7/1/06 - 01767

Proposed Remedial Action Plan For Site 10

Allegany Ballistics Laboratory
Rocket Center, West Virginia

Executive Summary

This Proposed Remedial Action Plan (PRAP) addresses surface and subsurface soil at Site 10 (defined as operable unit [OU] 06) of the Allegany Ballistics Laboratory (ABL) in Rocket Center, West Virginia. Site 10 groundwater (OU 05) is being addressed under a record of decision (ROD) issued in 2005, which requires site-wide groundwater extraction and treatment at the Site 1 groundwater treatment plant. The ABL facility, located adjacent to the North Branch Potomac River near the West Virginia-Maryland border, is a research, development, testing and production facility for solid propellants and motors used for ammunition, rockets, and armaments. Site 10 includes the location of the Building 157 trichloroethene (TCE) still, which was operated from approximately 1959 to the early 1960s, and is located in the south-central portion of Plant 1.

Site 10 has been the subject of several investigations, the most recent of which being a supplemental soil investigation conducted in 2000 to refine and complete site characterization. A Risk Assessment Report was prepared by the Navy and submitted to USEPA and WVDEP in July 2005 (CH2M HILL, 2005). The Risk Assessment report documents the potential current and future human health and ecological risk assessment conclusions associated with Site 10 soil. No unacceptable human health or ecological risks were identified and, therefore, the report concluded that no action is necessary for Site 10 soil to be protective of human health and the environment.

The Administrative Record contains historic documents related to Site 10, including the Risk Assessment Report, and can be found at the information repositories listed in Sections 1 and 7 of this PRAP. The Navy encourages the public to review Site 10 documentation within the Administrative Record for a more comprehensive characterization of the site as it relates to this PRAP.

In summary, based upon the findings of the human health and ecological risk assessments for Site 10 soil, the preferred alternative for OU6 is no further action. However, selection of this alternative may be modified or changed in response to comments from the public.

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Glossary

[Include definition of upper and lower trophic level receptors]

ABL – Allegany Ballistics Laboratory

Alluvium—Unconsolidated (loose) soil (clay, silt, sand, and gravel) laid down by a stream. Groundwater moves through alluvium (called an alluvial aquifer) by traveling around the individual particles.

Aquifer—A fully saturated, underground soil or rock formation that is capable of producing a significant quantity of water.

ARARs – Applicable or Relevant and Appropriate Requirements (ARARs)

ATK – ATK Tactical Systems Company, LLC

Bedrock—Consolidated (solid) material formed at high temperatures and/or pressures deep underground. Groundwater moves through bedrock (called a bedrock aquifer) by traveling through cracks and channels.

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

COC— Constituent of Concern. A chemical identified in the risk assessment as posing an unacceptable risk for the receptors identified at the site.

COPC— Constituent of Potential Concern. A chemical identified during the data screening assessment to be above a regulatory screening level and requiring further assessment.

CS—Confirmation Study - A phase of environmental investigation under the Navy Assessment and Control of Installation Pollutants (NACIP) program in which samples are collected to confirm the presence of and determine the nature of contamination at a site.

CT—Central Tendency. Assessment of risk based on the average level of human exposure that may be expected to occur.

ERA—Ecological Risk Assessment. An evaluation of the potential health risks posed to plants and animals from exposure to existing levels of contamination.

ESADDI – Estimated Safe and Adequate Daily Dietary Intake

FS – Feasibility Study. Part of the CERCLA process, the FS develops and evaluates potential alternatives to address contamination identified, quantified, and evaluated (including potential risks) during a Remedial Investigation (RI). When an FS is prepared for a single site or medium, it may be referred to as a Focused Feasibility Study (FFS).

Groundwater—Subsurface water that moves in soil and geologic formations that are fully saturated (aquifer).

HHRA—Human Health Risk Assessment. An evaluation of the potential health risks posed to people from exposure to existing levels of contamination.

HI – Hazard Index. For constituents that cause noncarcinogenic effects, the likelihood of adverse health effects is expressed as a numerical ratio called the Hazard Index (HI). The HI estimates the potential for the most sensitive individuals to be adversely affected by exposure to site conditions.

HQ – Hazard Quotient. The ratio of exposure intake to the daily exposure level that is likely to be without an appreciable risk of adverse effect over the period of exposure

IAS – Initial Assessment Study

IRP—Installation Restoration Program. The term used to describe the Navy's environmental program.

LOAEL—Lowest Observed Adverse Effect Level

msl—mean sea level

NACIP—Navy Assessment and Control of Installation Pollutants Program

NAVFAC—Naval Facilities Engineering Command

NAVSEA—Naval Sea Systems Command

NCP—National Oil and Hazardous Substances Contingency Plan. The NCP provides the organizational structure and procedures for preparing for and responding to discharges of oil and releases of hazardous substances, pollutants, and contaminants.

NPL—National Priorities List – Nationwide list of sites, established by Congress under CERCLA and compiled by EPA under CERCLA regulations, that identifies sites for priority investigation and remedial action.

OU—Operable Unit. The term for each of a number of separate activities undertaken as part of a Superfund site cleanup. For example, cleanup of soil and groundwater could be two separate operable units.

Pathway—Describes how a chemical moves through the environment (migration pathway) or comes into contact with a person, plant, or animal (exposure pathway).

PCE—tetrachloroethene. PCE is in a group of chemicals known as volatile organic compounds, or VOCs.

PRAP—Proposed Remedial Action Plan. A public document describing the remedial alternatives at a site and the regulators' preferred cleanup remedy that is used to solicit community participation in the decision-making process.

Public Comment Period—The time allowed for the members of a community to express views and ask questions regarding an action proposed to be taken by EPA, such as a rule making, permit, or Superfund remedy selection.

Public Meeting—The meeting where the lead agency presents and discusses the Proposed Remedial Action Plan, and accepts written and verbal comments and questions from the community members.

Public Notice—An announcement, generally published in local newspapers, notifying the community members of the availability of the Proposed Remedial Action Plan and the Administrative Record in advance of the Public Meeting.

PWA—Production Well A

RAB—Restoration Advisory Board. An informal public interest group at ABL.

RBC—Risk-Based Concentration - These are chemical concentrations, calculated by the USEPA, that correspond to fixed levels of potential risk in water, air, fish tissue, and soil. The primary use of RBCs is for chemical screening during baseline risk assessment.

RI—Remedial Investigation. An in-depth study designed to gather data needed to determine the nature and extent of contamination at a Superfund site and the potential risks posed to people, plants, and animals by the contamination.

RME—Reasonable Maximum Exposure. Assessment of risk based on the highest level of human exposure that could reasonably be expected to occur.

ROD—Record of Decision. A public decision document that establishes which cleanup alternative(s) will be used at a NPL site.

SARA—Superfund Amendments and Reauthorization Act of 1986

TCE – trichloroethene. TCE is in a group of chemicals known as volatile organic compounds, or VOCs (see below). In addition to their tendency to vaporize readily, many VOCs have the ability to absorb or dissolve other substances, such as oil and grease, which makes them valuable as degreasers and solvents for many industrial applications. Historically, TCE use as an industrial degreaser was widespread. Although its use at ABL was discontinued by the early 1990s, TCE was commonly used at the facility to degrease fabricated metal parts and to clean rocket casings.

USEPA—United States Environmental Protection Agency

VOC—Volatile Organic Compound. A type of chemical that readily vaporizes, often producing a distinguishable odor. Examples of VOCs include fingernail polish remover, household cleaners, and gasoline components. VOCs are of concern in groundwater because they tend to readily dissolve in groundwater, spread with the groundwater flow, remain in the groundwater for extended periods of time, and have both carcinogenic and non-carcinogenic health effects.

WVDEP—West Virginia Department of Environmental Protection

SECTION 1

Introduction and Purpose

This Proposed Remedial Action Plan (PRAP), or Proposed Plan, identifies the Preferred Alternative for surface and subsurface soil at Site 10 (defined as operable unit [OU] 06) of the Allegany Ballistics Laboratory (ABL) in Rocket Center, West Virginia. ABL is a research, development, testing, and production facility for solid propellants and motors used for ammunition, rockets, and armaments. ABL is located on the North Branch Potomac River, which separates West Virginia and Maryland (Figure 1-1). Site 10, is located in the south-central portion of Plant 1, adjacent to Building 157, where the Building 157 TCE still operated from approximately 1959 to the early 1960s.

The Department of the Navy, Naval Facilities Engineering Command (NAVFAC), Mid-Atlantic, hereafter referred to as the Navy, is the lead agency and is issuing this PRAP through the Navy's Installation Restoration Program (IRP) along with U.S. Environmental Protection Agency (USEPA) Region III, in accordance with the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA). CERCLA, as amended by SARA, sets forth the legal requirements for remediating hazardous waste disposal and spill sites on the National Priorities List (NPL). Plant 1 of ABL, where Site 10 is located, was listed on the NPL in May 1994 (USEPA ID WV0170023691).

This PRAP is issued pursuant to the public participation requirements established under Section 117(a) of CERCLA and Sections 300.430(f)(2) and (3) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). The Navy is issuing this document in conjunction with the USEPA Region III, and in consultation with the West Virginia Department of Environmental Protection (WVDEP), the support agency.

The objectives of this PRAP are to:

- Summarize the key site information;
- Identify the preferred remedial alternative for Site 10 OU 06, and
- Invite public participation in the remedy selection process by presenting technical information and public participation procedures.

This document addresses the surface and subsurface soil at Site 10 (OU 06). Site 10 groundwater (OU 05) is being addressed under a Record of Decision (ROD) issued in 2005 (Navy, 2005), which involves site-wide groundwater extraction and treatment at the Site 1 groundwater treatment plant.

This PRAP highlights key information found in the Final Risk Assessment Report (CH2M HILL, 2005) and other documents referenced in this plan. The Navy encourages the public to review these documents for a more comprehensive description of the characterization of the site, as it relates to selection of a Preferred Alternative for Site 10 OU 06. The Final Risk

Assessment Report, on which the preferred alternative is based, and other documents in the Administrative Record, are available for review at the following information repositories:

LaVale Public Library 815 National Highway LaVale, MD 21502 Tel: (301) 729-0855 Fax: (301) 729-3490 http://lib.allconet.org/locations/lavale.htm	Monday through Thursday Friday and Saturday Sunday	9:00 a.m. to 9:00 p.m. 900 a.m. to 5:00 p.m. Closed
Fort Ashby Public Library Lincoln Street, IGA Plaza P.O. Box 74 Fort Ashby, WV 26719 Tel: (304) 298-4493 Fax: (304) 298-4014 http://www.vouseemore.com/mineral/branch.asp?branch=3	Monday and Friday Tuesday through Thursday Saturday Sunday	1200 p.m. to 5:00 p.m. 6:00 p.m. to 8:00 p.m. 900 a.m. to 1200 p.m. and 1:00 p.m. to 4:00 p.m. Closed

The Navy, together with USEPA Region III and in consultation with the WVDEP, will select a final remedy for Site 10 soil after the public comment period has ended and the information and/or comments submitted during that time have been reviewed and considered. The final decision document (the ROD) may choose a different or modified remedy than proposed in this plan, in consideration of new information or public comments.

Background informa'tion and site characteristics of Site 10 OU 06 are presented in Sections 2 and 3, respectively, of this PRAP. Section 4 discusses the scope of the response action at Site 10 OU 06. Section 5 summarizes the potential risks associated with the site. The preferred alternative and the rationale for its selection are presented in Section 6. Additional information on community participation in the decision-making process, including information regarding the public comment period, meetings, information repositories, and a mailing list of Navy contacts, is provided in Section 7.

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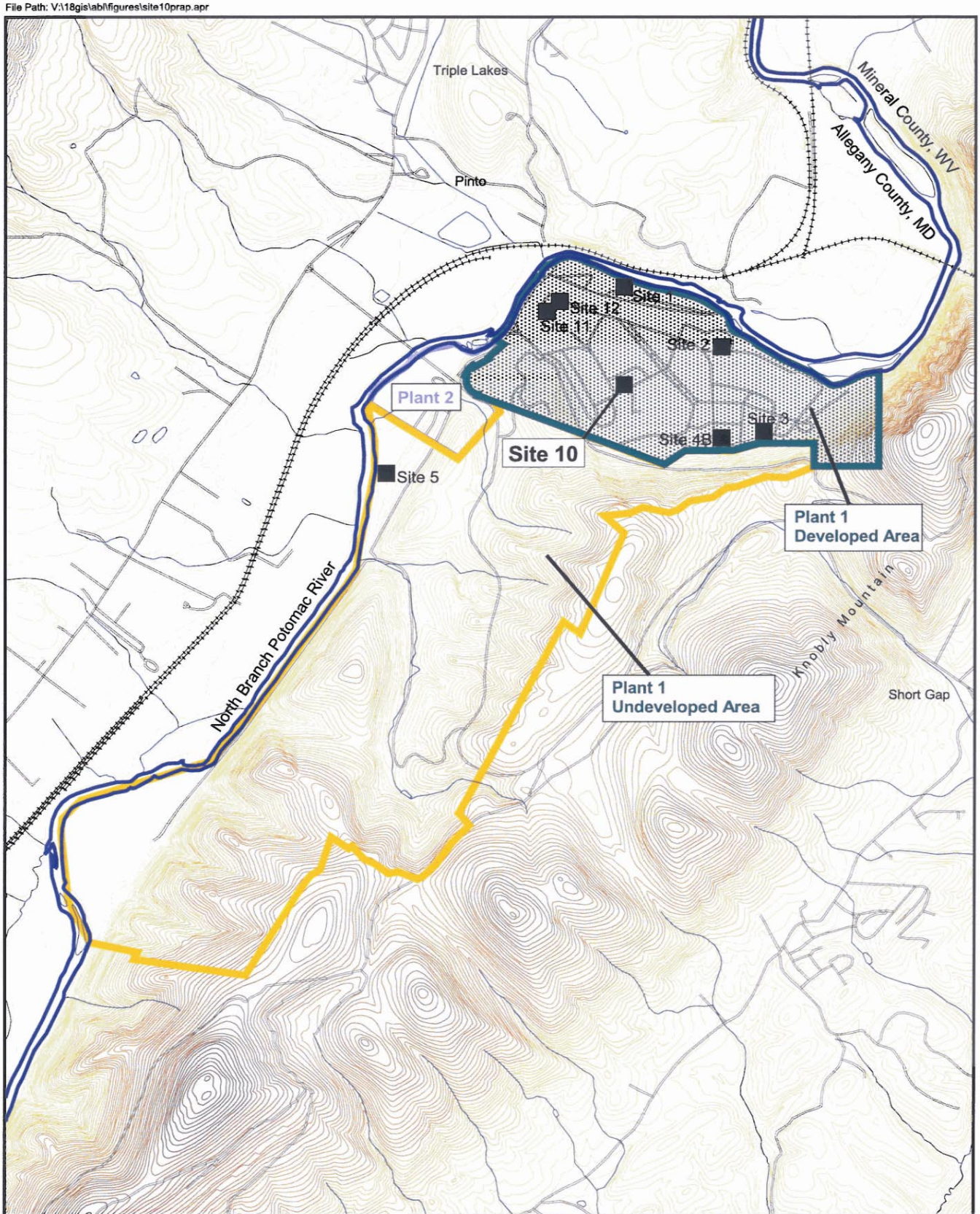

Figure 1-1
Location Map
Proposed Remedial Action Plan - Site 10
Allegany Ballistics Laboratory
Rocket Center, West Virginia

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SECTION 2

Site Background

This section provides Site 10 background information compiled from literature review, existing documents, and site investigations. Additional information can be found in the Final Risk Assessment Report (CH2M HILL, 2005) and in documents referenced in Section 2.2 below.

2.1 Site 10 Background and History

The ABL facility is located in Mineral County, in the northeastern part of West Virginia, approximately 10 miles southwest of Cumberland, Maryland, along the West Virginia/Maryland border. The North Branch Potomac River lies to the north and west of the facility and Knobly Mountain lies to the south and east. Several small towns are located near the facility, including Short Gap, West Virginia to the southeast and Pinto, Maryland to the north (Figure 1-1). The land surrounding the ABL facility is primarily rural agricultural and forest. Several residences across the river in Maryland and several residences south of ABL in West Virginia obtain water from private wells.

ABL is a research, development, testing, and production facility for solid propellants and motors used for ammunition, rockets, and armaments. The ABL property consists of approximately 1,634 acres of land (Figure 1-1) with about 350 buildings. The facility is divided into two distinct operating plants, Plant 1 and Plant 2. Plant 1 is owned by the Navy and currently leased to ATK Tactical Systems Company, LLC (ATK) by the Naval Sea Systems Command (NAVSEA) through a Facilities Use Contract. It occupies about 1,577 acres and is divided into a developed and undeveloped area. Plant 2, owned and operated by ATK, occupies the remaining 57 acres.

Site 10 is located in the south-central developed portion of the Plant 1. Site 10 was initially defined as Site PWA because contamination had been detected in Production Well A (PWA), which was used in the past to supply potable, boiler, and fire-fighting water to the plant. Because trichloroethene (TCE) was detected in PWA as early as 1980, its use as a water source was discontinued. Site PWA was renamed Site 10 in 1995 to be consistent with the naming convention of other sites at ABL. Historical soil and groundwater data collected indicate the source of contamination at Site 10 is the former Building 157 TCE still.

2.2 Previous Investigations

Site 10 was part of a number of investigations conducted at ABL in the 1980s and early 1990s, and was part of a supplemental soil investigation in June 2000. Investigations that included Site 10 soil are summarized briefly below.

2.2.1 Confirmation Study (1984 through 1987)

A Confirmation Study (CS) was initiated in June 1984 and completed in August 1987. The purpose of the CS was to confirm or refute the existence of suspected contamination at sites 1 through 7, identified during the Initial Assessment Study (ES&E, 1983), or in Plant Production Wells in the developed portion of Plant 1 (specifically PWA and PWC, which are now part of Site 10), springs, and the North Branch Potomac River.

As a result of SARA, the Navy changed its Navy Assessment and Control of Installation Pollutants Program (NACIP) terminology and scope under the IRP to follow the rules, regulations, guidelines, and criteria established by the USEPA for the Superfund program. Accordingly, the results of the CS are documented in an Interim RI Report, which recommended further investigation for some sites, including Site PWA (Site10) to identify the source of TCE and trichloroethane (TCA) contamination in groundwater (Roy F. Weston, 1989).

2.2.2 Remedial Investigation (1992) and NPL Listing

Based upon the recommendations of the Interim RI and in accordance with the Navy's modified IRP policy, an RI was performed following USEPA RI/FS format under CERCLA (USEPA, 1988). The 1992 RI investigated soil around buildings in the vicinity of well PWA and southwest of Building 157, and confirmed that groundwater contamination in PWA likely originated from the former TCE still at Building 157. The RI recommended further investigation at Site 10 (CH2M HILL, 1996a).

In June 1993, the USEPA proposed the Plant 1 portion of the ABL facility for inclusion on the NPL, based upon the calculated potential risks to human health and the environment. The Plant 1 portion of ABL was added to the NPL as documented in the ***Federal Register***, Volume 59, Number 27989, on May 31, 1994.

2.2.3 Phase II Remedial Investigation (1994)

In 1994, a Phase II RI was conducted to further define the nature and extent of contamination at several ABL sites, including Site 10 (CH2M HILL, 1996b). During this investigation, baseline human health and ecological risk assessments were performed to evaluate potential risks posed by each site.

The investigations leading up to and including the Phase II RI determined that groundwater contamination existed at Site 10, identified the probable source of the contamination as the former Building 157 TCE still, and determined that contaminated groundwater posed a potential risk to future groundwater users. Therefore, to expedite implementation of a remedial action for Site 10 groundwater, Site 10 was separated into two OUs: OU 05 to address groundwater at Site 10 and OU 06 to address soil at Site 10. In addition, because the former TCE still was identified as the probable source of groundwater contamination, additional soil delineation in the vicinity of the former TCE still was necessary (see Section 2.2.4).

2.2.4 Site 10 Supplemental Sampling/Risk Assessment (2000 and 2005)

Subsequent to the Phase II RI, it was determined that additional soil data were required in the vicinity of the former TCE still to adequately assess potential risks associated with

exposure to soil at Site 10. Therefore, a supplemental soil investigation was conducted in 2000 to supplement existing data at Sites 2, 3 and 10 (CH2M HILL, 2005).

Soil samples collected in the vicinity of Building 157 during the RI, Phase II RI, and the supplemental soil sampling activity were utilized to evaluate potential human health and ecological risks associated with current and potential future exposures to Site 10 soil.

No unacceptable human health or ecological risks were identified by the risk assessments. The report concluded that no action is necessary for Site 10 soil to be protective of human health and the environment (CH2M HILL, 2005).

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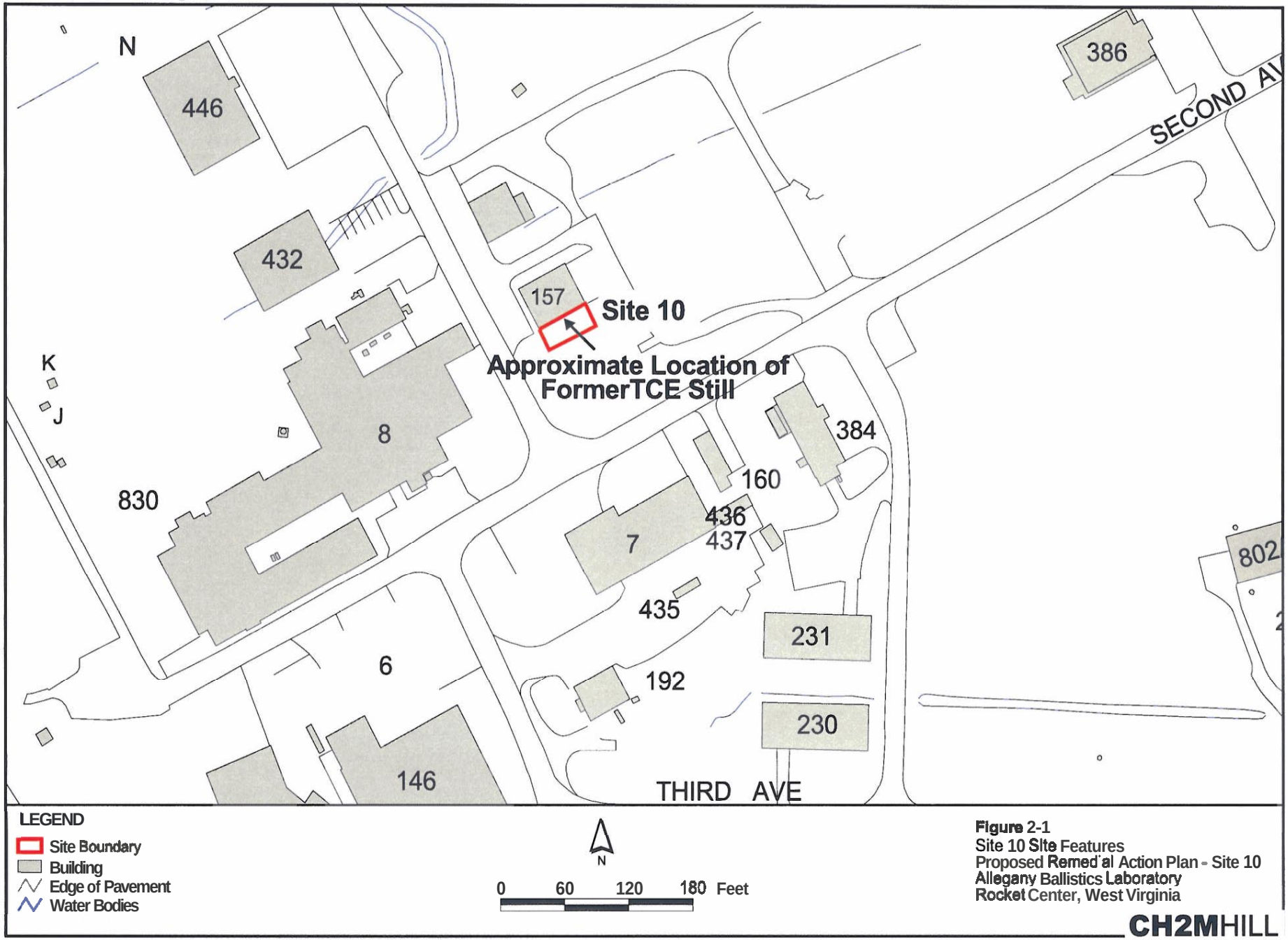

Figure 2-1
Site 10 Site Features
Proposed Remedial Action Plan - Site 10
Allegany Ballistics Laboratory
Rocket Center, West Virginia

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SECTION 3

Site Characteristics

This section describes general site characteristics for Site 10, including the nature and extent of contamination at the site.

3.1 Topography and Hydrology

The most significant physiographic feature in the vicinity of ABL is Knobly Mountain, located just south of Site 10 (Figure 1-1). Site 10 is located near the southern boundary of the 100-year floodplain of the North Branch Potomac River and has minimal topographical relief.

The predominant hydrologic feature at ABL is the North Branch Potomac River, which borders the western and northern sides of the facility, and is approximately 1,500 feet northeast of Site 10. The closest surface water feature in the vicinity of Site 10 is an intermittent drainage ditch, located approximately 100 feet north of the former TCE still, as depicted on Figure 2-1. However, the presence of Building 157 and the relatively flat topography in the vicinity of the former TCE still suggest little or no runoff exists at Site 10.

The elevation of the North Branch Potomac River ranges from about 645 feet above mean sea level (msl) at the eastern end of Plant 1 to about 655 feet above msl on the western border of ABL. The average river flow rate is estimated to be 886 cubic feet per second, as measured at the USGS Pinto gauging station.

3.2 Geology and Hydrogeology

Two predominant geologic layers exist in the subsurface at ABL: a shallow alluvial layer and a deeper bedrock layer. Detailed descriptions of the Site 10 geology and hydrogeology are presented in the RI (CH2M HILL, 1996a) and Phase II RI (CH2M HILL, 1996b). A brief description of subsurface conditions at Site 10 is presented below.

The alluvium and fractured bedrock constitute the principal aquifers underlying Site 10. Although historic data indicate that variations in groundwater movement exist at Site 10, the natural groundwater movement direction in both the alluvial and bedrock aquifers is northeast toward the North Branch Potomac River. However, groundwater in both the alluvial and bedrock aquifers is currently being captured by an extraction system and treated at a groundwater treatment plant.

Groundwater flow in the bedrock aquifer is confined to bedding planes, fractures and solution channels at Plant 1. Local variations in the flow pattern may exist due to lithologic irregularities or to structural control (by fractures or joints) in the bedrock. Hydraulic conductivities observed in the alluvial aquifer range from $1x10^{-5}$ to 5x103 centimeters per second at Plant 1 (CH2M HILL, 1996b). This range in hydraulic conductivities reflects the large degree of heterogeneity observed in the alluvium. Evidence exists that the bedrock

and alluvial aquifers are hydraulically connected, with no observable confining unit separating them. Groundwater beneath ABL is estimated to migrate at a rate of approximately 65 ft/year (CH2M HILL, 1996b).

3.3 Description of Contamination

This subsection describes the nature and extent of soil contamination at Site 10, including the constituents of potential concern (COPCs) identified during the HHRA (summarized in Section 5.1), and the constituents of concern (COCs) identified during the ERA (summarized in Section 5.2). Figures 3-1 and 3-2 show the surface and subsurface soil samples, respectively, as well as COPC/COC concentrations detected at each soil sampling location. Although COPCs (HHRA) and COCs (ERA) were identified, their concentrations were not found to represent an unacceptablelevel of potential risk.

3.3.1 Surface Soil

Only three VOCs (m-xylene, p-xylene and TCE) were detected in the surface soil at estimated concentrations below the laboratory quantitation limits. No organic constituents were identified as surface soil COPCs or COCs in the risk assessments.

Nineteen metals were detected in the surface soil samples. Five metals (aluminum, arsenic, iron, manganese, and vanadium) were identified as COPCs in surface soil during the HHRA (see Section 5.1), based on comparison with USEPA Region IIIs adjusted risk-based concentrations (RBCs) for residential soil . In addition, seven metals (aluminum, arsenic, chromium, iron, manganese, vanadium, and zinc) were identified as COCs during the ERA (see Section 5.2). Sample locations as well as COPC/COC concentrations are shown in Figure 3-1.

3.3.2 Subsurface Soil

Four VOCs (m-xylene, p- xylene, tetrachloroethene [PCE], and TCE) were detected in the subsurface soil at concentrations below levels required to be identified as a COPC during the HHRA. No organic constituents were identified as subsurface soil COPCs in the risk assessments.

Twenty-one metals were detected in ope or more subsurface soil samples. Five metals (aluminum, arsenic, iron, manganese, and vanadium) were identified as COPCs for combined surface and subsurface soil during the HHRA. Sample locations as well as COPC concentrations are shown in Figure 3-2. No ecological COCs were identified for the subsurface soil because subsurface soil is not an ecologically significant habitat.

3.3.3 Background Soil Comparison

Comparisons of central tendency (CT) were performed to help determine if the concentrations of the soil COPCs and COCs at Site 10 are statistically different from facility background concentrations (CH2M HILL, 2003).

The results of the comparison indicate that there is no statistical difference between facility background and concentrations of three of the constituents (arsenic, iron, and manganese) identified as COPCs/COCs in surface soil. Aluminum and vanadium, identified as COPCs,

were detected in the surface soil statistically above background. Two additional COCs identified during the ERA (chromium and zinc) were detected in the surface soil at concentrations statistically above background.

The results of the statistical comparison for subsurface soil and combined surface and subsurface soil indicate that there is a statistically significant difference between facility background and Site 10 subsurface soil concentrations for each of the COPCs. However, historical site information suggests that it is unlikely that a release of metals to the soil are attributed to past site activities.

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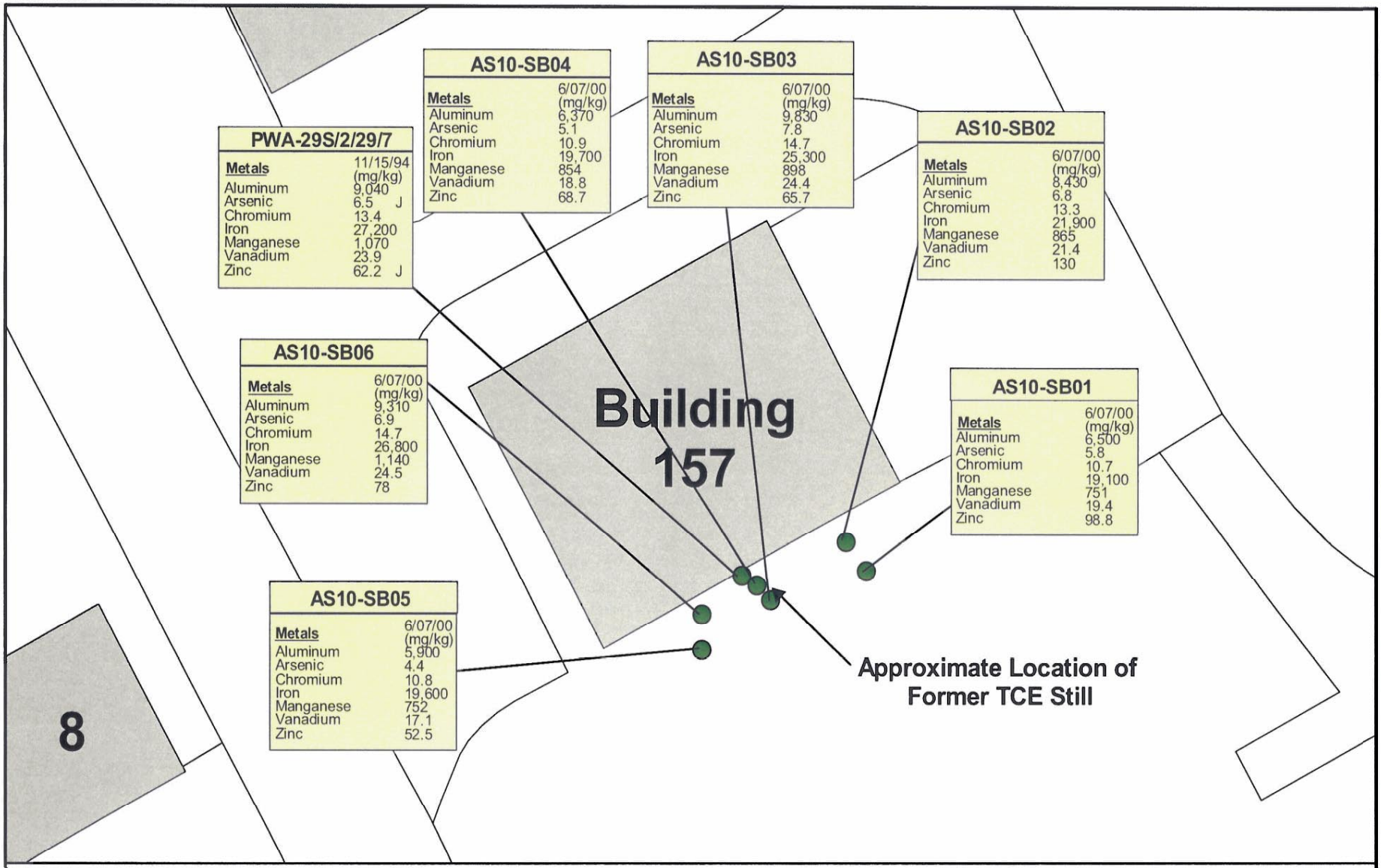

LEGEND

- Surface Soil Samples at Site 10
- Building
- Edge of Pavement

Qualifiers:
J - Estimated
mg/kg - milligrams per kilogram
ug/kg - micrograms per kilogram

N

0 10 20 30 Feet

Figure 3-1
COPCs/COCs Detected in Surface Soil Samples
Proposed Remedial Action Plan for Site 10 Soil
Allegany Ballistics Laboratory
Rocket Center, West Virginia

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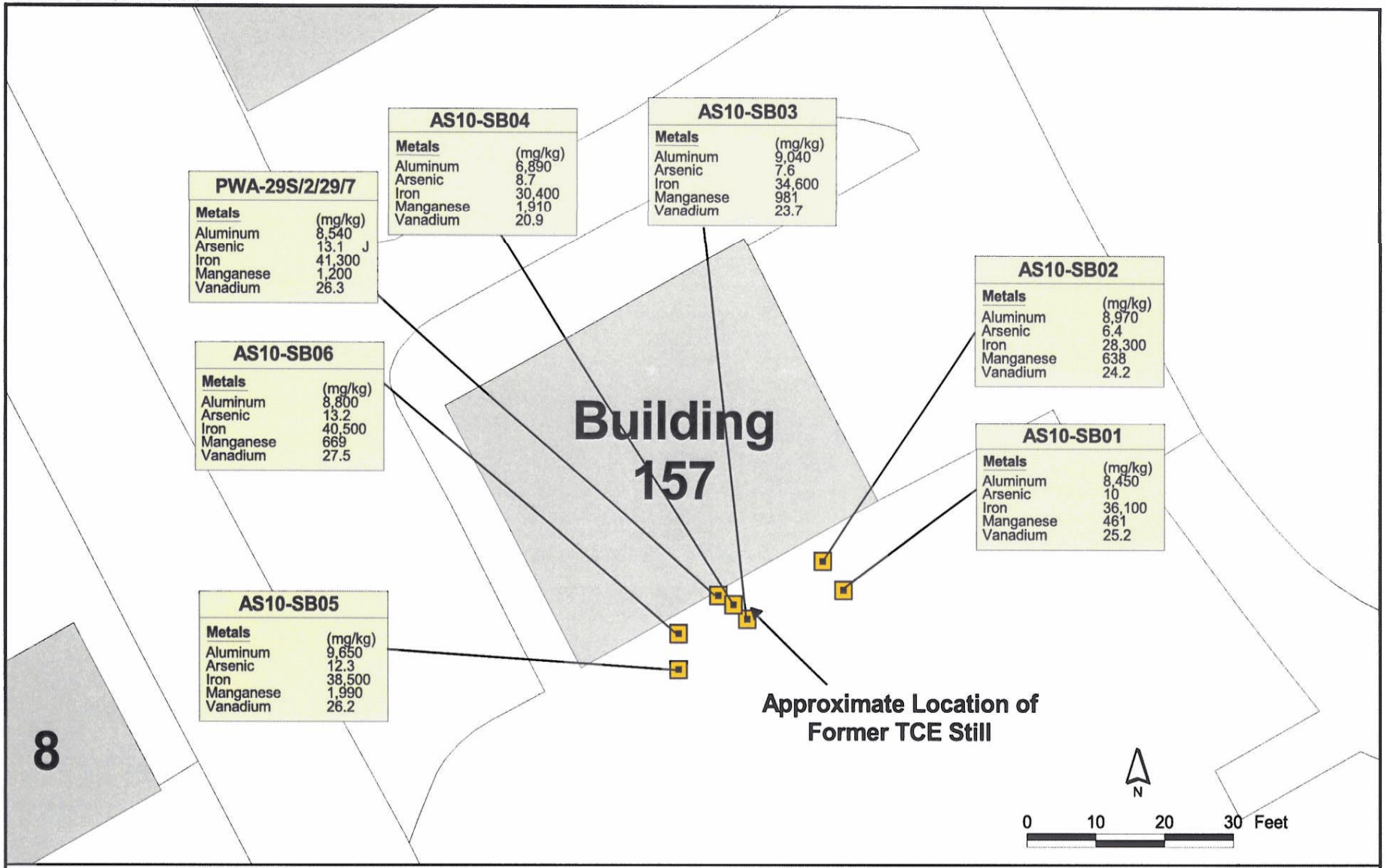

LEGEND

- Subsurface Soil Samples at Site 10
- Building
- Edge of Pavement

Qualifiers:
J - Estimated
ND - Not Detected
mg/kg = milligrams per kilogram
ug/kg = micrograms per kilogram

Figure 3-2
COPCs Detected in Subsurface Soil Samples
Proposed Remedial Action Plan for Site 10 Soil
Allegany Ballistics Laboratory
Rocket Center, West Virginia

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SECTION 4

Scope and Role of Response Action

Site 10 soil (OU 6) is one of several sites identified in the Federal Facility Agreement (FFA) for ABL. A list of all sites can be found in the Site Management Plan (SMP) for ABL (CH2M HILL, April 2004). Over the last nine years, six RODs have been signed for four sites at ABL in accordance with the priorities established in the SMP.

Remedies have been implemented at 4 of the 12 top priority sites at ABL. The designation, media, and remedial action for each site are listed below.

- Site 1 Groundwater, Surface Water, and Sediment (OU 3): site-wide groundwater extraction and treatment (ROD May 1997)
- Site 5 Landfill Contents and Surface Soil (OU 1): capping (ROD January 1997)
- Site 7 Former Beryllium Landfill (OU 7): landfill contents removal in 1997 (No Further Action ROD September 2001)
- Site 10 Groundwater (OU 5): focused groundwater extraction and treatment (Interim ROD June 1998; Final ROD February 2006)
- Site 5 Groundwater, Surface Water and Sediment (OU 2): installation of a permeable reactive barrier, monitored natural attenuation, and long-term monitoring (ROD September 2005)

The Navy is investigating numerous other locations at ABL, including Site 10 soil. This PRAP addresses potential contamination in Site 10 soil.

SECTION 5

Summary of Site Risks

This section summarizes the results of the baseline HHRA and ERA for Site 10 OU 06 (surface and subsurface soil). A baseline risk assessment evaluates site data to determine potential risks to human health and/or the environment. The potential risks are evaluated for constituents in the media of concern and for potential routes of exposure.

No unacceptable risks to human health or the environment were identified during the risk assessments prepared for Site 10 soil, as described below.

5.1 Baseline Human Health Risk Assessment

A baseline HHRA was conducted to assess the potential human health risks from exposure to the COPCs detected in Site 10 soil (CH2M HILL, 2005). The HHRA report is available at the information repositories listed in Sections 1 and 7. Site 10 soil constituent concentrations were evaluated in a baseline HHRA using current and future land use scenarios and conservative estimates of current and future human exposure to site contaminants.

As part of the Site 10 HHRA, a list of COPCs that may pose risks to human receptors defined for the site was developed and is presented in Table 5-1. As explained in Section 3 of this PRAP, the COPC identification process included collection of site soil data, and screening that data against constituent concentrations that could pose a risk to human health. All of the COPCs identified during the evaluation of Site 10 soil were metals in the surface soil and the combined surface and subsurface soil..

Exoosure refers to the potential contact of an individual with a constituent. A conceptual exposure model showing potential exposure pathways identified under current and potential future conditions at Site 10 is presented in Figure 5-1. This conceptual site model presents all potential routes of exposure; however, not all routes are complete exposure pathways. The exposure assessment identifies the complete pathways and routes by which an individual may be exposed to COPCs. It also estimates the magnitude, frequency, and duration of a potential exposure. The magnitude of exposure is determined by estimating the amount of a constituent that would be available at the exchange boundaries (i.e., the lungs, gastrointestinal tract, and skin) after an exposure. An HHRA quantifies constituent intakes and associated health risks only for complete exposure pathways.

The potential exposure pathways in Figure 5-1 were evaluated for five elements established by the USEPA to determine if each is potentially complete. The five elements are:

- A source (e.g., chemical residues in soil);
- A mechanism for release and migration of chemicals (e.g., leaching);
- An environmental transport medium (e.g., soil, groundwater);

- A point or site of potential human contact (i.e., exposure point, such as contact with soil or drinking water); and
- A route of intake (e.g., incidental ingestion of soil, ingestion of groundwater used as a drinking water source);

5.1.1 Current Land Use

Site **10** lies within the developed portion of Plant **1.** The current use for the area that includes Site **10** is industrial. Therefore, based on current land use, an industrial worker may be exposed to surface soil. Although unlikely due to security restrictions and perimeter fencing around the facility, adolescent trespassers or visitors were conservatively evaluated as potentially exposed human receptors.

5.1.2 Potential Future Uses

Site **10** is anticipated to remain an industrial area in the future. Therefore, the current exposed populations are also expected for potential future site uses. Additionally, it was assumed that if any construction activities occur at Site **10,** a future construction worker could be exposed to the combined surface and subsurface soil. After any construction activities, a trespasser or visitor could be exposed to soil (combined surface and subsurface soil), assuming that subsurface soil may be placed on the surface during the construction activities.

Although unlikely, future residential exposure to soil (combined surface and subsurface soil) was evaluated in the Site **10** risk assessment as a conservative scenario. It was assumed that the subsurface soil may be placed on and combined with the surface soil if the site was converted for residential use or during future construction or excavation activities.

5.1.3 Conclusion

The Site **10** soil baseline HHRA was conducted to evaluate the potential human health risks associated with exposure to site-related surface soil and combined surface and subsurface soil. Tables 5-2 and 5-3 present the cancer risks and hazard indices determined for Site **10** under an RME and a CT exposure. The HHRA concluded that no unacceptable potential human health risks exist for current site use.

The potential RME noncarcinogenic hazard for the future construction worker is slightly above the USEPAs target HI, primarily due to the ingestion of iron. However, none of the individual constituents contribute hazards above USEPAs target level alone, and there are no target organs with hazards above USEPAs target level. Furthermore, the CT noncarcinogenic hazard is below USEPAs target hazard index of 1.

Potential future exposure to combined surface and subsurface soil by a child resident may result in a potential noncarcinogenic hazard above USEPA's target hazard index of **1,** primarily due to ingestion of iron and manganese. The CT noncarcinogenic hazard is below USEPA's target HI. Although the potential RME hazards are associated with naturally occurring constituents, the concentrations of these constituents (iron and manganese) detected in the Site **10** soil are greater than the concentrations of these constituents in the background dataset (CH2M Hill, 2003). However, iron is an essential human nutrient, which

complicates the derivation of a reference dose (USEPA, 1999). The reference dose is the toxicity factor used, along with the intake (amount of soil ingested and taken into the body through dermal contact), to calculate the noncarcinogenic hazard index. The estimated RME intake of iron via incidental ingestion of Site 10 soil (0.38 mg/kg-day) is within the recommended dietary allowance (RDA) range of iron for children ages 6 months to 10 years (0.36 to 1.11 mg/kg-day) (RDA, 2003). Therefore, the concentration of iron in Site 10 soil is not unacceptable for ingestion by future child residents under conservative exposure scenario assumptions.

Like iron, manganese is an essential human nutrient, responsible for activating several enzymes (IRIS, 2004). Exposure to manganese in the Site 10 combined surface and subsurface soil results in a hazard quotient (HQ) above 1 for the future child resident. However, the recommended dietary intakes of manganese from the Food and Nutrition Board, Institute of Medicine, National Academies (National Academy of Sciences, 2004) for children 1 to 3 years of age and 4 to 8 years of age are 1.2 mg/day and 1.5 mg/day, respectively, which, based on the average weight of children, correlate to manganese intakes of 0.08 mg/kg-day and 0.1 mg/kg-day, respectively. The manganese intakes for child residents estimated in the risk assessment (0.014 mg/kg) were below these estimated safe and adequate daily dietary intake (ESADDI) doses. Therefore, the concentration of manganese in Site 10 soil is not unacceptable for ingestion by future child residents under conservative exposure scenario assumptions.

Based on the results of the HHRA, no remedial action is needed for Site 10 soil to be protective of human health under industrial or residential use scenarios.

5.2 Baseline Ecological Risk Assessment

A baseline ERA was conducted to assess the potential ecological risks from exposure to the COCs detected at Site 10 (CH2M HILL, 2005). The ERA report is available at the information repositories listed in Sections 1 and 7.

The ERA evaluated potential ecological risks for both upper-trophic-level receptors (via food web exposures) and lower-trophic-level receptors (via direct exposure to surface soil). Seven metals (aluminum, arsenic, chromium, iron, manganese, vanadium and zinc) were identified as COCs during the ERA.

Although concentrations of metals in surface soil exceeded direct-exposure screening values, they were generally consistent with concentrations in facility-wide background soils or are not likely to be site related based upon site history. Estimated food web exposure doses did not exceed ingestion screening values based on the lowest observed adverse effect level (LOAEL) for any receptor.

Information on the habitat features at the site and on the fate and transport of the constituents detected at the site were used to build a conceptual model, which is presented as Figure 5-2. The relatively small size of the site and the limited terrestrial habitat quality present at Site 10 will also limit potential exposures. Based on the results of the ERA, no remedial action is necessary for Site 10 soil to be protective of the ecological health.

Table 5-1
Summary of Chemicals of Potential Concern for the HHRA - Site 10
Proposed Remedial Action Plan
Allegany Ballistics Laboratory
Rocket Center, West Virginia

Surface Soil	Soil'
Ingestion, Dermal, and Inhalation of Airborne Particulates	Ingestion, Dermal, and Inhalation of Airborne Particulates
Aluminum	Aluminum
Arsenic	Arsenic
Iron	Iron
Manganese	Manganese
Vanadium	Vanadium

• Surface and subsurface soil combined.

Table 5-2
Summary of Reasonable Maximum Exposure Risks Cancer Risks and Hazard Indices • Site 10
Proposed Remedial Action Plan. Site 10
Allegany Ballistics Laboratory
Rocket Cenler, West Virginia

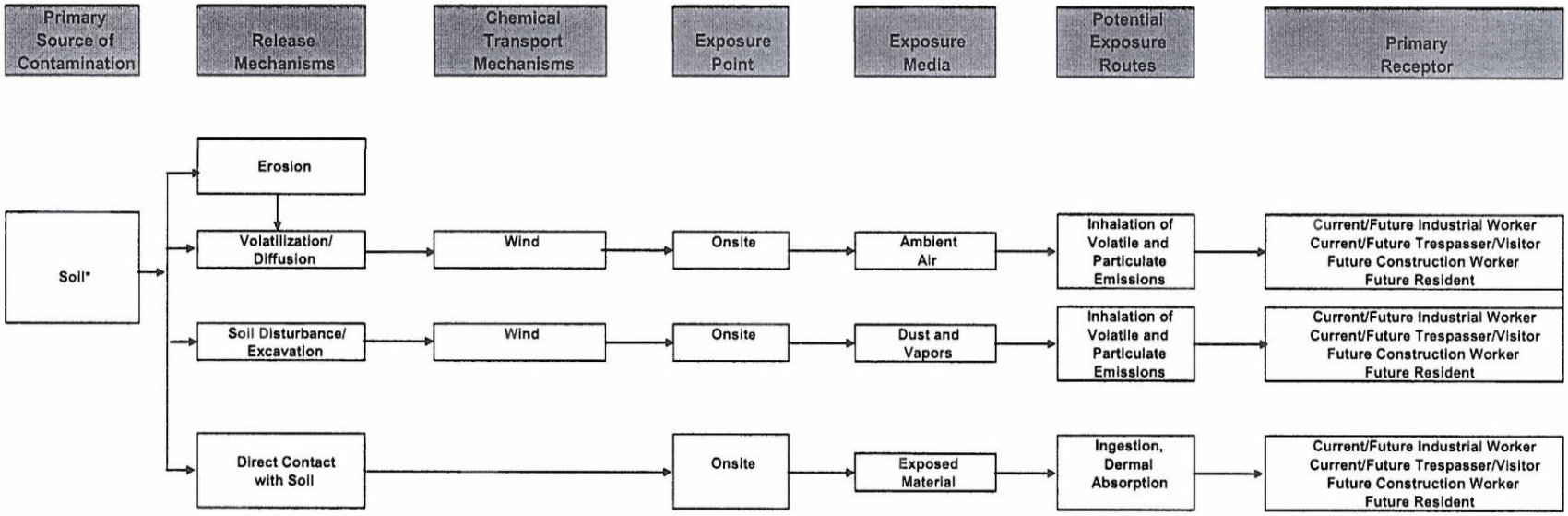
Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks $>10^{-4}$	Chemicals with Cancer Risks $>10^{-5}$ and $<10^{-4}$	Chemicals with Cancer Risks $>10^{-6}$ and $<10^{-5}$	Hazard Index	Chemicals with HI>1
Current/Future Industrial Worker	Surface Soil	Ingestion	3.7E-06			Arsenic	1.9E-01	
		Dermal Contact	9.4E-07				1.9E-01	
		Inhalation	3.3E-09				7.2E-03	
		Total	4.6E-06				3.9E-01	
	All Media	Total	4.6E-06				3.9E-01	
Current/Future Adolescent Trespasser/Visitor	Surface Soil	Ingestion	3.8E-07				5.4E-02	
		Dermal Contact	8.4E-08				4.8E-02	
		Inhalation	4.3E-11				2.6E-04	
		Total	4.6E-07				1.0E-01	
	All Media	Total	4.6E-07				1.0E-01	
Future Adult Resident	Soil*	Ingestion	NA				3.3E-01	
		Dermal Contact	NA				1.2E-01	
		Inhalation	NA				2.0E-02	
		Total	NA				4.7E-01	
	All Media	Total	NA				4.7E-01	
Future Child Resident	Soil*	Ingestion	NA				2.7E+00	Iron
		Dermal Contact	NA				8.1E-01	
		Inhalation	NA				6.1E-02	
		Total	NA				3.6E+00	Iron, Manganese
	All Media	Total	NA				3.6E+00	
Future Child/Adult Resident	Soil'	Ingestion	2.1E-05		Arsenic		NA	
		Dermal Contact	1.6E-06			Arsenic	NA	
		Inhalation	1.8E-08				NA	
		Total	2.3E-05				NA	
	All Media	Total	2.3E-05				NA	
Future Construction Worker	Soil'	Ingestion	9.6E-07				1.0E+00	
		Dermal Contact	1.9E-08				7.4E-02	
		Inhalation	4.0E-10				1.9E-02	
		Total	9.8E-07				1.1E+00	
	All Media	Total	9.8E-07				1.1E+00	
Future Adolescent Trespasser/Visitor	Soil'	Ingestion	5.1E-07				6.6E-02	
		Dermal Contact	1.1E-07				6.6E-02	
		Inhalation	5.8E-11				3.1E-04	
		Total	6.3E-07				1.3E-01	
	All Media	Total	6.3E-07				1.3E-01	

'Combined surface end subsurface soil
Hi • Hazard index
NA - Not Applicable

Table 5-3
Summary of Central Tendency Cancer Risks and Hazard Indices. Site 10
Proposed Remedial Action Plan -Site 10
Allegany Ballistics Laboratory
Rocket Center, West Virginia

Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks >10^{-4}	Chemicals with Cancer Risks >10^{-5} and <10^{-4}	Chemicals with Cancer Risks >10^{-6} and <10^{-5}	Hazard Index	Chemicals with HI>1
Future Child Resident	Soil'	Ingestion	NA				2.7E-01	
		Dermal Contact	NA				1.3E-01	
		Inhalation	NA				NA	
		Total	NA				4.0E-01	
	All Media	Total	NA				4.0E-01	
Future Construction Worker	Soil*	Ingestion	NA				7.7E-01	
		Dermal Contact	NA				2.0E-02	
		Inhalation	NA				NA	
		Total	NA				7.9E-01	
	All Media	Total	NA				7.9E-01	

* Combined surface and subsurface soil
Hi -Hazard Index
NA - Not Applicable



* Current scenarios are for exposure to surface soil, future scenarios are for exposure to combined surface and subsurface soil

FIGURE 51
Conceptual Site Model for Potential Human Exposures
Proposed Remedial Action Plan Site 10
Allegany Ballistics Laboratory, Rocket Center, West Virginia

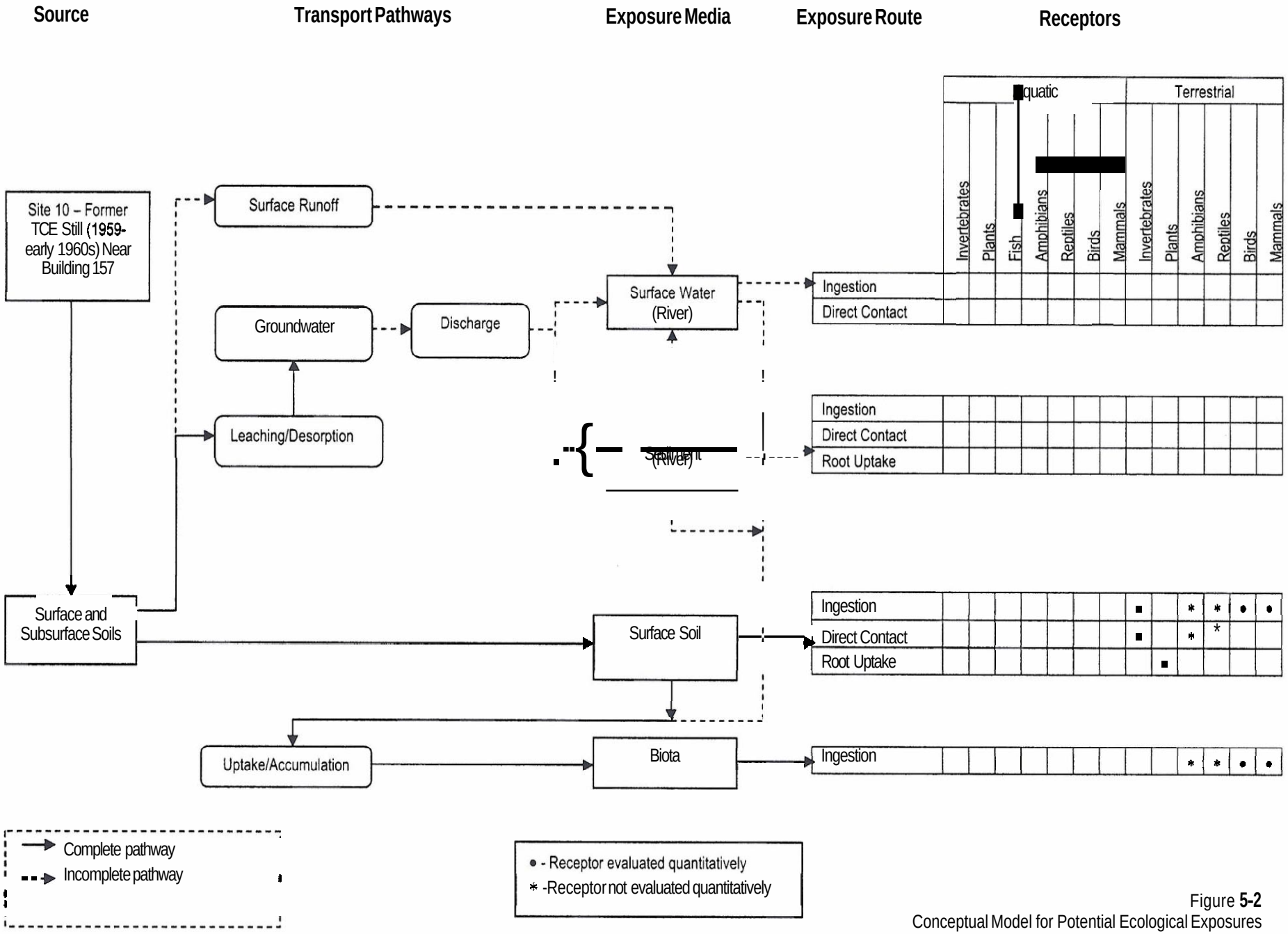


Figure **5-2**
Conceptual Model for Potential Ecological Exposures
Proposed Remedial Action Plan Site **10**
Allegany Ballistics Laboratory, Rocket Center, West Virginia

SECTION 6

Preferred Alternative

The Navy and the USEPA, with the support of WVDEP, are proposing the No Action alternative as the preferred alternative for Site 10 soil. This proposed alternative is protective of human health and the environment. The Navy may modify the preferred alternative or select another alternative if public comments or additional data indicate that another alternative will yield a more appropriate result.

The HHRA indicated that potential risks calculated for current site use (industrial worker, adolescent trespasser or visitor exposed to surface soil) and potential future site use (with the exception of the residential child and construction worker) were all within USEPA target levels. The potential RME noncarcinogenic hazard for the future construction worker is slightly above the target HI, primarily due to ingestion of iron. However, there are no target organs with hazards above USEPA's target level.

The potential RME noncarcinogenic hazard for the future child resident is primarily due to the ingestion of iron and manganese, both of which are essential human nutrients. A comparison of the estimated daily intakes of these constituents to the daily allowances indicated that exposure does not pose an unacceptable level of risk to future child residents.

The ERA evaluated potential ecological risks for both upper-trophic-level receptors (via food web exposures) and lower-trophic-level receptors (via direct exposure to surface soil) and identified acceptable potential risks for all receptors. Although concentrations of metals in soil exceeded direct-exposure screening values, they were generally consistent with concentrations in facility-wide background soils or are not likely to be site related based upon site history.

Based upon the results of the investigations conducted at Site 10, the Navy, USEPA, and WVDEP have determined that the site does not pose an unacceptable risk to human health or the environment under current and future land use and exposure scenarios, and therefore, no alternative other than the No Further Action alternative was evaluated. Under this alternative, no remedial actions will be performed at the site, and therefore, no remedy schedule, capital cost estimation, or annual operation and maintenance are necessary.

SECTION 7

Opportunities for Community Involvement

Community involvement is an important part of the selection process of a remedial action alternative. The Navy, USEPA, and WVDEP solicit comments from the community on the No Action alternative that has been proposed as the Preferred Alternative for Site 10 soil. On the basis of new information or public comments, the Navy and USEPA, in consultation with WVDEP, may modify the Preferred Alternative presented in this PRAP or select a different alternative.

The public comment period for this PRAP will begin on July 24,2006, when the PRAP is made available to the public, and will end on August 22,2006.

If you wish to submit written comments concerning this PRAP or to obtain additional information, please contact the following representative:

Mr. Robin Willis
NAVFAC Mid-Atlantic Division
9742 Maryland Ave.
Norfolk, Virginia 23511-3095
Phone: (757) 445-8732 ext. 3096

Robin.A.Willis@navy.mil

Written comments must be postmarked no later than the last day of the public comment period, which ends on August 22,2006.

A public meeting will be held on August 8,2006 at 6:30 PM to inform the public about the Preferred Alternative and to receive public comments. Notices announcing the location, date, and time of the public meeting were published in the Cumberland *Times* News and the *Mineral Daily* News on July 19,2006.

The Final Risk Assessment Report summarized in this PRAP, and other historical documents, are located at the following public document repositories:

LaVale Public Library 815 National Highway LaVale, MD 21502 Tel: (301) 729-0855 Fax: (301) 729-3490	Monday through Thursday Friday and Saturday Sunday	9:00 a.m. to 9:00 p.m. 9:00 a.m. to 5:00 p.m. Closed
Fort Ashby Public Library Lincoln Street, IGA Plaza P.O. Box 74 Fort Ashby, WV 26719 Tel: (304) 298-4493 Fax: (304) 298-4014	Monday and Friday Tuesday through Thursday Saturday Sunday	12:00 p.m. to 5:00 p.m. 6:00 p.m. to 8:00 p.m. 9:00 a.m. to 12:00 p.m. and 1:00 p.m. to 4:00 p.m. Closed

In addition to the public comment period and the public meeting, the ABL Restoration Advisory Board (RAB), a public interest group, offers increased opportunity for active community participation in the IRP. RAB meetings are open to the general public and are announced by direct mailings to interested persons. For more information about the RAB, please contact:

Mr. Robin Willis
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9742 Maryland Ave.
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SECTION 8

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