of soil within the ABG to support its continuing operation. The objectives of collecting the data were to assess potential risk to human health and the environment resulting from operation of the ABG, develop the ABG RCRA closure plan, assist in defining operational-related monitoring, provide input to pan/pad redesign activities, and to provide the baseline for an assessment of compliance with the permits. In addition, based on a review of existing soil data, including the proximity of areas of potential soil contamination to the North Branch Potomac River, collection of additional data was deemed necessary, primarily to assess whether soil constituents in areas of suspected contamination were affecting the surface water and sediment quality of the river via runoff. In July 2004, soil and tissue sampling (earthworms) were conducted to support Step 4 of the baseline ecological risk assessment (BERA). In September 2004, a supplemental investigation of the soil at Site 1 in support of both the HHRAs and ERAs was conducted to obtain additional nature and extent data and adequately assess potential human and ecological risks for Site 1 soil.
Soils Focused Remedial Investigation (2006)	In 2006, a second focused RI was completed for Site 1 to evaluate the nature and extent of the soil contamination at the site and the potential risks that soil contamination may pose to human receptors under residential and industrial scenarios and to ecological receptors. The discussions and assessment were based on data collected as part of the 2001 and 2004 supplemental investigations, as well as data from previous investigations. The 2006 focused RI identified potential unacceptable risks to human health and the environment based on exposure to OABG soil and debris. Based on the results of the risk assessments, it was recommended that an FS be prepared to evaluate the remedial alternatives proposed to address the potential risks identified for soil within the FDPs and the OABG areas at Site 1.
Wetland Assessment (2006)	A field review of Site 1 was conducted in order to determine whether wetlands or water bodies are present within the area. No wetlands were identified within the Site 1 study area, which consists of the ABG and OABG. The North Branch Potomac River, which borders Site 1 to the north, was mapped as a permanent, lower-perennial, unconsolidated-bottom, slow-moving river. Another wetland area was identified to the east of Site 1, but was outside of the study area. This small wetland was mapped as a seasonally flooded, broad-leaved deciduous, forested wetland.

TABLE 1
Site 1 Previous Investigation Summary

Investigation and/or Remediation Activities	Results Summary
Outside Active Burning Ground Geophysical and Global Positioning System Survey (2008)	Geophysical and global positioning system surveys were performed in May 2007 in support of the debris characterization to assist in the selection of the test pit locations. Survey results showed that the western and eastern regions of the OABG demonstrated the highest response to the geophysical instrumentation, indicating the location of metallic debris on the surface or in the subsurface within those areas. In contrast, the central region of the site showed little to no response. Detailed descriptions of both surveys can be found in the final Work Plan for Debris Characterization.
Outside Active Burning Ground Limited Surface Debris Removal (2008)	In February and March 2008, Shaw Environmental, Inc., conducted a limited surface debris removal in preparation for the debris characterization. Work was conducted under an approved Explosive Safety Submission (ESS) waiver and included unexploded ordnance (UXO) avoidance. Small shrubs and trees were cleared, and surface piles of construction and manufacturing debris were removed from the OABG areas where test pitting was to take place. Surface debris removed from the site was contained in portable roll-off boxes and sent offsite for proper disposal, with the exception of rocket casings containing asbestos material, which were removed and disposed by a licensed asbestos abatement contractor. Currently, surface debris (surficial and partially buried) remains throughout the OABG, Western Drainage Ditch, and bank of the North Branch Potomac River. This debris includes piles of construction and manufacturing debris, some of which is intertwined with vegetation along the riverbank. Furthermore, asbestos-containing ballistic rocket casings are present at the surface within the OABG.
Outside Active Burning Ground Debris Characterization (2008)	Following the limited surface debris removal, debris characterization was conducted in March and April 2008. Work was conducted under an approved ESS waiver and included UXO avoidance. Debris characterization was conducted to define further the nature and extent of subsurface debris within the West OABG, Central OABG, and East OABG. The objectives of the debris characterization were to further define the vertical and horizontal extent of debris within the OABG, identify the general composition of debris and foreign material present on the surface and in the subsurface soil, and determine whether the debris and foreign material in the subsurface had contaminated the underlying soil. Forty-nine exploratory test pits were excavated to a depth of 10 feet or until groundwater was encountered and then backfilled. The bulk of the surface and subsurface debris was shown to be buried in the West and East areas of the OABG; the Central area showed no surface or subsurface debris based on visual observations and test pits completed in this area. Based on observations of surface and subsurface debris, subsurface material was categorized as burn debris/ash, construction debris, manufacturing debris, or native soil. In addition to the debris characterization, samples were collected from 38 test pit locations. Each was analyzed for VOCs, SVOCs, and metals. A portion was analyzed for dioxins and explosives. The results indicated that the detected constituents in the subsurface soil matched the COCs presented in the 2006 focused RI.
Membrane Interface Probe and FLUTe Liner Investigation (2010)	A membrane interface probe (MIP) and Flexible Liner Underground Technologies, LLC (FLUTe), liner study was completed at the location of the FDPs at Site 1 between December 2009 and March 2010. The objective of the investigation was to determine if dense non-aqueous phase liquid (DNAPL) was present in the unsaturated zone (ground surface to approximately 15 feet bgs). The MIP was conducted at 55 locations. Twenty-one of the 55 locations had an MIP response, indicating that further investigation with the FLUTe liners was warranted to confirm the presence or absence of DNAPL. The FLUTe liner investigation was conducted during a second mobilization to the site. Twenty-one FLUTe liners were emplaced in the vadose zone and shallow aquifer to a maximum depth of 13.5 feet bgs. None of the FLUTe liners indicated the presence of DNAPLs in the vadose zone. Therefore, the team agreed principal threat waste was not present in the unsaturated zone at the Site 1 FDPs.

TABLE 1
Site 1 Previous Investigation Summary

Investigation and/or Remediation Activities	Results Summary
Investigation of Former Disposal Pit 1 (2011-2012)	An investigation was completed at FDP 1 to supplement the ongoing post-ROD optimization efforts associated with the existing groundwater extraction and treatment system. The investigation was divided into two phases; Phase I was completed in January 2011 and Phase II was completed in April 2012. Phase I (Focused Extraction Optimization at FDP 1) consisted of employing the existing groundwater model for ABL to estimate the additional groundwater extraction flow rate required to enhance hydraulic capture of TCE contamination within the alluvial aquifer at the FDP 1 area. The results of Phase I are presented in the *Final Sampling and Analysis Plan for Site 1 Former Disposal Pit 1 Investigation* and were used as the basis for data collection efforts conducted in Phase II. Phase II consisted of the collection of soil and groundwater data from the FDP 1 alluvial aquifer to refine the conceptual site model (CSM) and perform *in situ* chemical oxidation bench-scale testing. Investigation activities consisted of a subsurface soil investigation, hydraulic investigation, groundwater sampling, and *in situ* chemical oxidation bench-scale testing. The results of Phase II are presented in the *Final Technical Memorandum for Site 1 – Former Disposal Pit Investigation Results Summary*.
Engineering Evaluation and Cost Analysis and Action Memorandum (2012)	An EE/CA was prepared to evaluate removal action alternatives to conduct an NTCRA of the unsaturated soil beneath FDPs 1 and 3 within the ABG, which are believed to be primary sources of contamination to groundwater. The objective of the NTCRA (completed in January 2014) was to reduce the source present in the unsaturated soil beneath FDPs 1 and 3 in order to enhance the ability of the groundwater remedy to restore the aquifers to beneficial use. An Action Memorandum was prepared to document the selection and approval of the NTCRA to address source area soil beneath FDPs 1 and 3 at Site 1. The Preferred Alternative consisted of the excavation, removal, and disposal of the VOC source area in the unsaturated soils beneath FDPs 1 and 3. The excavation was replaced with clean fill and seeded to restore current site conditions.
Soils Feasibility Study (2013)	An FS was completed to address soil contamination at Site 1 and to evaluate remedial alternatives to mitigate potential hazards associated with the soil. The FS presents the SRGs and statistical method to determine the AOCs that will be targeted for remediation at Site 1. The SRGs for both the ABG and OABG were selected based on a restricted land-use scenario for human health (industrial scenario) and an unrestricted land-use scenario for ecological receptors and groundwater protection. The OABG evaluation considered the entire area as a whole, with no separation between the West, Central, and East areas. Considerations for ecological receptors were incorporated into each scenario.
Non-Time Critical Removal Action (2013)	The NTCRA, which was initiated in October 2013 and completed in January 2014, was intended to supplement the final remedy for Site 1 soil and augment the existing groundwater treatment system by reducing potential contaminant source mass to prevent future leaching to groundwater.
Proposed Plan (2014)	The remedial alternatives for the ABG and the OABG were presented for public comment. VOCs, explosives, and metals were identified as risk drivers in the ABG. VOCs, SVOCs, explosives, and metals were identified as risk drivers in the OABG.

2.3 Community Participation

The Navy, as lead agency for CERCLA activities at ABL, has met the public participation requirements of CERCLA Section 117(a) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) at 40 *Code of Federal Regulations* Section 300.430(f)(3) as follows:

The notice of availability of the Proposed Plan for Site 1 soil was published in the Cumberland Times-News on March 19, 2014.

The 45-day public comment period for the Proposed Plan was March 25, 2014 through May 9, 2014.

The Site 1 Administrative Record (that is, the Proposed Plan and supporting documents related to Site 1) was made available to the public at the following information repositories:

South Cumberland Library
100 Seymour Street
Cumberland, MD 21502

Fort Ashby Public Library
Lincoln Street, IGA Plaza
P.O. Box 74
Fort Ashby, West Virginia 26719

The Navy held a Public Meeting on March 25, 2014 to explain the Proposed Plan and to address public comments. The transcript of the public meeting is part of the Administrative Record for ABL, and a copy is included in this ROD as **Appendix A.**

In addition to the NCP public participation requirements, the Navy and ABL have had a comprehensive public involvement program for more than 15 years.

2.4 Scope and Role of Operable Units or Response Action

- Site 1 is one of 14 sites identified in the FFA or through Site Management Plan updates being addressed under CERCLA as part of the ABL Environmental Restoration Program.
- Site 1 groundwater, surface water, and sediment (OU-3), Site 5 groundwater (OU-2), Site 5 soil (OU-1), Site 10 (OU-5), and Sites 11 (OU-11)/12 (OU-8) groundwater have a final ROD and remedy in place. For the following sites, "response complete" has been documented through No Further Action RODs or the sites were closed out in the FFA: Site 2 groundwater and soil (OU-12), Site 3 groundwater and soil (OU-13), Sites 4A, 4B groundwater and soil (OU-14), Site 7 groundwater and soil (OU-7), and Site 9. Site 6 is being addressed under RCRA Corrective Action.
- The sites currently under investigation consist of Site 1 soil (OU-4) and Site 13 groundwater (OU-15).

The Selected Remedy, as documented in this ROD, represents the final remedial action for Site 1 soil (OU-4). The Selected Remedy addresses the potential risks from exposure to soil impacted as a result of releases from Site 1. Contaminants that pose potential human health and ecological risks have been identified in soil and have also impacted OU-3, Site 1, groundwater, surface water, and sediment. Therefore, the remedy to address the contaminants in soil is also expected to decrease the level of contaminants entering the groundwater, surface water, and sediment media, which are being addressed under the OU-3 ROD.

The Site Management Plan for ABL is updated annually and provides the current status of the sites.

2.5 Site Characteristics

ABL is located on the floodplain of the North Branch Potomac River and is flanked by Knobly Mountain to the south and east. The facility is underlain by sediments generally composed of an upper silt and clay layer underlain by coarser deposits of sand and gravel. Shale is the dominant lithology beneath the western third of the facility where Site 1 is located. Site 1 is comprised of a total of 13.9 acres. A CSM depicts the Site 1 characteristics (**Figure 3**).

Generally, Site 1 is underlain by two distinct lithologies: (1) unconsolidated alluvial deposits of clay, silt, sand, and gravel and (2) predominantly shale bedrock. Drilling efforts at Site 1 indicated that the unconsolidated alluvial deposits overlying bedrock generally consist of two distinct layers of material. The upper, or surficial, layer of alluvium consists of silty clay and is considered to be floodplain deposits of the North Branch Potomac River. At Site 1, this upper alluvial layer extends from the ground surface to an average depth of approximately 12 feet bgs. Groundwater is encountered at approximately 10 to 13 feet bgs. The lower layer of the alluvium consists of a sand and gravel layer containing pebbles and cobbles with variable but typically significant amounts of clay and silt, and is considered to be alluvial deposits of the North Branch Potomac River. At Site 1, this lower alluvial layer has an average thickness of approximately 14.5 feet. Below the alluvium lies bedrock consisting of mainly calcareous shale and limestone. The average depth to bedrock at Site 1 is approximately 26.5 feet bgs.

2.5.1 Nature and Extent of Contamination

Historical activities associated with the use of the FDPs and former burn pads in the ABG and the waste disposal and drum storage areas of the OABG have resulted in VOCs, SVOCs, explosives, dioxin, and metals in surface and subsurface soil at Site 1 (See Summary of Site Risk **Tables 3, 4, 5, and 6**). The distribution of soil contamination within the ABG and OABG was evaluated in previous investigations (**Figure 4**) and further refined using a statistical approach to estimate target remediation areas, identified as AOCs, in Site 1 soil. **Table 2** presents the COCs identified as risk drivers for the ABG and OABG, including the maximum concentrations detected and the SRGs and the basis for each SRG. The development of the SRGs for the COC risk drivers is discussed further, below, in Section 2.8, Remedial Action Objectives.

Eight AOCs, delineated with respect to their specific risk drivers, have been identified in the ABG (see **Figure 4**). The AOC-specific risk drivers are as follow:

- AOC 1: lead
- AOC 2: TCE, octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX), nitroglycerin (NG), and perchlorate
- AOC 3: copper
- AOC 4: TCE and lead
- AOC 5: tetrachloroethene (PCE) and TCE
- AOC 6: TCE and lead
- FDP 1: PCE and TCE
- FDP 3: PCE and TCE

An NTCRA was completed in January 2014 to address the unsaturated soil beneath the historical aerial extent of FDPs 1 and 3, which are two AOCs identified in the ABG. However, residual contamination left in place after the NTCRA of FDP 1 and FDP 3 will be evaluated and remediated, if necessary, in the same manner as the other ABG AOCs as part of the final remedy. It is estimated that the contaminated soil associated with the ABG AOCs (excluding FDPs 1 and 3) is equivalent to approximately 1,300 cubic yards.

Eleven AOCs, delineated with respect to their risk drivers, have been identified in the OABG (see **Figure 4**). The AOC-specific risk drivers for the OABG are as follow:

- AOC 1: methyl acetate and TCE
- AOC 2: TCE
- AOC 3: 1,2-dichloroethene (DCE), methyl acetate, TCE, benzo(a)pyrene, total polycyclic aromatic hydrocarbon (PAH) (high molecular weight), chromium, copper, lead, and vanadium
- AOC 4: TCE
- AOC 5: TCE
- AOC 6: 1,2-DCE, TCE, and cobalt
- AOC 7: methyl acetate, PCE, TCE, HMX, NG, hexahydro-1,2,5-trinitro-1,3,5-triazine (RDX), cadmium, chromium, copper, lead, and mercury
- AOC 8: chromium, cobalt, copper, and lead
- AOC 9: copper and mercury
- AOC 10: cobalt and copper

- AOC 11: benzo(a)anthrancene, benzo(a)pyrene, total PAHs (low molecular weight), total PAHs (high molecular weight), and cobalt

The FS estimated that the contaminated soil and subsurface debris associated with the OABG AOCs is equivalent to approximately 17,200 cubic yards.

The primary fate and contaminant migration pathways of COCs in Site 1 soil are:

- leaching of contaminants from soil to groundwater, ultimately discharging to the river; and
- surface runoff of COCs in soil media, primarily in the OABG, to the drainage ditch and river.

Presently, the groundwater containment remedy minimizes groundwater flow to the river from the ABG and OABG through groundwater extraction and treatment.

FIGURE 3
Site 1 Conceptual Site Model

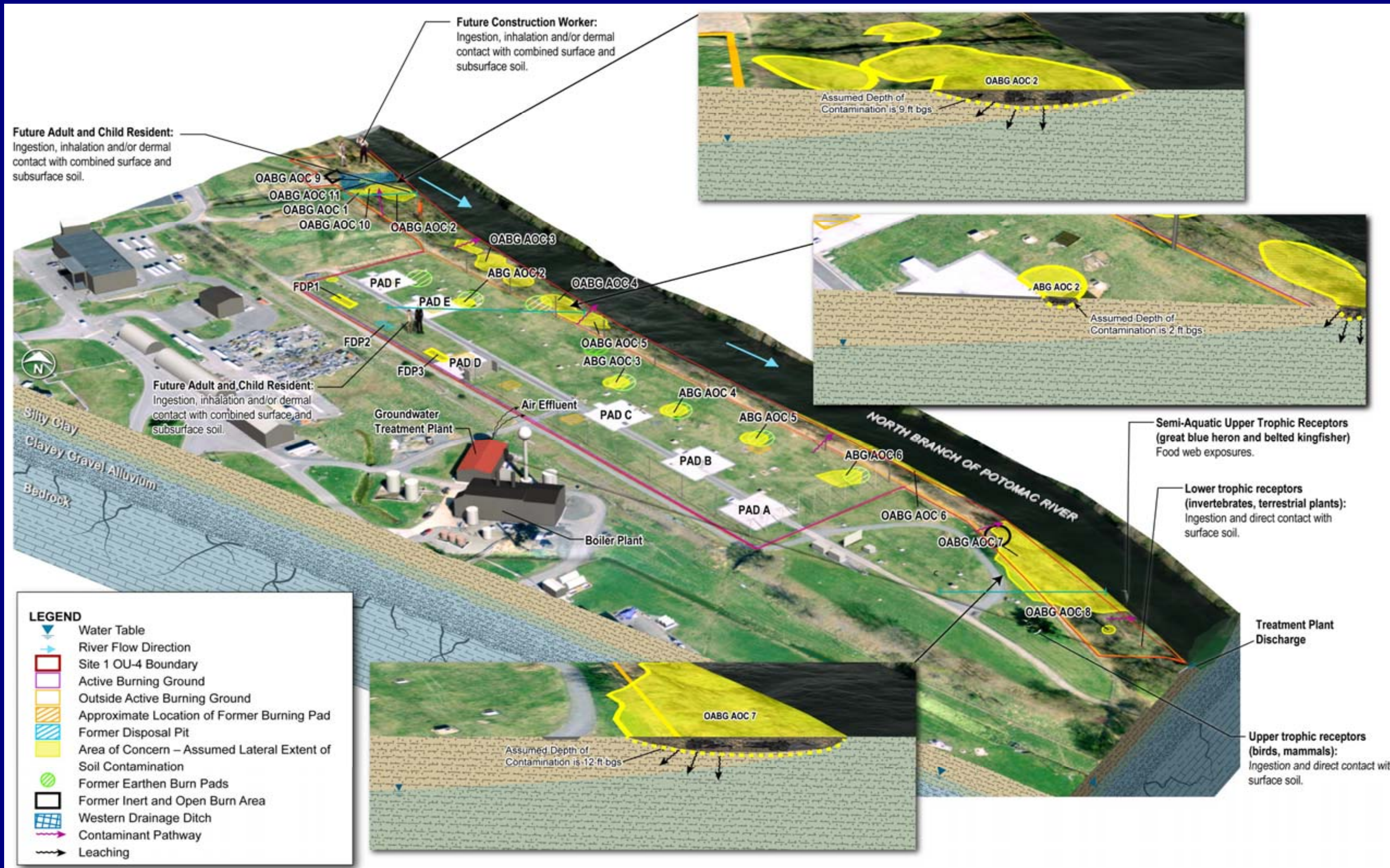


FIGURE 4
Site 1 Soil Samples

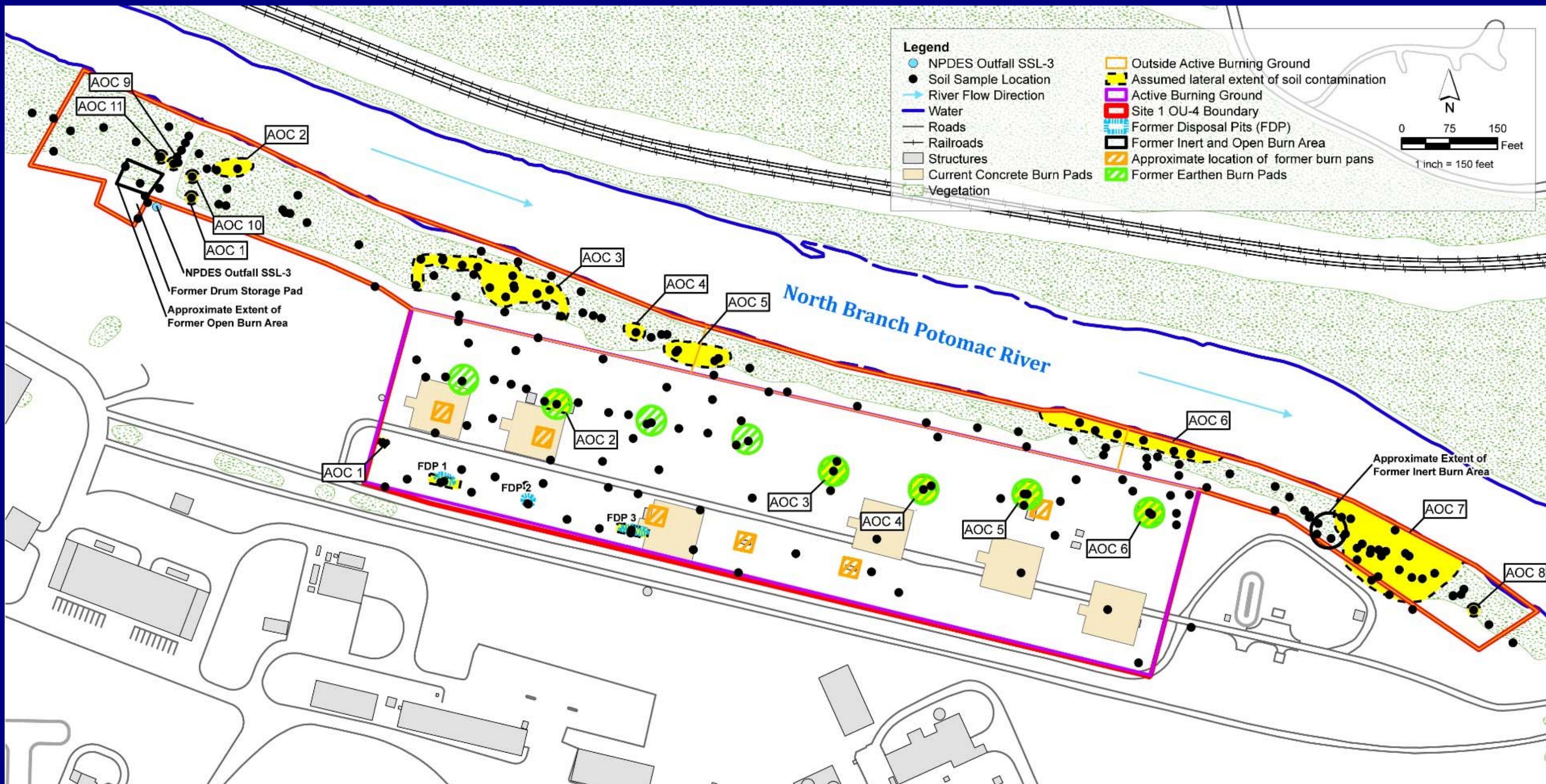


TABLE 2
Constituents of Concern Requiring Remedial Action

Risk Driver [1]	Range of Detected Concentrations in Soil (mg/kg)	Site Remediation Goal for Soils (mg/kg)	Basis
Active Burning Ground			
Volatile Organic Compounds			
PCE	0.003 - 5.80	0.22	SSL
TCE	0.001 - 160	0.16	SSL
Explosives			
HMX	0.123 - 51	10 (SS)	Ecological PRG
Nitroglycerin	2- 98	65 (SS)	Ecological PRG
Perchlorate	.027 - 31.3	0.85	SSL
Metals			
Copper	10.5 - 1,820	253 (SS)	Ecological PRG
Lead	9 -1,760	160	SSL
Outside Active Burning Ground			
Volatile Organic Compounds			
1,2-Dichloroethene	0.0017 - 27	0.45 (SS) 8.4 (SB)	Ecological PRG SSL
Methyl Acetate	0.0029 - 2.8	0.30 (SS)	Ecological PRG
PCE	0.001 - 11	1.1	SSL
TCE	0.003 - 730	0.81	SSL
Semivolatile Organic Compounds			
Benzo(a)anthracene	0.024 - 58	8.8	SSL
Benzo(a)pyrene	0.024 - 55	2.1	Industrial PRG
Total PAHs (low molecular weight)	0.659 - 240	29 (SS)	Ecological PRG
Total PAHs (high molecular weight)	0.22- 492	18 (SS)	Ecological PRG
Explosives			
HMX	0.076 - 530	10 (SS)	Ecological PRG
Nitroglycerin	0.5 - 30	0.37	SSL
RDX	0.082 - 7.3	0.12	SSL
Metals			
Cadmium	0.12 - 373	17.4 (SS) 130 (SB)	Ecological PRG SSL
Chromium	7- 319	42.7	Ecological PRG
Cobalt	3.7 - 60	52.3 (SS) 20.9 (SB)	Background
Copper	8.8-13,600	253 (SS) 11,000 (SB)	Ecological PRG SSL
Lead	6.5-12,100	785 (SS) 830 (SB)	Ecological PRG SSL
Mercury	0.043-56.3	1.61 (SS) 78.4 (SB)	Ecological PRG SSL
Vanadium	5.59- 994	173 (SS)	Ecological PRG

Notes:
[1] Risk drivers are COCs present at a concentration that drives the need for remedial action at the site and will be targeted for remediation at Site 1.
HMX – octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine
mg/kg – milligrams per kilogram
PAH – polycyclic aromatic hydrocarbon
PCE – tetrachloroethene
PRG – preliminary remediation goal
RDX – hexahydro-1,2,5-trinitro-1,3,5-triazine
SSL – Soil Screening Level
SS – surface soil
SB – subsurface soil
TCE – trichloroethene

2.6 Current and Potential Future Land and Resource Uses

Site 1 and the surrounding area are industrial and located within Plant 1 at ABL. The ABG is currently used for burning reactive wastes and is regulated under a RCRA permit (WVO170023691). Site 1 ABG at ABL is reasonably anticipated to remain industrial as an active RCRA unit. The OABG is an undeveloped floodplain with extensive subsurface debris. The land use of the OABG is not expected to change. The unrestricted land use scenario was quantitatively evaluated through the RI process. However, based on reasonably anticipated future land use, all alternatives evaluated in the FS included LUCs to be implemented to prevent unrestricted land use by (1) prohibiting the development and use of the property for residential housing, elementary and secondary schools, child care facilities and playgrounds, and (2) restricting intrusive activities to minimize the potential for human exposure to contamination presenting an unacceptable risk.

The remedy to address the contaminants in soil is also expected to decrease the level of contaminants entering the groundwater, surface water, and sediment media, which are being addressed under the OU-3 ROD.

2.7 Summary of Site Risks

This section summarizes the quantitative HHRA and ERA conducted during the 2006 focused RI for soil within the ABG and OABG. The human health and ecological risks were re-evaluated and included in the 2013 FS based on the most current toxicity criteria dated November 2012. The update included the addition of perchlorate, an emerging contaminant that EPA is in the process of regulating under the Safe Drinking Water Act. In addition, an evaluation of the potential for constituents to leach from soil to groundwater at levels posing a potentially unacceptable risk was completed for Site 1 soils and included in the FS. These assessments evaluated the potential for chemicals at the Site to have an adverse effect on human and ecological receptors and groundwater if no action is taken to clean up the Site.

2.7.1 Summary of Human Health Risk Assessment

The 2006 focused RI HHRA was conducted to evaluate the potential human health risks associated with dermal contact, inhalation, and ingestion of surface soil and combined soil (surface and subsurface soil) at the ABG, FDPs (addressed separately from the ABG in the 2006 focused RI), and OABG. The HHRA consists of the following components:

- Identification of Chemicals of Potential Concern (COPCs): Identification of contaminants found in soil and selection of the COPCs, which represent the subset of chemicals found in the soil that are expected to contribute the most to the risk estimates;
- Exposure Assessment: Identification of the potential pathways of human exposure and estimation of the magnitude, frequency, and duration of these exposures;
- Toxicity Assessment: Assessment of the potential adverse effects of the COPCs and compilation of the noncancer and cancer toxicity values used for developing numerical risk estimates;
- Risk Characterization: Integration of the results of the hazard, exposure, and toxicity assessments to develop numerical estimates of health risks and characterize the potential health risks associated with potential exposure to site-related contamination; and
- Uncertainty Assessment: Identification and discussion of sources of uncertainty in the risk assessment.

The calculated non-cancer hazards and cancer risks were compared to EPA's acceptable levels. EPA's acceptable hazard level is a hazard index of 1 or below for each target organ/target effect (i.e., kidney is a target organ).

EPA's generally acceptable cancer risk range for site exposures is 1×10^{-4} to 1×10^{-6}. An excess lifetime cancer risk of 1×10^{-6} indicates that an individual experiencing the reasonable maximum exposure (RME) estimate has a 1 in

1,000,000 chance of developing cancer as a result of site-related exposure. The RME exposure scenario estimates the highest level of human exposure that could reasonably be expected to occur.
The current receptor scenarios associated with Site 1 soil were evaluated for the industrial worker and adolescent trespasser/visitor. Hypothetical future scenarios associated with Site 1 soil were evaluated for the industrial worker, adolescent trespasser/visitor, adult resident, child resident, lifetime resident, and construction worker.

The 2006 focused RI HHRA indicated there are no unacceptable RME cancer risks or non-cancer hazards associated with exposure to site soils for current receptors. In addition, there are no RME non-cancer hazards above USEPA's acceptable levels for hypothetical future scenarios with the exception of future residents. The future resident child has HIs from exposure to site soil of 3.3 (FDPs), 8.9 (OABG), and 3.3 (ABG); although the future resident adult and future construction worker have total HIs exceeding 1, no target organ HIs exceed 1 for these receptors. Future lifetime residents have cancer risks of 1.7E-04 (FDPs) and 2.6E-04 (OABG). A summary of site risks from the 2006 focused RI associated with each receptor scenario is provided in **Table 3.** The COCs are identified in **Table 3** for each scenario with RME cancer risks or non-cancer hazards above EPA's acceptable levels. There are no unacceptable central tendency exposure (CTE) cancer risks and no CTE non-cancer hazards above USEPA's acceptable levels for current and future receptors with the exception of future residents (future child resident HI of 3.7 [OABG], and future lifetime resident cancer risk of 1.3E-04 [FDPs]). The CTE exposure scenario portrays the average level of exposure that could reasonably be expected to occur.

Potential adverse effects from exposure to lead by human receptors are quantified using the Integrated Exposure Uptake Biokinetic (IEUBK) model. The IEUBK model provides predictions of the probability of elevated blood lead levels for children from ages 0 to 7 years with potential exposures to lead in various media. The IEUBK model results are expressed as the predicted geometric mean blood lead level for children and the percent of the affected population potentially experiencing concentrations above EPA's recommended level of 10 micrograms per deciliter, below which adverse manifestations are not expected. If more than 5 percent of the population potentially experiences blood lead concentrations above EPA's recommended level, there is the potential for adverse effects associated with exposure to lead. Blood-lead concentrations estimated through the use of the model indicated a potential risk associated with exposure to lead in soil.

Additional soil sampling has been conducted at Site 1 since completion of the 2006 focused RI HHRA as part of the 2008 debris characterization efforts and pre-design sampling which is currently ongoing. These data have shown that concentrations detected in soil are higher than the concentrations detected in the data set evaluated in the 2006 focused RI HHRA. Therefore, although the HHRA indicated the only unacceptable risks were associated with potential future residential use of the site, based on the higher detected concentrations, there is the potential for unacceptable risks for additional receptors (current/future industrial workers, trespassers/visitors, and/or construction workers). In order to be protective of these additional receptors, potential unacceptable risks were considered when developing the RAOs and PRGs for the Site. PRGs were developed for the industrial worker, which is the current/future site receptor based on the implementation of LUCs at the site. Furthermore, all but one of the contaminant-specific SRGs (**Table 2**), are based on more stringent standards (ecological or threat to groundwater) than the industrial PRGs.

TABLE 3
Summary of Human Health Risk Assessment from the 2006 Remedial Investigation

	Exposure Route		Reasonable Maximum Exposure				Central Tendency Exposure			
Receptor	Cancer	Non-cancer	Cancer Risk***	Constituents of Concern** (EPC)	Hazard Index****	Constituents of Concern** (EPC)	Cancer Risk	Constituents of Concern** (EPC)	Hazard Index	Constituents of Concern** (EPC)
Soil* – Former Disposal Pits										
Future Resident Child	NA	Ingestion Dermal	NA	NA	**3.3**	TCE (68 mg/kg), iron (27,435 mg/kg), and thallium (0.9 mg/kg)	NA	NA	**1.3**	None (no target organ HIs exceed 1)
Future Resident Child/Adult	Ingestion Dermal Inhalation	NA	**1.7E-04**	Dioxin (0.00047 mg/kg), TCE (68 mg/kg), and arsenic (6.9 mg/kg)	NA	NA	1.3E-04	Dioxin (0.00047 mg/kg), TCE (68 mg/kg), and arsenic (6.9 mg/kg)	NA	NA
Future Construction Worker	Ingestion Dermal		6.6E-06	None	1.1	None (no target organ HIs exceed 1)	1.7E-06	None	0.25	None
Soil* – Outside Active Burning Grounds										
Future Resident Adult	NA	Ingestion Dermal	NA	NA	1.1	None (no target organ HIs exceed 1)	NA	NA	0.46	None
Future Resident Child	NA	Ingestion Dermal	NA	NA	**8.9**	TCE (64 mg/kg), antimony (6.6 mg/kg), cadmium (76 mg/kg), copper (1,658 mg/kg), iron (37,862 mg/kg), lead (559 mg/kg, COC based on IEUBK model), thallium (1.2 mg/kg), and vanadium (58mg/kg)	NA	NA	3.7	Cadmium (76 mg/kg) and vanadium (58 mg/kg)

TABLE 3

Summary of Human Health Risk Assessment from the 2006 Remedial Investigation

	Exposure Route		Reasonable Maximum Exposure				Central Tendency Exposure			
Receptor	Cancer	Non-cancer	Cancer Risk***	Constituents of Concern** (EPC)	Hazard Index****	Constituents of Concern** (EPC)	Cancer Risk	Constituents of Concern** (EPC)	Hazard Index	Constituents of Concern** (EPC)
Future Resident Child/Adult	Ingestion Dermal Inhalation	NA	**2.6E-04**	PCE (1.5 mg/kg), TCE (64 mg/kg), benzo(a)anthracene (70 mg/kg), benzo(a)pyrene (6.8 mg/kg), benzo(b)fluoranthene (8.4 mg/kg), dibenz(a,h)anthracene (0.3 mg/kg), indeno(1,2,3-cd)pyrene (2.4 mg/kg), dioxin (0.00016 mg/kg), arsenic (13 mg/kg)	NA	NA	8.2E-05	None	NA	NA
Future Construction Worker	Ingestion Dermal		9.6E-06	None	1.2	None (no target organ HIs exceed 1)	2.5E-06	None	0.63	NA
Soil* – Active Burning Grounds										
Future Resident Child	NA	Ingestion Dermal Inhalation	NA	NA	**3.3**	Iron (28,594 mg/kg) and thallium (1.3 mg/kg))	NA	NA	1.1	None (no target organ HIs exceed 1)

*Combined surface and subsurface soil

**COCs are the COPCs that contribute a cancer risk above 1E-06 to a cumulative cancer risk above 1E-04, or a non-cancer HI above 0.1 to a cumulative target organ HI above 1.

***A cumulative cancer risk above 1E-04 generally requires remedial action to reduce risks at the site.

****A target organ specific Hazard Index (HI) greater than 1 indicates there is some potential for adverse non-cancer health effects, generally requiring remedial action to reduce the non-cancer hazard.

Bold indicates a risk or hazard that exceeds the EPA's target level.

mg/kg-milligrams per kilogram

EPC- exposure point concentration

IEUBK-integrated exposure uptake biokinetic

NA – not applicable

PCE – tetrachloroethene

TCE – trichloroethene

2.7.2 Summary of Ecological Risk Assessment

The baseline ecological risk assessment (BERA) was conducted to identify potential risks to ecological receptors from exposure to Site 1 soil. The BERA consisted of the following components:

- Problem formulation: Establishes the goals, scope, and focus of the BERA, including the development of an ecological CSM for Site 1;
- Exposure assessment: Estimates the chemical concentrations in soil, termed exposure point concentrations, to which the receptors may be exposed;
- Effects assessment: Establishes exposure thresholds for defining adverse ecological effects; and
- Risk characterization: Uses the information generated during the three previous parts of the BERA to estimate potential risks to ecological receptors.

A potentially unacceptable risk to plants and/or animals at the site requires a source of contamination and a pathway for exposure to the contaminants. Because of their proximity and similarity in habitat, the ABG and FDP areas were addressed together and referred to as “upland habitat.” Because most of the OABG area is within the floodplain of the river, this area was referred to as “floodplain habitat.” The ERA was quantitatively conducted using surface soil samples collected from the top foot of the soil because this depth range represented the most realistic potential exposures for most of the ecological receptors evaluated in terrestrial habitats. However, because some ecological receptors may be exposed, at least periodically, to deeper soils, available subsurface soil data from the 12- to 24-inch depth interval (including data from a few samples that extended to 3 feet bgs) were also used.

For upland areas, potential unacceptable risks were associated with direct exposure to several metals and explosive compounds in surface soil. The upland portion of Site 1 is covered with periodically mowed grasses and other herbaceous plants, providing habitat of limited diversity and quality. Given the limited habitat quality of the ABG area, particularly in the vicinity of the active burn pads where most of the significant exceedances were found, elevated concentrations of the metal and explosive COCs are not likely to result in adverse impacts to populations of ecological receptors. For floodplain areas, potential unacceptable risks were associated with direct exposures to several metals, explosives, VOCs, and PAHs in surface soil (**Table 4**).

Surface soil COCs were selected based on a comparison of site surface soil concentrations to literature-based soil screening values and site-specific background concentrations, the results of soil toxicity testing, and the results of food web modeling. The following upper trophic level receptors were used for food web modeling:

- ABG: American robin, American kestrel, red fox, meadow vole, and short-tailed shrew
- OABG: American robin, red-shouldered hawk, long-tailed weasel, meadow vole, and short-tailed shrew

These receptors are representative of key groupings for food web exposures, as reflected in the assessment endpoints selected for evaluation in the ERA, and were selected in consultation with the Region 3 BTAG.

TABLE 4
Summary of COCs Identified in the Ecological Risk Assessment

Constituent of Concern	Upland (Active Burning Ground/Former Disposal Pit)		Floodplain (Outside Active Burning Ground)	
	Surface Soil	Food Web	Surface Soil	Food Web
Volatile Organic Compounds				
1,2-dichloroethene			X	
Methyl acetate			X	
TCE			X	
Semivolatile Organic Compounds				
2-nitroaniline	X			
PAHs			X	
Dioxin/furans				
Total dioxin/furans (TEQ)				X
Explosives				
1,3,5-trinitrobenzene	X			
HMX	X		X	
Nitroglycerin	X		X	
Perchlorate	X			
RDX	X		X	
Metals				
Cadmium			X	X
Chromium			X	
Copper	X		X	
Lead	X		X	X
Mercury	X		X	X
Nickel			X	
Silver			X	
Vanadium			X	
Zinc			X	X

Notes:
Information summarized from the 2006 Focused Remedial Investigation
HMX - Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine
PAH - polyaromatic hydrocarbon
RDX - Hexahydro-1,2,5-trinitro-1,3,5-triazine
TCE – trichloroethane
TEQ - toxic equivalency quotient
X – potential ecological risk is present

2.7.3 Soil to Groundwater Leaching

Site-specific soil screening levels (SSLs) were developed as estimates of contaminant concentrations in soil that are protective of the uppermost groundwater-bearing unit. The natural process is that infiltrating precipitation leaches the contaminants from the soil and transports them into the aquifer, and the contaminants are then diluted by the lateral flow within the aquifer. Potable groundwater use is assumed for the hypothetical future scenario for the Site 1 SSL evaluation. A qualitative summary showing the type and location of contaminants that pose potential site risks associated with the soil-to-groundwater leaching scenario for the ABG and OABG is provided in **Table 5** and **Table 6**, respectively.

TABLE 5
Summary of COCs Identified in the Soil-to-Groundwater Leaching Model for the ABG

Constituent of Concern	Active Burning Ground		Former Disposal Pits	
	Surface Soil	Subsurface Soil	Surface Soil	Subsurface Soil
Volatile Organic Compounds				
1,1-dichlorothene				X
PCE	X	X		X
TCE	X	X	X	X
Semivolatile Organic Compounds				
2-nitroaniline	X			
Explosives				
1,3,5-trinitrobenzene	X			
Nitroglycerin	X	X		
RDX	X	X	X	X
Metals				
Antimony		X		
Cobalt	X	X	X	X
Iron	X	X	X	X
Lead	X	X		
Manganese	X	X	X	X

Notes:
Information summarized from the 2013 SRG Tech Memo
PCE – tetrachloroethene
RDX - Hexahydro-1,2,5-trinitro-1,3,5-triazine
TCE – trichloroethene
X – potential soil-to-groundwater leaching risk is present

TABLE 6
Summary of COCs Identified in the Soil-to-Groundwater Leaching Model for the Outside Active Burning Ground

Constituent of Concern	Western Outside Active Burning Ground		Central Outside Active Burning Ground	Eastern Outside Active Burning Ground	
	Surface Soil	Subsurface Soil	Subsurface Soil	Surface Soil	Subsurface Soil
Volatile Organic Compounds					
1,2,4-trichlorobenzene[1]					X
Bromodichloromethane[1]				X	
trans-1,2-dichloroethene				X	
PCE				X	
TCE	X	X		X	X
Semivolatile Organic Compounds					
1,1-biphenyl		X			
benzo(b)fluoranthene		X			
Naphthalene[1]		X			
Explosives					
Nitroglycerin				X	X
RDX				X	X
Metals					
Cadmium				X	X
Cobalt	X	X	X	X	X
Copper				X	
Iron	X	X		X	X
Lead	X			X	X
Mercury					X

Notes:
Information summarized from the 2013 SRG Tech Memo
[1] COC based on leaching concern documented in the Revised Draft Proposed RAOs and Remediation Goals for Site 1 Soil
PCE - tetrachloroethene
RDX - Hexahydro-1,2,5-trinitro-1,3,5-triazine
TCE – trichloroethene
X - soil-to-groundwater leaching risk exists

2.7.4 Basis for Response Action

It is the current judgment of the Navy and USEPA, with the concurrence of WVDEP that the Selected Remedy identified in this ROD is necessary to protect human health or welfare or the environment from actual or threatened releases of hazardous substances into the environment. Based on the HHRA, ERA, and SSL evaluation, exposure to debris and VOCs, SVOCs, dioxins, explosives, and/or inorganics in soil at Site 1 as listed on **Table 2** poses an unacceptable risk to human health and/or the environment.

2.8 Remedial Action Objectives

The site-specific RAOs for soil at Site 1 are:

- Prevent or minimize direct contact with soil COCs at concentrations above SRGs that pose unacceptable risks to current and future industrial workers, trespasser/visitor adolescents, construction workers, hypothetical future residents, and ecological receptors;
- Prevent or minimize overland migration of COCs at concentrations above SRGs to the North Branch Potomac River;
- Prevent or minimize migration of COCs at concentrations above SRGs from soil to groundwater, in order to enhance the ability of the groundwater remedy to restore the aquifers to beneficial use;
- Render area free of surficial debris (including partially exposed debris) from within the boundaries of the OABG; and
- Control erosion and riverbank scour to prevent subsurface debris from becoming exposed.

SRGs were developed for the COC risk drivers in soil based on the lower of the human health and ecological risk-based PRGs, site-specific SSLs (as applicable), or facility-wide background concentration (as applicable)(see **Table 2**). Through a statistical evaluation of site-wide soil concentrations in comparison to the SRGs, the AOCs were estimated as shown on **Figure 3** for targeted remediation to mitigate unacceptable risk.

2.9 Description of Remedial Alternatives

The remedial alternatives developed to address soil contamination in the ABG and the OABG are detailed in the FS. The potential future scenario for hypothetical residential receptors was evaluated in the 2006 focused RI but is not addressed by the remedial alternatives because the ABG is an active RCRA unit and land use in both the ABG and OABG is to remain industrial. Therefore, LUCs to prohibit residential-type development and to restrict intrusive activities to minimize the potential for human exposure to contamination are a common element of each remedial alternative evaluated. Screening of remedial technologies identified two remedial alternatives in the ABG and three remedial alternatives in the OABG for detailed evaluation and comparative analysis. The alternatives are as follow:

TABLE 7
Summary of Remedial Alternatives

Alternative	ABG	OABG
1	No Action	No Action
2	Excavation of AOCs, Offsite Disposal, LUCs, and Long-term Management (LTMgt)	Removal of Surface Debris, Excavation of AOCs, Offsite Disposal, LUCs, and LTMgt
3	Not applicable	Removal of Surface Debris, Excavation of AOCs, *Ex-Situ* Treatment, Offsite Disposal, LUCs, and LTMgt

Details of the components for each of the remedial alternatives are provided in **Table 8**. In addition to the remedial alternative components developed in the FS and listed above in Table 7, a bank restoration component has been developed for the OABG, incorporating sustainable practices focused on using native plants and grasses for enduring, regenerative stabilization of the bank that will provide long-term erosion protection, and utilizing bioengineered materials to reduce resource consumption. The restoration will control erosion and riverbank scour to prevent subsurface debris from becoming exposed in order to achieve RAOs.

2.9.1 Description of Remedial Alternatives

Table 8 provides the major components, details, and cost of each remedial alternative evaluated for Site 1 ABG and OABG soil.

TABLE 8
Remedial Alternatives

Alternative	Description	Costs
ABG -1	No Action	Capital Cost: $0 Present-worth Operation and Maintenance (O&M): $0 Total Present-worth: $0 Construction Timeframe: Not applicable Timeframe to achieve RAOs: Not applicable
ABG - 2	Excavation of AOCs, Offsite Disposal, LUCs, and LTMgt Alternative 2 involves excavation of the areas comprising AOCs 1 through 6 within the ABG; backfill to original grade; offsite disposal; LUCs (1) to prohibit the development and use of the property for residential housing, elementary and secondary schools, child care facilities and playgrounds, and (2) to restrict intrusive activities to minimize the potential for human exposure to contamination presenting an unacceptable risk; and LTMgt to ensure continued protection following remedy implementation by conducting LUC inspections, vegetation/erosion repairs, and/or maintenance. In addition, residual contamination left in place after the NTCRA of FDP 1 and FDP 3 will be managed in the same manner as the AOCs (excavation, backfill, offsite disposal, LUCs, and LTMgt).	Capital Cost: $718,695 Present-worth O&M: $0 Total Present-worth: $718,695 Construction Timeframe: 5 weeks Timeframe to achieve RAOs: 1 year
OABG -1	No Action	Capital Cost: $0 Present-worth O&M: $0 Total Present-worth Cost: $0 Construction Timeframe: Not applicable Timeframe to achieve RAOs: Not applicable
OABG - 2	Removal of Surface Debris, Excavation of AOCs, Offsite Disposal, LUCs, and LTMgt Alternative 2 involves removal of surficial debris; excavation of the areas comprising AOCs 1 through 11 within the OABG; UXO support; debris handling and management; reconfiguration of the Western Drainage Ditch; offsite disposal; sustainable bank restoration focused on using native plants and grasses for enduring, regenerative stabilization of the bank that will provide long-term erosion protection; LUCs (1) to prohibit the development and use of the property for residential housing, elementary and secondary schools, child care facilities and playgrounds, and (2) to restrict intrusive activities to minimize the potential for human exposure to contamination presenting an unacceptable risk; and LTMgt to ensure continued protection following remedy implementation by conducting LUC inspections, vegetation/erosion repairs, and/or maintenance.	Capital Cost: $10,194,241 Present-worth O&M: $210,862 Construction Timeframe: 24 weeks Total Present-worth: $10,405,103 Timeframe to achieve RAOs: 5 years with LTMgt lifecycle cost for 30 years
OABG - 3	Removal of Surface Debris, Excavation of AOCs, *Ex Situ* Treatment, Offsite Disposal, LUCs, and LTMgt Alternative 3 comprises the same components as Alternative 2, with an additional component of treatment via *ex situ* thermal desorption of soil deemed hazardous to levels deemed non-hazardous before offsite disposal.	Capital Cost: $8,334,872 Present-worth O&M: $ 210,862 Construction Timeframe: 33 weeks Total Present-worth: $8,545,734 Timeframe to achieve RAOs: 5 years with LTMgt lifecycle cost for 30 years [a]

Note:
[a] Costs beyond 30 years have minimal impact to the overall evaluation as a result of the present worth adjustment.

2.9.2 Common Elements and Distinguishing Features of Each Alternative

Each alternative, except the "no action" alternative for both the ABG and OABG, meets the applicable or relevant and appropriate requirements (ARARs). Common elements and distinguishing features of the alternatives (with the exception of the "no action" Alternative 1) for the ABG and the OABG are summarized as follow.

Common Elements:

- Alternatives 2 and 3 for the OABG include removal of surface debris and excavation of the AOCs.
- Offsite disposal is common to Alternative 2 for the ABG and Alternatives 2 and 3 for the OABG.
- LUCs and LTMgt will be required for Alternative 2 for the ABG and Alternatives 2 and 3 for the OABG.

Distinguishing Features:

- Alternative 3 for the OABG includes treatment via *ex situ* thermal desorption of soil deemed hazardous to levels deemed non-hazardous before offsite disposal. This would reduce the overall cost of the remedy for the OABG by reducing disposal costs.

2.9.3 Expected Outcomes of Each Alternative

Under each alternative, except the "no action" alternatives for the ABG and the OABG, soil will be remediated to a level that does not pose a risk to human health and environment under the current industrial land use. The remedy will also reduce migration of contaminants from soil to groundwater. Because the ABG is an active RCRA unit, and because the OABG will contain buried debris in place, the remedial action for soil is not expected to achieve unrestricted use at the site.

2.10 Comparative Analysis of Remedial Alternatives

Each remedial alternative was evaluated against the nine criteria established by the NCP at 40 CFR 300.430(e)(9)(iii), which consist of the two threshold criteria, five balancing criteria, and two modifying criteria listed and described below.

Threshold Criteria

The threshold criteria must be met in order for the alternative to be eligible for selection.

- *Overall Protection of Human Health and the Environment.* Assessment of whether the alternative can adequately protect human health and the environment, in both the short- and long-term, from unacceptable risks posed by hazardous substances, pollutants, or contaminants present at the site by eliminating, reducing, or controlling exposures to levels established during development of remediation goals. Overall protection of human health and the environment draws on the assessments of other evaluation criteria, especially long-term effectiveness and permanence, short-term effectiveness, and compliance with ARARs.
- *Compliance with ARARs*. Assessment of whether the alternative can attain applicable or relevant and appropriate requirements under federal environmental laws and state environmental or facility siting laws or provide grounds for invoking one of the waivers.

Balancing Criteria

The primary balancing criteria include considerations that are used to weigh major trade-offs among alternatives.

- *Long-term Effectiveness and Permanence*. Assessment of the expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup levels have been met. This criterion includes the consideration of the residual risk that will remain onsite following remediation and the adequacy and reliability of controls.

- *Reduction of Toxicity, Mobility, and Volume through Treatment*. Assessment of the degree to which each of the alternatives employs recycling or treatment that reduces toxicity, mobility, or volume, including how treatment is used to address the principal threats posed by the site.
- *Short-term Effectiveness*. Assessment of the time period needed to implement the alternatives and any adverse impacts that may be posed to workers, the community, and the environment during construction and operation until cleanup levels are achieved.
- *Implementability*. Assessment of the ease or difficulty of implementing the alternatives by considering the technical feasibility, administrative feasibility, and availability of services and materials.
- *Cost.* Assessment of the cost of the alternatives by considering the capital cost, annual operation and maintenance cost, and net present value of these costs.

Modifying Criteria

The modifying criteria, which include State and community acceptance, are considered following the public comment period on the proposed plan (see **Appendix A**).

- *State Acceptance*. Assessment of state concerns by considering the State's position and key concerns related to the preferred alternative and other alternatives, and State comments on ARARs or the proposed use of waivers.
- *Community Acceptance*. Assessment of which components of the alternatives interested persons in the community support, have reservations about, or oppose.

The following is a discussion of how well each remedial alternative satisfies each of the nine criteria relative to the other alternatives that were considered.

2.10.1 Active Burning Ground

Threshold Criteria

1) Overall Protection of Human Health and the Environment

Alternative 1, the No Action alternative, would not be protective of human health and the environment because contaminants would be left in place that could pose risk for several human exposure scenarios, and there would be no LUCs to prevent such exposures. Furthermore, since the contaminated soil in the AOCs would not be excavated, contaminants would continue to leach into groundwater and through the groundwater to the sediment and river, thus exposing ecological receptors to potentially unsafe levels of contaminants. Therefore, since Alternative 1 would not satisfy this threshold criterion, it will not be considered further in this analysis. Alternative 2 would be protective of human health and the environment because it includes removal of the contaminated soil in the AOCs and FDP's 1 and 3, as well as LUCs to prohibit residential-type development and to restrict intrusive activities to minimize the potential for human exposure to residual contamination. Furthermore, since the contaminated soil in the AOCs would be excavated, contaminants would not continue to leach into groundwater and through the groundwater to the sediment and river, thus reducing exposure of ecological receptors to potentially unsafe levels of contaminants. Alternative 2 also includes performance monitoring to confirm that the remedy is functioning and protective.

2) Compliance with Applicable or Relevant and Appropriate Requirements

Alternative 2 is expected to comply with ARARs, which can be found in **Appendix B**.

The West Virginia ARARs associated with Alternative 2 are chemical-specific (i.e., soils being a source of contamination to other media), location-specific (i.e., areas within the 100-year floodplain), and action-specific (i.e., erosion and sediment controls during land disturbance; hazardous waste accumulation and treatment in containers for less than 90 days; accumulation of hazardous waste in staging piles onsite; excavating and soil staging; generation of fugitive dust; discharge to waters of the State; site closure with waste in place; soil boring/ well construction and abandonment; and outdoor material storage or disposal activities). The Maryland ARARs associated with Alternative 2 are location-specific (i.e., surface waters of the State) and action-specific (i.e., shoreline protection; and water resources of the State). There are no Maryland chemical-specific ARARs that apply to Alternative 2. The Federal ARARs associated with Alternative 2 are location-specific (i.e., areas subject to the Migratory Bird Treaty Act) and action-specific (i.e., discharge or dredge and fill to waters of the United States; and storage of fuels and oils onsite). There are no Federal chemical-specific ARARs that apply to Alternative 2.

Primary Balancing Criteria

3) Long-term Effectiveness and Permanence

Alternative 2 is expected to be effective in the long term. The residual risks associated with Alternative 2 are anticipated to be low given the excavation and offsite disposal of the area with the highest contaminant concentrations. With proper engineering, planning, and implementation, controls would be put in place to prevent unacceptable exposure to residual contamination. Because the remedy would not address risks to all receptors sufficiently in order to allow for unlimited use and unrestricted exposure (UU/UE), LUCs would need to be continually enforced. Reviews at least every five years, as required, would be necessary to evaluate the effectiveness of this alternative because contaminants would remain onsite at concentrations above health-based levels for unrestricted use.

4) Reduction of Toxicity, Mobility and Volume through Treatment

Alternative 2 does not involve treatment and, therefore, does not satisfy this criterion.

5) Short-term Effectiveness

Alternative 2 would be highly effective in the short term as a result of the estimated 5-week timeframe for excavation of the AOCs. There would be short-term risks to the community and workers from exposure to site contaminants associated with the construction activities; however, the short-term risks under Alternative 2 would be minimized through the implementation of the appropriate health and safety procedures and through proper engineering and implementation of construction standard operating procedures. Short-term disruptions to daily ABL operations and the local community might be experienced from heavy equipment operation, such as increased traffic of construction trucks in and out of the site; dust generation from heavy equipment during re-grading, excavation, or backfill operations; and transportation of clean fill from an offsite source. These disruptions would be minimized, to the extent practical, through proper planning for traffic diversion and periodic dust suppression.

The FS quantitatively evaluated sustainability metrics using SiteWise, a tool developed jointly by Battelle, the Navy, and U.S. Army Corps of Engineers to evaluate the environmental footprint of each remedial alternative in terms of metrics that coincide with the criteria established by the NCP. Based on this evaluation, it is estimated that Alternative 2 would emit approximately 130 metric tons of carbon dioxide equivalents. The environmental footprint of Alternative 2 would primarily be driven by impacts associated with borrow pit operations for backfill and transportation of fill and excavated material to and from the site.

6) Implementability

Alternative 2 could be easily implemented as its technology (excavation and offsite disposal) is readily available, reliable, able to be monitored for effectiveness, and has been used successfully at many other sites.

7) Cost

The costs associated with each ABG alternative are presented in **Table 8**, including the capital cost, O&M present-worth, and total present-worth. The capital cost for Alternative 2 would be approximately $719,000. There would be no O&M associated with Alternative 2; therefore, the present worth cost for this alternative would also be approximately $719,000.

Modifying Criteria

8) State Acceptance

State involvement has been solicited throughout the CERCLA process and remedy selection. The State supports Alternative 2 for the ABG. The State does not believe that Alternative 1 provides adequate protection for human health or the environment.

9) Community Acceptance

Community acceptance was evaluated after the public comment period for the Proposed Plan. No written comments were received during the public comment period (See Section 3, Responsiveness Summary, of this ROD). The transcript for the public meeting is included as **Appendix A**.

2.10.2 Outside Active Burning Ground

Threshold Criteria

1) Overall Protection of Human Health and the Environment

Alternative 1, the No Action alternative, would not be protective of human health and the environment because surficial debris and contaminants would be left in place that could pose risk for several human exposure scenarios, and there would be no LUCs to prevent such exposures. Furthermore, since the contaminated soil in the AOCs would not be excavated, contaminants would continue to leach into groundwater and through the groundwater to the sediment and river, thus exposing ecological receptors to potentially unsafe levels of contaminants. Finally, without any plan to restore the riverbank, buried debris could become exposed, thus presenting a hazard to human and ecological receptors. Therefore, since Alternative 1 would not satisfy this threshold criterion, it will not be considered further in this analysis. Alternatives 2 and 3 would both be protective of human health and the environment because they both include removal of surface debris, excavation of the contaminated soil in the AOCs, and LUCs to prohibit residential-type development and to restrict intrusive activities to minimize the potential for human exposure to residual contamination and buried debris. Both alternatives would result in subsurface debris remaining in place; however, both alternatives would include performance monitoring to confirm that the remedy is functioning and protective. Furthermore, since the contaminated soil in the AOCs would be excavated, contaminants would not continue to leach into groundwater and through the groundwater to the sediment and river, thus reducing exposure of ecological receptors to potentially unsafe levels of contaminants.

2) Compliance with Applicable or Relevant and Appropriate Requirements

Both Alternatives 2 and 3 are expected to comply with ARARs. The ARARs for the Selected Remedy (Alternative 2) can be found in **Appendix B**.

The West Virginia ARARs associated with Alternative 2 and 3 are chemical-specific (i.e., soils being a source of contamination to other media), location-specific (i.e., areas within the 100-year floodplain), and action-specific (i.e., erosion and sediment controls during land disturbance; hazardous waste accumulation and treatment in containers for less than 90 days; accumulation of hazardous waste in staging piles onsite; excavating and soil staging; generation of fugitive dust; discharge to waters of the State; site closure with waste in place; soil boring and well construction and abandonment; and outdoor material storage or disposal activities). Additional potential West Virginia ARARs associated with only Alternative 3 were action specific (i.e., accumulation or treatment of hazardous waste onsite; and treatment of hazardous waste). The Maryland ARARs associated with Alternative 2 and 3 are location-specific (i.e., surface waters of the State) and action-specific (i.e., shoreline protection; and water resources of the State). There are no Maryland chemical-specific ARARs that apply to Alternative 2 and 3. The Federal ARARs associated with Alternative 2 and 3 are location-specific (i.e., areas subject to the Migratory Bird Treaty Act) and action-specific (i.e., discharge of dredge or fill to waters of the United States; and storage of fuels and oils onsite). There are no Federal chemical-specific ARARs that apply to Alternative 2 or 3.

Primary Balancing Criteria

3) Long-term Effectiveness and Permanence

Both Alternative 2 and Alternative 3 would be expected to be effective in the long term. The residual risks for Alternatives 2 and 3 are anticipated to be at relatively the same magnitude given the excavation and offsite disposal of the area with the highest contaminant concentrations. With proper engineering, planning, and implementation, controls would be put in place to monitor all the alternatives effectively to verify continued compliance with RAOs. Because these remedies would not address risks to all receptors sufficiently in order to allow for UU/UE, LUCs would need to be continually enforced. Alternative 3 would have a lower level of confidence due to the reliance on treatment prior to offsite disposal. This is due to the fact that there are uncertainties associated with the treatment of various COCs (VOCs, SVOCs, explosives, and metals) to non-hazardous levels using a single technology. These uncertainties give rise to the potential need for multiple rounds of treatment to reach SRGs, which could lead to excess cost.

4) Reduction of Toxicity, Mobility and Volume through Treatment

Alternative 2 does not involve treatment and, therefore, does not satisfy this criterion. Alternative 3 provides active *ex situ* treatment through implementation of thermal treatment prior to offsite disposal and does, therefore, satisfy this criterion.

5) Short-term Effectiveness

Both Alternatives 2 and 3 would be effective in the short-term to a similar degree because they each would have similar impacts on the community and risks to the workers during implementation. However, Alternative 3 would present a slightly higher risk to construction workers during implementation due to the handling of equipment and materials required for the *ex situ* thermal treatment, and additional waste streams generated from the treatment.

Alternative 2 would be more effective in the short-term than Alternative 3 as a result of having the shortest timeframe, estimated at 24 weeks, for achieving RAOs through excavation of the AOCs. Alternative 3 is rated slightly lower because it would require a longer timeframe, estimated at 33 weeks, to achieve the RAOs due to the addition of the *ex situ* treatment component. Under both alternatives, there would be short-term risks to the community and workers from exposure to site contaminants associated with the construction activities. However, the short-term risks would be minimized through the implementation of the appropriate health and safety procedures and through proper engineering and implementation of construction standard operating procedures. Short-term disruptions and outdoor air quality impacts to daily ABL operations and the local community might be experienced from heavy equipment operation, such as increased traffic of construction trucks in and out of the site; dust generation from heavy equipment during re-grading, excavation, or backfill operations; and transportation of clean fill from an offsite source. These disruptions would be minimized, to the extent practical, through proper planning for traffic diversion and periodic dust suppression.

The FS quantitatively evaluated sustainability metrics using SiteWise, a tool developed jointly by Battelle, the Navy, and U.S. Army Corps of Engineers to evaluate the environmental footprint of each remedial alternative in terms of metrics that coincide with the criteria established by the NCP. Based on this evaluation, it is estimated that Alternative 2 would emit approximately 2,150 metric tons of carbon dioxide emissions, while Alternative 3 would emit approximately 3,700 metric tons of GHG emissions. The environmental footprint of Alternative 2 would primarily be driven by the offsite disposal of the excavated material, including transportation of excavated material to hazardous and non-hazardous landfills. The environmental footprint of Alternative 3 would primarily be driven by fuel use for the *ex situ* thermal treatment and handling of the excavated material.

6) Implementability

Alternatives 2 and 3 could both be easily implemented as their technologies are readily available, reliable, able to be monitored for effectiveness, and have been used successfully at many other sites. Alternative 2 would be more easily implemented than Alternative 3 because it would not involve the space requirements, uncertainties, and potential limitations associated with the *ex situ* treatment, making it a more reliable alternative. Alternative 3 would be slightly more difficult to implement due to the additional *ex situ* treatment component. This is due to the fact that there are uncertainties associated with the treatment of various COCs (VOCs, SVOCs, explosives, and metals) to non-hazardous levels using a single technology. These uncertainties could give rise to the potential need for multiple rounds of treatment to reach SRGs, which could lead to excess cost.

7) Cost

The costs associated with each OABG alternative are presented in **Table 8**, including the capital cost, O&M present-worth, and total present-worth. With the exception of the no action alternative, the least expensive alternative is Alternative 3, with a total present-worth of approximately $8.55 million. The total present-worth of Alternative 2 is approximately $10.41 million. Alternative 3 also would have the lowest total capital cost, estimated at $8.33 million. The capital cost for Alternative 2 would be an estimated $10.19 million.

The total present-worth of OABG Alternative 2 is 22 percent greater than that of OABG Alternative 3. However, the benefit of reducing the uncertainty associated with the effectiveness of the *ex situ* treatment is considered by the Navy to be worth the additional cost. The *ex situ* treatment may have limitations that could lead to significant cost growth if multiple rounds of treatment are required and/or if treatment goals cannot be achieved.

Modifying Criteria

8) State Acceptance

State involvement has been solicited throughout the CERCLA process and proposed remedy selection. The State supports Alternative 2 as the preferred alternative.

9) Community Acceptance

Community acceptance was evaluated after the public comment period for the Proposed Plan. No written comments were received during the public comment period (See Section 3, Responsiveness Summary, of this ROD). The transcript for the public meeting is included as **Appendix A**.

2.11 Principal Threat Wastes

"Principal threat wastes" are source materials that are considered to be highly toxic or highly mobile and that generally cannot be reliably contained or would present a significant risk to human health or the environment should they be exposed. Previous investigations in the ABG and the subsequent removal action did not conclusively indicate the presence of DNAPL in FDP unsaturated soil. Therefore, the Navy, with concurrence from EPA and WVDEP, concluded the FDPs did not contain principal threat waste. However, it was recognized that VOCs in soil, primarily TCE, are a continuing source to groundwater contamination and, therefore, an NTCRA was completed to remove the FDP vadose zone soil. In the OABG, the waste at Site 1 consists of debris from burning, and such debris is not considered a principal threat waste. Based upon the absence of identified DNAPL, principal threat wastes are not believed to be present at Site 1 soil.

2.12 Selected Remedy

2.12.1 Rationale for Selected Remedy

The Navy and USEPA, with the support of WVDEP, have selected the following alternatives as the final remedy based on the comparative analysis:

- ABG - Alternative 2: Excavation of AOCs, Offsite Disposal, LUCs, and LTMgt
- OABG - Alternative 2: Removal of Surface Debris, Excavation of AOCs, Offsite Disposal, LUCs, and LTMgt

These alternatives are selected because they can be effectively implemented using readily available engineering and construction practices, are effective both in the short term and in the long term, and will ultimately reduce contaminant mobility by removing the source material that contributes to the soil-to-groundwater leaching risk at a reasonable cost. Because ABL is an active industrial facility and the ABG is an active RCRA unit, appropriate personnel will be involved during the design and planning phases to ensure the Selected Remedy will not interfere with the continued use of the ABG during and after remedy construction.

LTMgt will be implemented to monitor the effectiveness of the Selected Remedy, including inspections to assess vegetation and erosion and make any necessary repairs in the OABG. Additionally, following signature of the ROD, a LUC Remedial Design (RD) will be developed and LUCs will be implemented and maintained by the Navy (1) to prohibit the development and use of the property for residential housing, elementary and secondary schools, child care facilities, and playgrounds; and (2) to restrict intrusive activities to minimize the potential for human exposure to contamination presenting an unacceptable risk. Also, since contaminants and buried debris will remain on site at levels that do not allow for UU/UE, as required by CERCLA, Five-year Reviews will be conducted to assess the effectiveness of the remedy.

Based on information currently available, the Selected Remedy (ABG Alternative 2 and OABG Alternative 2) meets the threshold criteria and provides the best balance of tradeoffs with respect to the balancing and modifying criteria. Although the present worth cost for OABG Alternative 3 was lower than for Alternative 2, the Navy and EPA selected Alternative 2 because the benefit of avoiding the uncertainty associated with the effectiveness of the *ex situ* treatment included in Alternative 3 was considered by the Navy to be worth the additional cost. The Navy expects the selected alternative to satisfy the statutory requirements of CERCLA Section 121 (b), including: (1) protection of human health and the environment, (2) compliance with ARARs, (3) cost-effectiveness, and (4) use of permanent solutions.

2.12.2 Description of Selected Remedy

Active Burning Ground

Alternative 2 – Excavation of AOCs, Offsite Disposal, LUCs, and LTMgt

Alternative 2 consists of excavation and offsite disposal of the AOCs. The components of this alternative are as follow:

- Excavation of AOCs: Assumes that AOCs 1 through 6 will be excavated to an estimated vertical depth of 5 feet bgs. The extent of excavation was estimated based on a comparison of soil concentrations to the SRGs performed during the FS, and it will be refined in the Remedial Design. Each AOC will then be backfilled to grade with imported soil. Land survey and compaction will be required because the ABG AOCs are within the actively used portion of Site 1. The ABG will be restored to pre-excavation conditions with topsoil, seeding, and mulching. The residual contamination related to FDP 1 and FDP 3 will be managed in the same manner as the AOCs.
- Offsite Disposal: Excavated soil will be transported to and disposed of at an approved disposal facility via truck.
- LUCs: LUCs will be implemented to (1) prohibit the development and use of the property for residential housing, elementary and secondary schools, child care facilities and playgrounds, and (2) restrict intrusive activities to minimize the potential for human exposure to contamination. LUCs will be maintained for the long term because contaminants and buried debris will remain onsite at levels that do not allow for UU/UE.
- LTMgt: The Site will be managed to ensure the remedial design components, primarily for erosion control, continue to meet the RAOs. LTMgt will also include site inspections, including monitoring the implementation of the LUCs, and any necessary vegetation maintenance or erosion repairs.

Outside Active Burning Ground

Alternative 2 – Removal of Surface Debris, Excavation of AOCs, Offsite Disposal, LUCs, and LTMgt

Alternative 2 consists of excavation and offsite disposal of the AOCs. As part of this alternative, surficial debris (including partially exposed debris) will be removed and properly disposed. A pre-design study will be conducted to delineate more precisely the lateral and vertical extent of contamination in support of the remedial design process, which will minimize excavation effort. In addition, a bank restoration approach has been developed that focuses on using bioengineering techniques and native vegetation for enduring, sustainable bank stabilization and erosion protection in order to maintain a natural floodplain and reduce resource consumption. The components of this alternative are as follow:

- Removal of Surface Debris: Although the extent of surface debris is unknown at this time, the volume of surface debris has been estimated as five times the volume removed during the 2008 OABG limited surface debris removal, or approximately 500 cubic yards. It should also be noted that the ballistic rocket casings are asbestos- and cadmium-contaminated and will be managed as material potentially presenting an explosive hazard (MPPEH) under the established protocols set forth by the Naval Ordnance Safety and Security Activity Instruction 8020.15D.
- Excavation of AOCs: For the OABG, it is assumed that AOCs 1 through 11 will be excavated to the water table (estimated to range between 10-12 feet bgs). The extent of excavation was estimated based on a comparison of soil concentrations to the SRGs performed during the FS, and it will be refined in the Remedial Design. All excavated material generated from the OABG will be mechanically screened prior to offsite disposal to ensure removal of MPPEH and asbestos containing material. The segregation of the excavated material will also support the efforts to reuse and recycle material. Unlike the ABG, compaction testing is not required because the OABG AOCs are not within the actively used portion of Site 1; however, a survey will be conducted to ensure that the AOCs are backfilled to sufficient compaction to support the bank and site restoration. The restoration, including bank stabilization, will occur across the OABG and span the West, Central, and East OABG portions to achieve RAOs. Activities include limited backfilling with imported soil as part of a sustainable restoration approach, with native plants installed throughout. This also includes the restoration of the Western Drainage Ditch.
- Offsite Disposal: Excavated soil and debris will be transported to and disposed of at an approved disposal facility via truck.
- LUCs: LUCs will be implemented to (1) prohibit the development and use of the property for residential housing, elementary and secondary schools, child care facilities and playgrounds, and (2) restrict intrusive activities to minimize the potential for human exposure to contamination. LUCs will be maintained for the long term because contaminants and buried debris will remain onsite at levels that do not allow for UU/UE.
- LTMgt: The Site will be managed to ensure the remedial design components, primarily for erosion control, continue to meet the RAOs. LTMgt will also include site inspections, including monitoring the implementation of the LUCs, and any necessary vegetation maintenance or erosion repairs.

LUCs will be maintained across the Site 1 boundary shown on **Figure 2** because residual contaminants and buried debris will remain on site following completion of the remedy. Details and requirements of the LUCs, including implementation and maintenance actions and periodic inspections, will be developed and documented in the LUC Remedial Design, which the Navy will submit within 90 days of ROD signature. The Navy will be responsible for implementing, maintaining, reporting on, and enforcing the LUCS. Although the Navy may later transfer responsibility to implement the LUCs to another party by contract, property transfer agreement, or through other means, the Navy shall retain ultimate responsibility for remedy integrity.

2.12.3 Summary of the Estimated Remedy Costs

Active Burning Ground

The capital costs for Alternative 2 are $718,695, and the total present-worth costs for Alternative 2 are $718,695 (**Table 9**). LUCs and LTMgt are expected to be minimal and are accounted for under the OABG. The primary costs for Alternative 2 are associated with the excavation and offsite disposal of the contaminated soil to a non-hazardous landfill. Costs are within the -30 percent to +50 percent degree of accuracy associated with conceptual-level cost estimates for the FS outlined by the USEPA guidance.

Outside Active Burning Ground

The capital costs for Alternative 2 are $10,194,241 and the total present-worth costs for Alternative 2 are $10,335,491 (**Table 9**). The primary costs for Alternative 2 are associated with the excavation and offsite disposal of the contaminated soil and debris to certified RCRA D and RCRA C landfills. It is anticipated that RCRA D waste will be comprised of non-hazardous soil and debris such as construction debris, and RCRA C waste will be comprised of hazardous soil and debris such as asbestos contaminated material. Costs are within the -30 percent to +50 percent degree of accuracy associated with conceptual-level cost estimates for the FS outlined by the USEPA guidance.

TABLE 9
Cost Summary

Remedial Alternative	Description	Construction Time (weeks)	Operation Time (years)	Capital Cost	Present Worth O&M Costs	Total Present Worth
Active Burning Ground						
1	No Action	0	0	$0	$0	$0
2	Excavation of AOCs, Offsite Disposal, LUCs, and LTMgt	5	0	$718,695	$0	$718,695
Outside Active Burning Ground						
1	No Action	0	0	$0	$0	$0
2	Removal of Surface Debris, Excavation or AOCs, Offsite Disposal, LUCs, and LTMgt	24	30	$10,194,241	$141,249	$10,335,490
3	Removal of Surface Debris, Excavation or AOCs, *Ex Situ* Treatment, Offsite Disposal, LUCs, and LTMgt	33	30	$8,334,872	$141,249	$8,476,121

2.12.4 Expected Outcomes of the Selected Remedy

The expected outcomes of the selected remedy are provided in **Table 10**. Land use at Site 1 is currently industrial and will continue to be used for industrial purposes for the foreseeable future. Implementation of the Selected Remedy will not reduce contaminant concentrations at the Site to levels that would allow for unrestricted exposure to the soil at Site 1; therefore, LUCs will be implemented and will be maintained indefinitely (1) to prohibit the development and use of the property for residential housing, elementary and secondary schools, child care facilities and playgrounds, and (2) to restrict intrusive activities to minimize the potential for human exposure to contamination presenting an unacceptable risk. Long term Management of the OABG will be required to monitor the stabilization of the river bank. The remedy to address the contaminants in soil is also expected to decrease the level of contaminants entering the groundwater, surface water, and sediment media, which are being addressed under the OU-3 ROD.

2.13 Statutory Determinations

In accordance with the NCP, the Selected Remedy, Alternative 2 for the ABG and Alternative 2 for the OABG, meets the following statutory requirements:

Protection of Human Health and the Environment—Alternative 2 for the ABG and Alternative 2 for the OABG are protective of human health and the environment. The contaminated soil will be excavated and removed from the ABG and OABG, which will mitigate unacceptable risks for current and reasonably anticipated future land use.

Compliance with ARARs—The Selected Remedy complies with all ARARs (see **Appendix B**).

Cost-Effectiveness—The Selected Remedy represents the most reasonable value relative to cost. The costs are proportional to overall effectiveness because the remedy achieves long-term effectiveness and permanence within a reasonable timeframe.

Use of Permanent Solutions and Alternative Treatment Technologies or Resource Recovery Technologies to the Maximum Extent Practicable—The Navy, in partnership with USEPA and WVDEP, determined the Selected Remedy for the ABG and the OABG at Site 1 represents the maximum extent to which treatment technologies can be used in a practicable manner. Although OABG Alternative 3 would have included treatment of excavated soil, there were too many uncertainties regarding the ability to treat the combination of contaminants present, which could lead to excess costs.

Preference for Treatment as a Principal Element—Although the Selected Remedy does not involve treatment, excavation and offsite disposal will reduce the mobility of contaminants that cause a risk to human health and the environment, particularly with regard to the quality of groundwater.

Five-year Review Requirements—The Selected Remedy will result in hazardous substances, pollutants or contaminants remaining onsite above levels that allow for unlimited use and unrestricted exposure. Therefore, as required by CERCLA, a statutory review will be conducted within 5 years of initiation of the remedial action, and every 5 years thereafter, to evaluate whether the remedy continues to be protective of human health and the environment.

2.14 Documentation of Significant Changes from Preferred Alternative of Proposed Plan

The Proposed Plan for ABL Site 1 soil was presented for public comment on March 25, 2014. The Proposed Plan recommended Alternative 2 as the Preferred Alternative for the ABG at Site 1 and Alternative 2 as the Preferred Alternative for the OABG at Site 1. The public comment period ran from March 26, 2014 through May 9, 2014. No written or oral comments were received during the public comment period. The Navy, USEPA, and WVDEP determined that no significant changes to the proposed alternative, as originally identified in the Proposed Plan, were necessary or appropriate.

TABLE 10
Expected Outcomes for Site 1 (OU-4)

Unacceptable Risk			COCs Requiring Action	Remedial Action Objective	Remedy Component	Performance Standard	Success Metric
Human Health	Ecological	Soil to Groundwater Leaching					
Dermal contact with, ingestion of, and inhalation of COCs in surface and subsurface soil by future hypothetical residents. However, based on the higher detected concentrations from recent sampling events, there is the potential for unacceptable risks for additional receptors (industrial workers, trespassers/visitors, and/or construction workers).	Upland and Floodplain Area - direct exposure to COCs in surface soil.	Leaching of contaminants from soil to groundwater may result in contaminant levels in groundwater that present an unacceptable risk to hypothetical future use as a potable water supply.	Select VOCs, SVOCs , Explosives, and Metals (Table 2)	Prevent or minimize direct contact with soil constituents of concern (COCs) at concentrations above background that pose unacceptable risks to potential industrial workers, trespasser/visitor adolescents, construction workers, residents, and ecological receptors.	LUCs	LUCs will be implemented (1) to prohibit the development and use of the property for residential housing, elementary and secondary schools, child care facilities and playgrounds, and (2) to restrict intrusive activities to minimize the potential for human exposure to contamination presenting an unacceptable risk.	Completion of LUC Remedial Design
					Excavation of AOCs	Each AOC in the ABG and OABG will be excavated to a vertical depth and horizontal extent as defined in the remedial design.	Achievement of the site remediation goals within the AOCs as defined by the remedial design
				Prevent or minimize overland migration of COCs at concentrations above background to the North Branch Potomac River.	Excavation of AOCs	Each AOC in the ABG and OABG will be excavated to a vertical depth and horizontal extent as defined in the remedial design.	Achievement of the site remediation goals within the AOCs as defined by the remedial design
				Prevent or minimize migration of COCs at concentrations above background from soil to groundwater, in order to enhance the ability of the groundwater remedy to restore the aquifers to beneficial use.	Excavation of AOCs	Each AOC in the ABG and OABG will be excavated to a vertical depth and horizontal extent as defined in the remedial design.	Achievement of the site remediation goals within the AOCs as defined by the remedial design
				Render area free of surficial debris (including partially exposed debris) from within the boundaries of the OABG.	Removal of Surface Debris (OABG only)	Debris visible on the ground surface at the time of the remedial action will be removed and disposed offsite or recycled.	Confirmation through visual inspection that area is free from surface debris
				Control erosion and riverbank scour to prevent subsurface debris from becoming exposed.	LTMgt (OABG only)	A LTMgt Plan will be developed to document the details and requirements of the LTMgt to ensure that the remedy components are maintained and continue to meet the RAOs.	Continuous inspections and repairs as required based on the LTMgt plan specifications

3 Responsiveness Summary

The notice of availability of the Proposed Plan for Site 1 soil was published in the Cumberland Times-News on March 19, 2014. The 45-day public comment period for the Proposed Plan ran from March 26, 2014 through May 9, 2014.

The Navy held a Public Meeting on March 25, 2014 to explain the Proposed Plan and to address public comments. Navy, WVDEP, and USEPA representatives were available to present the Proposed Plan for Site 1 soil and answer questions regarding the Proposed Plan or any other documents in the information repository. Three members of the public attended the public meeting held on March 25, 2014. The meeting proceedings were transcribed and are included in **Appendix A.**

No written comments, concerns, or questions were received by the Navy, USEPA, or WVDEP during the public comment period.

References

Item	Reference Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administrative Record
1	Record of Decision (ROD)	Section 1.2	Navy. 1997. *Record of Decision, Site 1 Operable Unit 3, Groundwater, Surface Water, and Sediment at the Allegany Ballistics Laboratory, West Virginia*.
2	OU-3 ROD	Section 1.4	Navy. 1997. *Record of Decision, Site 1 Operable Unit 3, Groundwater, Surface Water, and Sediment at the Allegany Ballistics Laboratory, West Virginia*.
3	Site 1 Focused Remedial Investigation (RI) Report	Section 2.1	CH2M HILL. 1995a. *Focused Remedial Investigation of Site 1 at Allegany Ballistics Laboratory Superfund Site.*
4	a source of contamination to groundwater	Section 2.1	CH2M HILL. 1996. Remedial Investigation of the Allegany Ballistics Laboratory, Vol. I and II.
5	geophysical investigation	Section 2.1	Roy F. Weston. 1987. *Results of the Confirmation Study to Determine the Existence and Possible Migration of Specific Chemicals In-Situ.* October.
6	non-time critical removal action	Section 2.1	AGVIQ-CH2M HILL. 2013a. *Final Work Plan for Non-Time Critical Removal Action of Former Disposal Pits 1 and 3. Allegany Ballistics Laboratory, Rocket Center, West Virginia.*
7	Engineering Evaluation and Cost Analysis	Section 2.1	CH2M HILL. 2012a. *Final Site 1 Former Disposal Pits 1 and 3 (Soil) Engineering Evaluation and Cost Analysis, Allegany Ballistics Laboratory Rocket Center, West Virginia*. May.
8	Action Memorandum	Section 2.1	CH2M HILL. 2012b. *Final Site 1 Former Disposal Pits 1 and 3 (Soil) Action Memorandum, Allegany Ballistics Laboratory Rocket Center, West Virginia*. May.
9	Initial Assessment Study	Section 2.2, Table 1	Environmental Science and Engineering, Inc. 1983. *Initial Assessment Study, Allegany Ballistics Laboratory*. January.
10	Interim RI report	Section 2.2, Table 1	Roy F. Weston. 1989. *Interim Remedial Investigation for Allegany Ballistics Laboratory.*
11	RI	Section 2.1, Table 1	CH2M HILL. 1996. Remedial Investigation of the Allegany Ballistics Laboratory, Vol. I and II.
12	Remedial Investigation of the Allegany Ballistics Laboratory report	Section 2.1, Table 1	CH2M HILL. 1996. Remedial Investigation of the Allegany Ballistics Laboratory, Vol. I and II.
13	Focused Remedial Investigation of Site 1 at Allegany Ballistics Laboratory Superfund Site report	Section 2.2, Table 1	CH2M HILL. 1995a. *Focused Remedial Investigation of Site 1 at Allegany Ballistics Laboratory Superfund Site.*
14	Draft Site 1 Focused Feasibility Study at Allegany Ballistics Laboratory Superfund Site report	Section 2.2, Table 1	CH2M HILL. 1995b. *Draft Site 1 Focused Feasibility Study, Allegany Ballistics Laboratory Superfund Site.*
15	Site 1 Soil Level Delineation – Final memorandum	Section 2.2, Table 1	CH2M HILL. 1998. *Site 1 Soil Level Delineation – Final.*

Item	Reference Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administrative Record
16	Sampling and Analysis Plan for the Focused Remedial Investigation/ Feasibility Study for Site 1 at the Allegany Ballistics Laboratory Superfund Site	Section 2.2, Table 1	CH2M HILL. 1994. *Sampling and Analysis Plan for the Focused Remedial Investigation/Feasibility Study for Site 1 at the Allegany Ballistics Laboratory Superfund Site.*
17	Draft Ecological Risk Assessment for the Burning Grounds at Allegany Ballistics Laboratory	Section 2.2, Table 1	CH2M HILL. 2002. Draft *Ecological Risk Assessment for the Burning Grounds at Allegany Ballistics Laboratory.*
18	Final Work Plan Addendum for Supplemental Investigation of Site 1 Soil in Support of Human Health and Ecological Risk Assessment, Allegany Ballistics Laboratory, Rocket Center, West Virginia	Section 2.2, Table 1	CH2M HILL. 2004. *Final Work Plan Addendum for Supplemental Investigation of Site 1 Soil in Support of Human Health and Ecological Risk Assessment, Allegany Ballistics Laboratory, Rocket Center, West Virginia.*
19	second focused RI	Section 2.2, Table 1	CH2M HILL. 2006a. *Final Focused Remedial Investigation for Site 1 Soil, Operable Unit 4, at Allegany Ballistics Laboratory Rocket Center, West Virginia*. July.
20	field review	Section 2.2, Table 1	CH2M HILL. 2006b. *Wetland Assessment – Site 1 Technical Memorandum, Allegany Ballistics Laboratory, Mineral County, West Virginia. September 22.*
21	final Work Plan for Debris Characterization at Site 1	Section 2.2, Table 1	CH2M HILL. 2008. Final Work Plan for Debris Characterization at Site 1, *Allegany Ballistics Laboratory, Rocket Center, West Virginia.*
22	limited surface debris removal	Section 2.2, Table 1	Shaw Environmental, Inc. 2008*. Construction Completion Report for Site 1 Surface Debris Removal Action. Allegany Ballistics Laboratory Rocket Center, West Virginia*.
23	debris characterization	Section 2.2, Table 1	CH2M HILL. 2008. Final Work Plan for Debris Characterization at Site 1, *Allegany Ballistics Laboratory, Rocket Center, West Virginia.*
24	membrane interface probe (MIP) and Flexible Liner Underground Technologies, LLC (FLUTe), liner study	Section 2.2, Table 1	CH2M HILL. 2010. *Allegany Ballistics Laboratory Site 1 Membrane Interface Probe and FLUTe Liner Investigation Results Technical Memorandum.*
25	investigation was completed at FDP 1	Section 2.2, Table 1	AGVIQ-CH2M HILL. 2013b. *Draft Final Technical Memorandum for Site 1 – Former Disposal Pit Investigation Results Summary. Allegany Ballistics Laboratory, Rocket Center, West Virginia*.
26	Final Sampling and Analysis Plan for Site 1 Former Disposal Pit 1 Investigation	Section 2.2, Table 1	AGVIQ-CH2M HILL. 2012. *Final Sampling and Analysis Plan, Site 1 Former Disposal Pit 1 Investigation, Allegany Ballistics Laboratory, Rocket Center, West Virginia.*
27	Final Technical memorandum for Site 1 – Former Disposal Pit Investigation Results Summary	Section 2.2, Table 1	AGVIQ-CH2M HILL. 2013b. *Final Technical Memorandum for Site 1 – Former Disposal Pit Investigation Results Summary. Allegany Ballistics Laboratory, Rocket Center, West Virginia*.
28	EE/CA	Section 2.2, Table 1	CH2M HILL. 2012a. *Final Site 1 Former Disposal Pits 1 and 3 (Soil) Engineering Evaluation and Cost Analysis, Allegany Ballistics Laboratory Rocket Center, West Virginia*. May.
29	Action Memorandum	Section 2.2, Table 1	CH2M HILL. 2012b. *Final Site 1 Former Disposal Pits 1 and 3 (Soil) Action Memorandum, Allegany Ballistics Laboratory Rocket Center, West Virginia*. May.
30	site remediation goals (SRGs) and statistical method	Section 2.2, Table 1	CH2M HILL. 2013c. *Revised Final Technical Memorandum Site Remediation Goal Selection Process and Evaluation of Target Remediation Areas in Soil at Site 1, Allegany Ballistics Laboratory, Rocket Center, West Virginia.*
31	FS	Section 2.2, Table 1	CH2M HILL. 2013d. *Final Operable Unit 4 Site 1 (OU-4) Soil Feasibility Study, Allegany Ballistics Laboratory, Rocket Center, West Virginia*.

Item	Reference Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administrative Record
32	NTCRA	Section 2.2, Table 1	AGVIQ-CH2M HILL. 2013a. *Final Work Plan for Non-Time Critical Removal Action of Former Disposal Pits 1 and 3. Allegany Ballistics Laboratory, Rocket Center, West Virginia.*
33	Site Management Plan	Section 2.4	CH2M HILL. 2013e. *Final 2013 Site Management Plan, Allegany Ballistics Laboratory, Rocket Center, West Virginia*. December.
34	statistical approach to estimate target remediation areas	Section 2.5	CH2M HILL. 2013c. *Revised Final Technical Memorandum Site Remediation Goal Selection Process and Evaluation of Target Remediation Areas in Soil at Site 1, Allegany Ballistics Laboratory, Rocket Center, West Virginia.*
35	focused RI	Section 2.7	CH2M HILL. 2006a. *Final Focused Remedial Investigation for Site 1 Soil, Operable Unit 4, at Allegany Ballistics Laboratory Rocket Center, West Virginia*. July.
36	perchlorate	Section 2.7	USEPA. 2012. *Technical Fact Sheet – Perchlorate*. May.
37	evaluation of the potential for constituents to leach from soil to groundwater	Section 2.7	CH2M HILL. 2013c. *Revised Final Technical Memorandum Site Remediation Goal Selection Process and Evaluation of Target Remediation Areas in Soil at Site 1, Allegany Ballistics Laboratory, Rocket Center, West Virginia.*
38	Potential risk associated with exposure to lead in soil	Section 2.7.1	CH2M HILL. 2006a. *Final Focused Remedial Investigation for Site 1 Soil, Operable Unit 4, at Allegany Ballistics Laboratory Rocket Center, West Virginia*. July.
39	site-specific background concentrations	Section 2.7.2	CH2M HILL. 2006a. *Final Focused Remedial Investigation for Site 1 Soil, Operable Unit 4, at Allegany Ballistics Laboratory Rocket Center, West Virginia*. July.
40	2013 SRG Tech Memo	Section 2.7.2 Table 6	CH2M HILL. 2013c. *Revised Final Technical Memorandum Site Remediation Goal Selection Process and Evaluation of Target Remediation Areas in Soil at Site 1, Allegany Ballistics Laboratory, Rocket Center, West Virginia.*
41	Site 1 SSL evaluation	Section 2.7.3	CH2M HILL. 2013c. *Revised Final Technical Memorandum Site Remediation Goal Selection Process and Evaluation of Target Remediation Areas in Soil at Site 1, Allegany Ballistics Laboratory, Rocket Center, West Virginia.*
42	2013 SRG Tech Memo	Section 2.7.2 Table 7	CH2M HILL. 2013c. *Revised Final Technical Memorandum Site Remediation Goal Selection Process and Evaluation of Target Remediation Areas in Soil at Site 1, Allegany Ballistics Laboratory, Rocket Center, West Virginia.*
43	Revised Draft Proposed RAOs and Remediation Goals for Site 1 Soil	Section 2.7.2 Table 7	CH2M HILL. 2009. *Revised Draft Technical Memorandum Proposed RAOs and Remediation Goals for Site 1 Soil, Allegany Ballistics Laboratory, Rocket Center, West Virginia.*
44	RAOs	Section 2.8	CH2M HILL. 2013d. *Final Operable Unit 4 Site 1 (OU-4) Soil Feasibility Study, Allegany Ballistics Laboratory, Rocket Center, West Virginia*.
45	remedial alternatives	Section 2.9	CH2M HILL. 2013d. *Final Operable Unit 4 Site 1 (OU-4) Soil Feasibility Study, Allegany Ballistics Laboratory, Rocket Center, West Virginia*.
46	Total Present-worth: $0	Section 2.9.1, Table 8	CH2M HILL. 2013d. *Final Operable Unit 4 Site 1 (OU-4) Soil Feasibility Study, Allegany Ballistics Laboratory, Rocket Center, West Virginia*. Appendix C.
47	Total Present-worth: $718,695	Section 2.9.1, Table 8	CH2M HILL. 2013d. *Final Operable Unit 4 Site 1 (OU-4) Soil Feasibility Study, Allegany Ballistics Laboratory, Rocket Center, West Virginia*. Appendix C.
48	Present-worth Cost: $0	Section 2.9.1, Table 8	CH2M HILL. 2013d. *Final Operable Unit 4 Site 1 (OU-4) Soil Feasibility Study, Allegany Ballistics Laboratory, Rocket Center, West Virginia*. Appendix C.

Item	Reference Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administrative Record
49	Total Present-worth: $10,335,490	Section 2.9.1, Table 8	CH2M HILL. 2013d. *Final Operable Unit 4 Site 1 (OU-4) Soil Feasibility Study, Allegany Ballistics Laboratory, Rocket Center, West Virginia*. Appendix C.
50	Total Present-worth: $8,476,121	Section 2.9.1, Table 8	CH2M HILL. 2013d. *Final Operable Unit 4 Site 1 (OU-4) Soil Feasibility Study, Allegany Ballistics Laboratory, Rocket Center, West Virginia*. Appendix C.
51	Costs beyond 30 years have minimal impact to the overall evaluation as a result of the present worth adjustment.	Section 2.9.1, Table 8	Office of Management and Budget. 2012. OMB Circular No. A-94.
52	130 metric tons of carbon dioxide equivalents	Section 2.10.1	CH2M HILL. 2013d. *Final Operable Unit 4 Site 1 (OU-4) Soil Feasibility Study, Allegany Ballistics Laboratory, Rocket Center, West Virginia*.
53	2,150 metric tons of carbon dioxide emissions	Section 2.10.2	CH2M HILL. 2013d. *Final Operable Unit 4 Site 1 (OU-4) Soil Feasibility Study, Allegany Ballistics Laboratory, Rocket Center, West Virginia*.
54	3,700 metric tons of GHG emissions	Section 2.10.2	CH2M HILL. 2013d. *Final Operable Unit 4 Site 1 (OU-4) Soil Feasibility Study, Allegany Ballistics Laboratory, Rocket Center, West Virginia*.
55	USEPA guidance	Section 2.12.3	USEPA. 2000. *A Guide to Developing and Documenting Cost Estimates During the Feasibility Study*, EPA 540-R-00-002, Office of Solid Waste and Emergency Response Directive 9355.0-75.
56	USEPA guidance	Section 2.12.3	USEPA. 2000. *A Guide to Developing and Documenting Cost Estimates During the Feasibility Study*, EPA 540-R-00-002, Office of Solid Waste and Emergency Response Directive 9355.0-75.

Appendix A
Public Meeting Transcript

PUBLIC MEETING

PROPOSED PLAN SITE 1 SOIL

ALLEGANY BALLISTICS LABORATORY

ROCKET CENTER, WEST VIRGINIA

* * * * * *

TRANSCRIPT OF PROCEEDINGS

South Cumberland Public Library

100 Seymour Street

Cumberland, Maryland

March 25, 2014

* * * * * *

PRESENT:

Walter Bell

Cassandra Brown

Jamie Butler

Paul Corwell

Joe Foran

Cathy Guynn

Steve Hirsh

MEMBERS OF THE PUBLIC:

Aaron Clark

Julie Helmstetter

Sterlin Rebuck

P R O C E E D I N G S

(The meeting was called to order at 6:30 p.m.)

MR. BELL: Good evening. I'm Walter Bell. I work for NAVFAC Mid-Atlantic, which is in charge of doing environmental cleanup here at the ABL facility. I'd like to welcome you to the public plan -- public meeting for the Site 1 Soil Remedy at ABL.

Again, my name's Walter Bell. I'd like to introduce the team that I work with for the environmental restoration site. Jamie Butler's one of the contractors that supports our work. Paul Corwell is with the Navy Sea Systems Command who operates the -- that's the Command that operates ABL or owns and operates ABL.

Cathy Guynn with the West Virginia Department of Environmental Protection. Joe Foran is with -- it's another contractor that supports us in our work. The EPA representative is Steve Hirsh, and Sandy Brown in the back is another contractor that supports us.

So, this meeting is being held to meet the Navy's responsibility to hold a public meeting during the public comment period when selecting a remedy for restoration under CERCLA. Any comments or questions you may have will be considered as part of selecting a remedy and will be reported in the Record of Decision.

We do plan on having about 15 minutes at the end of our time here in the library to take comments and questions, and we ask though that you understand that we have to be out of here by 7:30 because the library staff need to close up the library.

So, if you could please hold your -- any comments and questions till after our presentation, then again, you may write in written comments to the address that's listed, the point of contact that's listed on the proposed plan. I think you have copies in your hands, and those will be considered as well. The deadline for written comments is May 9th.

So, I'd like to go ahead on with our presentation. Jamie Butler's going to lead us in the presentation.

MS. BUTLER: Good evening everyone. As Walt said, I'm Jamie Butler. I'm a contractor with CH2M Hill working with the Navy on the installation/ restoration program for ABL. So the purpose of the presentation is to present the general history of Site 1 and the proposed plan for Site 1 soil. The proposed plan identifies the preferred alternative for addressing the potential contamination at the site. It explains the rationale for selecting the remedial alternative through the remedial eval -- the remedial investigation and feasibility study process.

We will be seeking answers to your questions and community feedback on this proposed plan. As Walt said, if you can please hold your comments or questions to the end of the presentation, we'll be happy to address them then.

A little bit of background on Allegany Ballistics Laboratory. It's about a 1,600-acre facility located in Mineral County, West Virginia. It's a research, development, testing, and production facility for solid propellants and motors for ammunitions, rockets, and armaments.

Divided into two distinct operating plants, Plant 1, which is about 1,500 acres, is government owned and contractor operated. Plant 2 is 57 acres, which is exclusively owned by ATK.

For the environmental restoration program at ABL, Plant 1 was added to the National Priorities List in May of 1994, and we have 14 sites on the Installation Restoration Program. All but two, one of which is the subject of the proposed plan this evening, have been addressed with a final remedy in place, either through record of decision or site closeout.

So the focus of tonight's discussion is on Site 1, which is identified in the red area along the Potomac River. A little background on Site 1, it's approximately 14 acres adjacent to the North Branch of the Potomac River. The Site is separated into two areas based on operational history and current activities and disposal activities. The outside active burning ground is the floodplain area along the North Branch of the Potomac River, and the active burning ground is currently operated under a RCRA permit for open burning.

So in the OABG, which is the outside active burning ground area, the eastern portion of the outside active burning ground was historically used for inert burning followed by spreading of ash. The western portion was historically used for burning and disposal of solid waste, spreading of ash, and drum storage. The central portion, based on our investigation history and research that has been conducted, there's really no evidence that any disposal activities had occurred there.

In the active burning ground from around 1959 to 1990, we had eight earthen burn pads, which are in the green circular hash areas, that were used to burn solvents or explosive wastes, and six steel burn pads then replaced them in the eight former earthen burn pad areas.

From the '70s through the '80s, three former disposal pits, which are the blue rectangular areas within the active burning ground, were used for disposal of spent acids and solvents, including trichlorethene, approximately a thousand pounds per month.

Currently, we have six large concrete burn pads, which are the square areas labeled pad A through pad F on the figure, which are used to burn reactive wastes under the RCRA permit which was issued for open burning.

Several investigations have been conducted to date since beginning in 1983 and the mid 1990s. Following the completion of the initial remedial investigation activities , the Site was separated into two operable units. Operable unit 3, we have a Record of Decision which was signed in May of 1997 for the groundwater, surface water, and sediment, the site, and then operable unit 4 is the soil which is the subject of the proposed plan this evening.

Investigations and studies that have been conducted since 2006 include a focused remedial investigation which evaluated the nature and extent of soil contamination and assessed human health and ecological risks associated with exposure to contaminants at the Site.

In 2008, a debris characterization was completed in the outside active burning grounds, which was used to further define the nature and extent of what debris existed out there within the west, the central, and the eastern portion of that outside active burning ground area.

In 2012, we completed an engineering evaluation and cost analysis which allowed us to conduct a non-time critical removal action to address source area soil beneath the former disposal pits 1 and 3, and that was completed just this past year.

In 2013, we completed a soils feasibility study to evaluate remedial alternatives to address soil contamination at Site 1 site-wide.

So, for the interim removal actions in 2008, there was a limited surface debris removal that was conducted and then further characterization of the subsurface debris was completed, and then in 2013, we completed the non-time critical removal action of former disposal pits 1 and 3 to support source area removal on the overall site.

This figure is one that's also in your proposed plan, but it just demonstrates the sample characterization that's been completed at the site. The yellow -- or the black dots within the active burning ground area and outside active burning ground area shows the sample locations for soil, surface, and sub-surface soils that has been completed to date, so a number of samples have been collected at the site.

So, human health risk assessment and ecological risk assessments were completed at the site. There are no unacceptable cancer risks or non-cancer hazards associated with current site use; however, under the most conservative unrestricted use scenario, there were potential unacceptable risks identified with residential use of the site.

For the ecological risks, the upland area, which is the active burning ground area, the potential risks were identified for ecological receptors that were exposed to metals and explosives and surface soil. And in the floodplain area, the outside active burning ground, potential unacceptable risks were identified for ecological receptors exposed to metals, explosives, volatiles, and PAHs in surface soil.

In addition to this, groundwater has been impacted on this site, which was -- selected remedy was chosen during the 1997 Record of Decision. We evaluated the potential for our constituents in soil to contribute to groundwater contamination, and potential risk was identified for that soil-to-groundwater leaching potential.

This again is a Human Health Risk Assessment Summary table that just demonstrates the potential risks of the site for human health, and this is also included in your table. You can see that there are no unacceptable risks based on current exposures; however, future residential use of the site may present an unacceptable risk.

And for ecological receptors, there are unacceptable risks in both the active burning ground and outside active burning ground associated with chemicals on the site.

Soil screening levels, this is the soil-to-groundwater leachability evaluation that was completed. You can see that VOCs, SVOCs, explosives, and metals were identified as potential contaminants of the site that could be contributing to groundwater contamination, which is currently being treated under a separate Record of Decision.

So, based on the results of the investigations, the EPA, the Navy, and West Virginia Department of Environmental Protection determined that a remedial action is necessary to protect human health and the environment. Remedial action objectives were established in the feasibility study, and these were to prevent direct contact with soil at concentrations above levels that would pose unacceptable risk to industrial workers, trespassers, construction workers, residents, and ecological receptors. Also, to prevent the overland migration of chemicals at concentrations above background to the North Branch of the Potomac River and then to prevent or minimize migration of COCs at concentrations above background from soil to groundwater, in order to enhance the ability of the groundwater treatment system to do its job.

Also, one of the remedial action objectives is to render the area free of surficial debris and control erosion and riverbank scour to prevent sub-surface debris from becoming exposed in the future.

This is a conceptual site model. Through the remedial investigation and pre-feasibility study process, areas of concern were identified that are driving the need for remedial action at the site, and you can see there are several areas in the active burning ground and in the outside active burning ground along the North Branch of the Potomac River that are targeted for remediation.

For the active burning ground, two remedial alternatives were considered as a baseline. We considered no action, and then we also looked at excavation of the areas with offsite disposal and land use controls with a long-term management for the active burning ground.

And for the outside active burning ground, we looked at the same criteria, with the addition of a third alternative, which involved ex situ treatment of the material to render it non-hazardous prior to disposal at an off-site facility.

So, components of the remedial alternatives that were considered are here. We have excavation of the areas of concern to remove the contaminated soil, which will mitigate the unacceptable risk for direct contact, overland migration of the COCs to the North Branch of the river, and the migration of the COCs -- chemicals of concern -- from soil to groundwater.

And then with offsite disposal of the excavated soil, we'd be transporting the material to approved disposal facility.

Land use controls will be implemented to ensure appropriate land use is maintained and to minimize the potential for human exposure to any contaminants.

And then from the long-term management, we'll be managing the soils to ensure that the remedial design components are met. We have erosion and sediment control measures in place and will be removing and handling any debris that surfaces through -- over time.

Surface debris removal in the outside active burning ground, we do still have surface debris at the site, and we will be removing that debris from within the boundaries of the outside active burning ground to prevent or minimize hazards associated with direct contact with the debris.

And then the ex situ component, which was the third component for the outside active burning grounds, was looking at thermal desorption of waste soil which was -- is deemed hazardous in rendering it -- treating it to render it non-hazardous prior to disposal.

The remedy selection criteria that are evaluated with each of these alternatives consist of threshold criteria, which is protection of human health and the environment in compliance with applicable relevant and appropriate requirements.

The primary balancing criteria consist of long-term effectiveness and permanence, reduction in toxicity, mobility, or volume through treatment, short-term effectiveness, implementability, and present-worth cost. And then the modifying criteria are state acceptance and community acceptance.

The preferred alternative for Site 1 soils is excavation of soil to remove the contaminated soil from the areas of concern within the active burning ground and the outside active burning ground. We will be removing surface debris from within the boundaries of the outside active burning ground. We will be managing the soil for offsite disposal. We will transport and dispose of the excavated soil from the active burning ground and the outside active burning ground, as well as the debris, to an approved disposal facility.

We will be implementing land use controls to maintain and ensure appropriate land use and restrict intrusive activities to the site.

And then a long-term management component, which is managing the soils in the active burning ground and the outside active burning ground to ensure their remedial design components continue to meet the remedial action objectives.

So, as Walt mentioned, part of the CERCLA process is public involvement and community participation. Our public comment period starts today and is effective through May 9th, and tonight's meeting has covered the proposed plan elements for the preferred alternative at the site, and you have the proposed plan. Additional information is provided if you would like to read through it, and you're welcome to submit your comments. You can tear this out, fold it, and send it on to Tom Kreidel. He's our Public Affairs Officer.

We also have the feasibility study, the final FS, and the remedial investigation for soils available here at the Cumberland Library and then also at the Fort Ashby Public Library as reference materials.

So verbal comments will be accepted tonight at the presentation conclusion. Written comments you can feel free to send them with the proposed plan comment sheet to Tom Kreidel who's our Public Affairs Officer at NAVFAC Mid-Atlantic in Norfolk, Virginia. And following the completion of the public comment period, the Record of Decision will be developed and issued, and it will include a section on the responsiveness summary, which discusses and presents the public comments and how they were incorporated into the remedy selection decision process.

If there are modifications that substantially change the proposed remedy, additional public comment may be solicited, and the Navy, EPA, and West Virginia DEP will make the final decision on the remedial approach for Site 1 soil after reviewing and considering all the information that's submitted during the public comment period.

We do anticipate a Record of Decision for this site by August of this year and the remedial design or remedial action work plan to be issued in the early part of 2015. That's all I have.

MR. BELL: So, if anybody does have any questions or comments, I would ask you to please state your name so we can enter that in the transcript as well.

MR. CLARK: Aaron Clark. Do you know -- I'm just trying to understand the meeting. You guys don't really know what you're going to do with the materials yet, do you? Are you --

MR. BELL: What extent?

MR. CLARK: Do you know, are yous excavating materials, or are you then doing what with them? Are you going to burn them, burn the soil, or you take them off-site? Do you know where you're taking them to?

MR. BELL: I understand your question -- Mr. Clark?

MR. CLARK: Yes, sir.

MR. BELL: Okay. Right now, we've evaluated two alternatives for the ABG and three alternatives for the OABG, and at this point, we have a preferred remedy that we're proposing.

MR. CLARK: Okay.

MR. BELL: It's not yet selected. When we select the remedy, that'll be entered with signature with the EPA and the DEP and Navy signing that they agree that this is the selected remedy, and we'll move forward with that. However, the preferred remedies, which are alternatives two for the ABG and alternative two for the OABG, essentially -- could you move to that slide, please.

MS. BUTLER: Uh-huh.

MR. BELL: -- cover the -- the key elements of that are the excavation of the soil, the removal of surface debris, off-site disposal at an appropriately permitted landfill, and land use controls which would prevent certain uses of the site, for example, and then long-term management which maintains any more surface debris that are discovered that we, you know, might've -- might surface through erosion, for example, and maintain erosion controls.

MR. CLARK: So you would be taking it to a landfill.

MR. BELL: That's our intent.

MR. CLARK: I'm just asking.

MR. BELL: Yeah, yeah. I just wanted to make sure I understood your question fully.

MR. HIRSH: It'll probably go to a couple different landfills, depending on how contaminated the dirt is.

MR. CLARK: Okay.

MR. HIRSH: Like some of it may go to a normal, you know, wherever Cumberland's trash goes. Maybe they need dirt every day to put over the stuff, and so the low-level waste, the stuff that just has a little bit of like lead or something like that in there could go to a regular landfill.

MR. CLARK: Okay. I assume --

MR. HIRSH: The hazardous stuff will go far, probably. I don't think there's a -- I don't know where the hazardous waste landfill is, but that would be different.

MR. CLARK: Yeah, I've seen where they burn soil.

MR. HIRSH: That's not going to happen.

MR. CLARK: Okay.

MR. HIRSH: There's no alternative that includes burning soil here.

MR. CLARK: Okay.

MR. HIRSH: It's not going to happen.

MR. CLARK: Okay. Um, what about the debris along river bed -- or the river bank, excuse me?

MR. BELL: It would depend on --
MR. CLARK: Is that being cleaned up?
MR. BELL: The debris will be -- go through a decontamination process before it leaves to make sure any soil is removed from, let's say, a piece of cement, for example, or metal.
MR. CLARK: The metal, yes.
MR. BELL: The metal, for example, could be recycled.
MR. CLARK: Okay. That was a question I was going to ask you. That's why I was sent here, to find that out.
MR. BELL: Okay.
MR. CLARK: Uh, jump in.
MR. BELL: Those are good questions; appreciate that.
MR. REBUCK: Sterlin Rebuck. I also had a question. I didn't know if you had checked into landfills and where they were located. I didn't know how much trouble or expense you're looking at to -- or even the volume, do you know what the volume is for excavation?

MR. BELL: I don't have the total volume that's -- some of that will be determined through the design process and, also, we do not have this contracted yet.

MR. HIRSH: The estimate that they were working with to price it out was 22,000 cubic yards, just for a sense of how big it is.

MR. BELL: That estimate also has a lot of variability to it at this point. We are narrowing it down and --

MR. REBUCK: What percentage of the surface area would be disturbed for his estimation, roughly? You're not talking the whole area. You're just talking like areas where -- from your soil tests?

MR. BELL: That's correct. You'll see this gives you some idea of the relative areas. The yellow areas are the areas to be removed, you know, a narrow band here in this area but a wider band here. These smaller circle areas in the ABG, in the ditch area, has a lot of metal coming out of the ditch side, so that will be cleaned up from the debris.

MS. BUTLER: Yeah, so this figure takes into account that the yellow blocks are contaminated soil areas, so the surface debris portion, also, will be removed, Any surface debris in that outside active burning area will also be removed.

MR. REBUCK: The surface debris is just inert materials? Is that what, primarily, your surface debris is?

MR. BELL: There is documentation that there are components of rockets within the surface debris that will be managed appropriately with the -- under the Navy's Ordnance Safety and Security Administration requirements for safe handling and disposal of those items.

MR. CORWELL: Those will be fired -- excuse me. Those will be fired rocket motors, and they have trace elements.

MR. BELL: That's correct, but we still have to --

MR. CORWELL: It's not going to be a fully loaded rocket motor.

MR. BELL: That was a very good point, but they will still have to be inspected, just to ensure that all trace elements have been removed. So that's a very good point. Thank you.

MR. REBUCK: Okay. I was under the impression you just burned your leftover fuels there. You don't really set off rocket motors themselves, or do you?

MR. CORWELL: Yes, sir.

MR. REBUCK: Oh, you do set off motors?

MR. CORWELL: We do have a static test facility --

MR. REBUCK: Okay.

MR. CORWELL: -- with, currently, two days operating and setting up a third day.

MR. REBUCK: So it's mostly composite material? It's not -- are your motors mostly composite?

MR. CORWELL: No. The motors are mostly metal.

MR. REBUCK: Okay.

MR. CORWELL: Composite rocket motors are still in the process of going through the design phases.

MR. REBUCK: Okay.

MR. CORWELL: They actually have a small tactical rocket motor that's composite, so there are composite materials in the debris as well. And that was from, probably, back in the '60s and '70s some of the larger motors were composite back then.

MR. REBUCK: Okay.

MR. BELL: And if I could speak, as far as disposal -- final disposal goes for debris, any such items would be demilitarized to the point where they would not be recognizable when they left the site.

MR. REBUCK: Okay. Well, you're still using the site actively every day. Is the same -- are you still burning on your active burning pads?

MR. BELL: Okay. In the active burning pads.

MR. REBUCK: So how do you control further pollution? What's the other different system you may have for the task or what's the --

MS. GUYNN: The active burning pads are under a State permit, so they're handled that way.

MR. REBUCK: Oh, you mean --

MS. GUYNN: Like the air permit and the RCRA permit, so any -- any, say, contamination from the active, they're handled under State permitted air permit and a RCRA permit.

MR. REBUCK: Right, the permit, that's a requirement so you don't pollute. That's what it's after. The permit's not going to do it. I mean, do you have containment? Do you have -- I don't know what you do --

MR. HIRSH: So, what they do now is different than what they did before. Before they took drums of solvent, and they dumped them and burned them. They don't do that now. And the burning takes place in a metal pan; right?

MR. CORWELL: Yes.

MR. HIRSH: It's a pan on top of a concrete -- a thick concrete slab. So they're not doing it on the ground anymore.

MR. CORWELL: Yeah, the pan is much smaller than the concrete pad that you see in the picture there, and there's also layers in that pan of rock, sand, and those materials would draw any of the ash down into them so that there's less airborne ash than what there used to be when they were openly burning on the -- practically on the ground itself.

MR. REBUCK: So you have some kind of a way of handling any rainfall coming off of that then or --

MS. GUYNN: There's contingency plans in the permit, but they're not associated with what they're doing with this.

MR. REBUCK: Oh, I know that, but --

MS. GUYNN: But I don't know them by heart, but there is, like for spills and, you know, water and anything, there's a contingency plan in the permit itself.

MR. CORWELL: And each of the pans, also, have a wheel cover, so a certain period of time passes after each batch is fired off, and that pan's covered so that it's protected from the elements. That way the pans aren't filling up and washing over.

MR. REBUCK: So, at some point you change out the material in there, the medium or --

MR. CORWELL: Yes. I'm not sure what that time period is.

MR. BELL: I missed the question.

MR. REBUCK: I was just -- I hear it going sometimes several times a day. I'm a neighbor, so I'm pretty much aware.

MR. CORWELL: His home overlooks the facility.

MR. BELL: Oh, okay.

MR. REBUCK: Yeah, I have a great view. The other thing mentioned, too, is a groundwater treatment system here. What is that? Is this one of your previous approvals?

MR. BELL: The groundwater treatment system manages groundwater, extracts groundwater from a couple different sites, primarily for solvents in the groundwater, and treats them prior to discharge.

MR. REBUCK: What, do you have wells pulling up groundwater?

MR. BELL: We do.

MR. REBUCK: And I think some years ago, I was at a meeting over at your facility, and there was mention about monitoring private wells. You still do that. Is that part of your groundwater monitoring program?

MR. BELL: My understanding is that in the admin record there is solid data on wells that were sampled, but there is no indication that there was a need to continue that sampling.

MR. REBUCK: So offsite wells, you don't sample those anymore?

MR. BELL: No, we don't.

MR. REBUCK: So the groundwater, what treatment do you -- do you treat the water you pull up somehow? What's the treatment procedures for that?

MR. BELL: It goes through a -- it removes volatiles through a filtering system prior to discharge.

MR. HIRSH: It also removes explosives. It's a pretty complicated treatment plan.

MR. BELL: Ion Exchange Resin as well.

MR. FORAN: In fact, the water that comes out of the treatment plant is clean enough that it then becomes make-up water for the boilers.

MR. HIRSH: So that's what goes into that big water tower is treated water.

MR. REBUCK: Okay. I'd say it's a pretty good treatment system if you can put it in the boilers. Okay. So your proposal, your preferred alternative is excavation. The other one is you're not --

MR. BELL: Yes, sir, the -- we always have to evaluate the no action alternative.

MR. REBUCK: You have a third one for one site.

MR. BELL: The third one is -- involved treatment, and we determined that the best, the preferred remedy at this point is the excavation and not treatment.

MR. HIRSH: This took a long time. As you saw when Jamie went through the schedule, they started feasibility studies like ten years ago or something. And early on, there were a number of different, sort of thought processes, and one of them was let's just cover it. Let's put a cover on top of the contaminated soil instead of removing it, and over the years, it was kind of decided that doesn't really solve the problem of contamination getting in the river. You know, because this -- the soil is saturated at some time, and it's so close to the river level that -- so a lot of things were looked at, and a decision was made that they were not a viable option. And those things are listed in the feasibility study that is in here somewhere.

MR. REBUCK: Any time for more questions?

MR. BELL: Our presentation went a little faster than we anticipated. Well, I mean, can I just say that there are no more questions? Is that an accurate statement at this point? I mean written questions and comments are always welcome until May 9th. Plenty of time. Or do you have any more questions, sir?

MR. REBUCK: I have none at this time.

MR. BELL: Well, I appreciate your time and attention and the interest in what we're doing at ABL. Is there anything anybody has? Thank you.

MR. REBUCK: And one more out of curiosity.

MR. BELL: Yes, sir.

MR. REBUCK: How deep is your excavation going to be?

MR. BELL: What is the deepest? The ABG's only down about two feet. The OABG is much deeper.

MS. BUTLER: Yeah, the active burning ground is pretty shallow.

MR. REBUCK: Oh, just a few feet?

MS. BUTLER: The active burning ground is shallow. The outside active burning ground right now, our current estimates are around 10 feet.

MR. REBUCK: I was going to say, if they're not deep enough, you'll have a swimming hole.

MS. BUTLER: Yeah.

MR. BELL: And again, that'll be defined more readily in the design.

MR. REBUCK: When will that be complete, the design phase?

MR. BELL: The design? Did you have that in the schedule?

MS. BUTLER: So, January of 2015.

MR. REBUCK: Okay.

MR. BELL: Thank you again.

(Meeting concluded 7:05 p.m.)

* * * * *

STATE OF MARYLAND, SS:

I, Christina D. Pratt, a Notary Public of the State of Maryland, do hereby certify that I recorded the proceedings of the Public Meeting held March 25th, 2014, and this transcript is a true record of those proceedings.

Given under my hand and Notarial Seal this 29th day of March, 2014.

Christina D. Pratt

My commission expires:
November 12, 2016

Appendix B
Applicable or Relevant and Appropriate Requirements

APPENDIX B

ARARs

TABLE B-1
Chemical-Specific Applicable or Relevant and Appropriate Requirements
Site 1 (OU-4) Soil Record of Decision
Allegany Ballistics Laboratory, Rocket Center, West Virginia

Media	Citation	Requirement	Prerequisites	Determination	Comments
No Federal Chemical-Specific ARARs Apply					
No Maryland Chemical-Specific ARARs Apply					
West Virginia Chemical Specific ARARs					
Soil	47 CSR 57-4.1 and 4.2	Owners of sources must cease further release of contaminants which exceed any applicable groundwater quality standard subject to the W. Va. Groundwater Protection Act and must make every reasonable effort to identify, remove or mitigate the source of such contamination and strive where practical to reduce the level of contamination over time to support drinking water use of such groundwater.	Source which has caused the concentration of any constituent to exceed any applicable quality standard subject to the Act.	Applicable	Site 1 soils are considered a source of contamination to groundwater. Sources which are operating in full compliance with CERCLA remedial action requirements to address groundwater contamination shall be deemed to be in compliance this requirement.

ARAR - Applicable or Relevant and Appropriate Requirements

CERCLA – Comprehensive Environmental Response, Compensation, and Liability Act

CSR - Code of State Regulations [West Virginia]

TABLE B-2
Location-Specific Applicable or Relevant and Appropriate Requirements
Site 1 (OU-4) Soil Record of Decision
Allegany Ballistics Laboratory, Rocket Center, West Virginia

Location	Citation	Requirement	Prerequisites	Determination	Comments
Federal Location-Specific ARARs					
Areas where birds subject to the Migratory Bird Treaty Act are located	16 USC 703	Protects almost all species of native birds in the United States from unregulated taking.	Presence of migratory birds	Applicable	ABL is located in the Atlantic Migratory Flyway. If migratory birds, or their nests or eggs, are identified at Site 1, operations will not destroy the birds, nests or eggs.
Maryland Location-Specific ARARs					
Surface waters of the state	COMAR 26.08.02.04 (C)	Protect and maintain the quality of surface water in the State of Maryland. Criteria and standards for discharge limitations and policy for anti-degradation of the State's surface water.	Activities that will pollute the surface waters of the State.	Applicable	This regulation is applicable for remedial actions that may affect surface water quality in the State of Maryland. Since the North Branch Potomac River, which borders the Site to the north, forms the boundary between West Virginia and Maryland, Maryland regulations affecting surface water quality are included as ARARs for this action.
West Virginia Location-Specific ARARs					
Within 100-year Floodplain	33 CSR 20-7.2 only as it incorporates 40 CFR 264.1(j)(7)	Facility must be designed, constructed, operated, and maintained to avoid washout if located within the 100 year floodplain.	Storage of hazardous waste in tanks, containers, or staging piles onsite.	Applicable	Portions of the site are within the 100-year flood zone. Applicable if hazardous waste is stored for more than 90 days or treated onsite during remediation. Relevant and appropriate to wastes accumulated onsite for 90 days or less.

ABL - Allegany Ballistics Laboratory
ARAR - Applicable or Relevant and Appropriate Requirements
CFR - Code of Federal Regulations
COMAR – Code of Maryland Regulations
CSR - Code of State Regulations [West Virginia]
USC - United States Code

TABLE B-3
Action-Specific Applicable or Relevant and Appropriate Requirements
Site 1 (OU-4) Soil Record of Decision
Allegany Ballistics Laboratory, Rocket Center, West Virginia

Action	Citation	Requirement	Prerequisite	Determination	Comments
Federal Action-Specific ARARs					
Discharge of dredge and fill to waters of the United States	40 CFR 230.10(d); 33 CFR 320.4(a), (b), (d), (p), (r)	No discharge of dredged or fill material will be allowed unless appropriate and practicable steps are taken that minimize potential adverse impacts of the discharge on the aquatic ecosystem.	Discharges of dredged or fill material to surface waters, including wetlands.	Applicable	Shoreline stabilization will involve disturbing the banks of the North Branch Potomac River by excavating and/or adding fill material; however the ecosystem will be enhanced through the action. If wetlands are permanently lost, mitigation will be performed. Onsite CERCLA actions are not subject to administrative requirements such as permitting or administrative reviews and endorsements.
Storage of fuels and oils onsite	40 CFR 112.3(a)(1); 112.5; 112.6(a)(1), (a)(3)*; 112.7(a)(3)(i), (a)(3)(iv), (a)(3)(vi),(a)(4), (a)(5), (c), (e), (f),(g),(k); 112.8(b)(1), (b)(2), (c)(1), (c)(3), (c)(6), (c)(10), and (d)(4) *the provisions incorporated by reference here are not ARARs unless they are also listed in this table.	If storage capacity limits are exceeded a Spill, Prevention, Control, and Countermeasures Plan must be prepared and implemented with procedures, methods, equipment, and other requirements to prevent discharges into or upon the navigable waters of the United States.	Total onsite storage capacity exceeding 1,320 gallons in containers that are 55 gallons or larger in size.	Applicable	If the storage capacity in containers that are 55 gallons or greater is equal to or exceeds 1,320 gallons a Spill Prevention, Control, and Countermeasure (SPCC) Plan or its equivalent must be prepared and implemented. Containers include any drum or tank used to store any type of oil, oil filled equipment, and equipment fuel tanks. Onsite CERCLA actions are not subject to administrative requirements such as administrative reviews and endorsements.
Maryland Action-Specific ARARs					
Shoreline protection	COMAR 26.08.02.03(B)	Established minimum standards for surface water quality	Actions involving discharges to surface water.	Applicable	Necessary measures will be implemented during the shoreline stabilization activities to minimize impact to surface water quality.
	COMAR 26.08.03.01(A)(5) and (C)(1)(d)	Discharges to surface water that will substantially impair anchorage and navigation are prohibited	Actions involving the addition of rip rap or bulkheads to the shoreline	Applicable	Necessary measures will be implemented during the shoreline stabilization activities to minimize impact to anchorage and navigation.
Water resources of the State	COMAR 26.17.01.07B(6)(a)-(g) and COMAR 26.17.02.09 (E)(5)(a)-(e), (6)(a)-(p)	Provides for the conservation and protection of the water resources of the State by requiring that any land-clearing, grading, or other earth disturbances require an erosion-and-sediment-control plan. Also provides that Stormwater must be managed to prevent offsite sedimentation and maintain current site conditions.	Activities that affect the water resources of the State.	Applicable	The design for the remedial action must incorporate the substantive requirements of this regulation. However, the administrative requirements of the regulations are not required (e.g., submission of plans for approval, etc.).

TABLE B-3
Action-Specific Applicable or Relevant and Appropriate Requirements
Site 1 (OU-4) Soil Record of Decision
Allegany Ballistics Laboratory, Rocket Center, West Virginia

Action	Citation	Requirement	Prerequisite	Determination	Comments
West Virginia Action-Specific ARARs					
Erosion and Sediment control during land disturbance	Substantive requirements of the West Virginia NPDES General Permit for Stormwater Associated with Construction Activities. Permit No. WV0115924	Requirements for construction activity include the development of a stormwater pollution prevention plan that describes the temporary and permanent stormwater controls that will be implemented during the construction activity to prevent discharges of pollutants to surface waters.	Disturbance of one acre or greater of land during construction activities including smaller sites that are part of a larger common plan of development.	Applicable	The cumulative total area of land that will be disturbed during the response action will exceed one acre. A stormwater pollution prevention plan or equivalent will be prepared and implemented during the response action. The WVDEP Erosion and Sediment Control Best Management Practice Manual will be utilized in developing the plan when practical. Onsite response actions taken under CERCLA are exempt from administrative requirements including obtaining coverage under the general permit as well as administrative reviews and approvals.
Hazardous waste accumulation and treatment in containers for less than 90 days	33 CSR 20-5.1 only as it incorporates 40 CFR 262.34(a)(1)(i), (2), (3), and 40 CFR 265.171-174	Hazardous waste may be accumulated and treated (except for thermal treatment) on site in containers for up to 90 days so long as the containers are in good condition, compatible with the waste being stored, and labeled with the words “Hazardous Waste” and the date that accumulation began. The containers must also be kept closed unless adding or removing waste and inspected weekly	Accumulate hazardous waste.	Applicable	If waste generated at ABL is determined to be hazardous, accumulation of the hazardous waste will not exceed 90 days.

TABLE B-3
Action-Specific Applicable or Relevant and Appropriate Requirements
Site 1 (OU-4) Soil Record of Decision
Allegany Ballistics Laboratory, Rocket Center, West Virginia

Action	Citation	Requirement	Prerequisite	Determination	Comments
Accumulation of hazardous waste in staging piles onsite	33 CSR 20-7.2 only as it incorporates 40 CFR 264.554(d)(1)(ii), (d)(2), (j)(1), and (j)(2)	A staging pile must be designed constructed and maintained to prevent the migration of hazardous constituents into other media. The design must consider location, hydrogeology, and any other factors that may reasonably influence the migration of hazardous constituents. Closure requirements are also included in (j)(1) and (j)(2).	Accumulation or treatment of hazardous wastes in staging piles onsite	Applicable	Applicable for the design of piles to allow for temporary storage of remediation wastes characterized as hazardous waste. The substantive requirements will be complied with but a permit is not required.
Excavation and soil staging	45 CSR 25-4.3	Facilities shall be designed, constructed, maintained and operated in a manner to minimize unplanned releases of hazardous constituents into the air.	Onsite hazardous waste staging in piles	Applicable	Excavation associated with the Selected Remedy will be conducted in a manner to prevent unplanned releases of hazardous constituents. Excavated soil staging areas will be designed to meet these standards.
Generation of fugitive dust	45 CSR 17-3.1	The purpose of this rule is to prevent and control particulate matter air pollution from materials handling, preparation, storage, and other sources of fugitive particulate matter. Particulate matter emissions are not allowed beyond the boundary of the property on which they originate.	Generation of dust	Applicable	Excavation associated with the remedial action will be conducted in a manner to minimize or prevent fugitive particulate matter from being discharged beyond the boundary lines of the properly on which the discharge originates or at any public residential location, which causes or contributes to statutory air pollution.
Discharge to waters of the State (including groundwater)	47 CSR 2-3.2	Lists adverse conditions not allowed in State waters, (including groundwater) which must be prevented during remediation.	Potential adverse effects to groundwater or surface water from solid wastes or material stored at the site.	Applicable	Solid wastes and materials (including soil stockpiled for cover) that are stored at the site during remedial actions will be managed so as not to impact the waters of the State via leachate, runoff, or discharge.
Site closure with waste in place	33 CSR 1-6.1.f.1 through 3	Final Use. The following activities are prohibited at closed landfills: • Agricultural use • Construction of buildings • Excavation of the final cover or waste materials.	Closure of landfills	Relevant and appropriate	Relevant and appropriate for remediation sites where wastes are left in place. Institutional Controls will be designed to meet these requirements.
Soil boring / Well construction and abandonment	47 CSR 58-4.2	Subsurface borings shall be constructed, operated, and closed in a manner that protects groundwater.	Construction of soil borings, monitoring wells, or injection wells	Applicable	Soil borings and monitoring wells that are installed, operated, or abandoned during the response action will meet this standard.

TABLE B-3
Action-Specific Applicable or Relevant and Appropriate Requirements
Site 1 (OU-4) Soil Record of Decision
Allegany Ballistics Laboratory, Rocket Center, West Virginia

Action	Citation	Requirement	Prerequisite	Determination	Comments
Outdoor material storage or disposal activities	47 CSR 58-4.3(b), 4.4(a)	New areas used for storage shall be designed, constructed and operated to prevent release of contaminants. Groundwater monitoring stations may be necessary to assure protection of the groundwater resource. Loading and unloading stations including but not limited to drums, trucks and railcars shall have spill prevention and control facilities and procedures as well as secondary containment, if appropriate. Spill containment and cleanup equipment shall be readily accessible.	Storage of raw materials, products, or wastes.	Applicable	Remedial actions will be conducted in a manner that prevents the release of hazardous substances to the groundwater

ARAR - Applicable or Relevant and Appropriate Requirements

CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act

CFR - Code of Federal Regulations

COMAR – Code of Maryland Regulations

CSR - Code of State Regulations [West Virginia]

NPDES - National Pollutant Discharge Elimination System