7/1/06 - 01768

Proposed Remedial Action Plan For Site 3

Allegany Ballistics Laboratory
Rocket Center, West Virginia

Executive Summary

This Proposed Remedial Action Plan (PRAP) addresses environmental media at Site 3 of the Allegany Ballistics Laboratory (ABL) in Rocket Center, West Virginia. 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 3, a burning ground, from 1950 to 1958, is located in the southeastern portion of Plant 1.

Site 3 has been the subject of several investigations, the most recent of which being a supplemental soil investigation conducted in 2001 to refine and complete site characterization. A Risk Assessment Report for Site 3 and was prepared by the Navy and submitted to USEPA and WVDEP in July 2005 (CH2M HILL, 2005). This report documents the potential current and future human health and ecological risk conclusions associated with Site 3 media. No unacceptable human health or ecological risks were identified and, therefore, the risk assessments concluded that no remedial action is necessary at Site 3 to be protective of human health and the environment.

The Administrative Record contains historic documents related to Site 3, 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 3 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 3, the preferred alternative for Site 3 is no further action. However, selection of this alternative may be modified or changed in response to comments from the public.

Glossary

[Include definition of upper and lower trophic level receptors]

1,2-DCE – 1,2-dichloroethene

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.

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.

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

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.

CFR – Code of Federal Regulations

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 at a site.

DoD – Department of Defense

DoN – Department of Navy

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 non-carcinogenic 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

MC – methylene chloride

µg/kg – micrograms/ kilogram

mg/kg – milligrams/kilogram

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.

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

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.

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

SVOC - Semi-volatile organic compound (see VOC)

TCE – trichloroethene

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

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SECTION 1

Introduction and Purpose

This Proposed Remedial Action Plan (PRAP), or Proposed Plan, identifies the Preferred Alternative for soil and groundwater at Site 3 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 (Figure1-1). Site 3 is located in the southeastern portion of Plant 1 and consists of a burning ground, which according to historic documents was used from 1950 to 1958 (Figure 1-1).

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 the remediation of hazardous waste disposal and spill sites on the National Priorities List (NPL). Plant 1 of ABL, where Site 3 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:

- Summarize the key site information;
- Identify the preferred remedial alternative for Site 3; and
- Invite public participation in the remedy selection process by presenting technical information and public participation procedures.

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 3. 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 900 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) 2984014 http://www.vouseemore.com/mineral/branch.asp	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. 9:00 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 3 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 remedial action than that proposed in this plan, in consideration of new information or public comments.

Background information and site characteristics of Site 3 are presented in Sections 2 and 3, respectively, of this PRAP. Section 4 discusses the scope of the response action at Site 3. 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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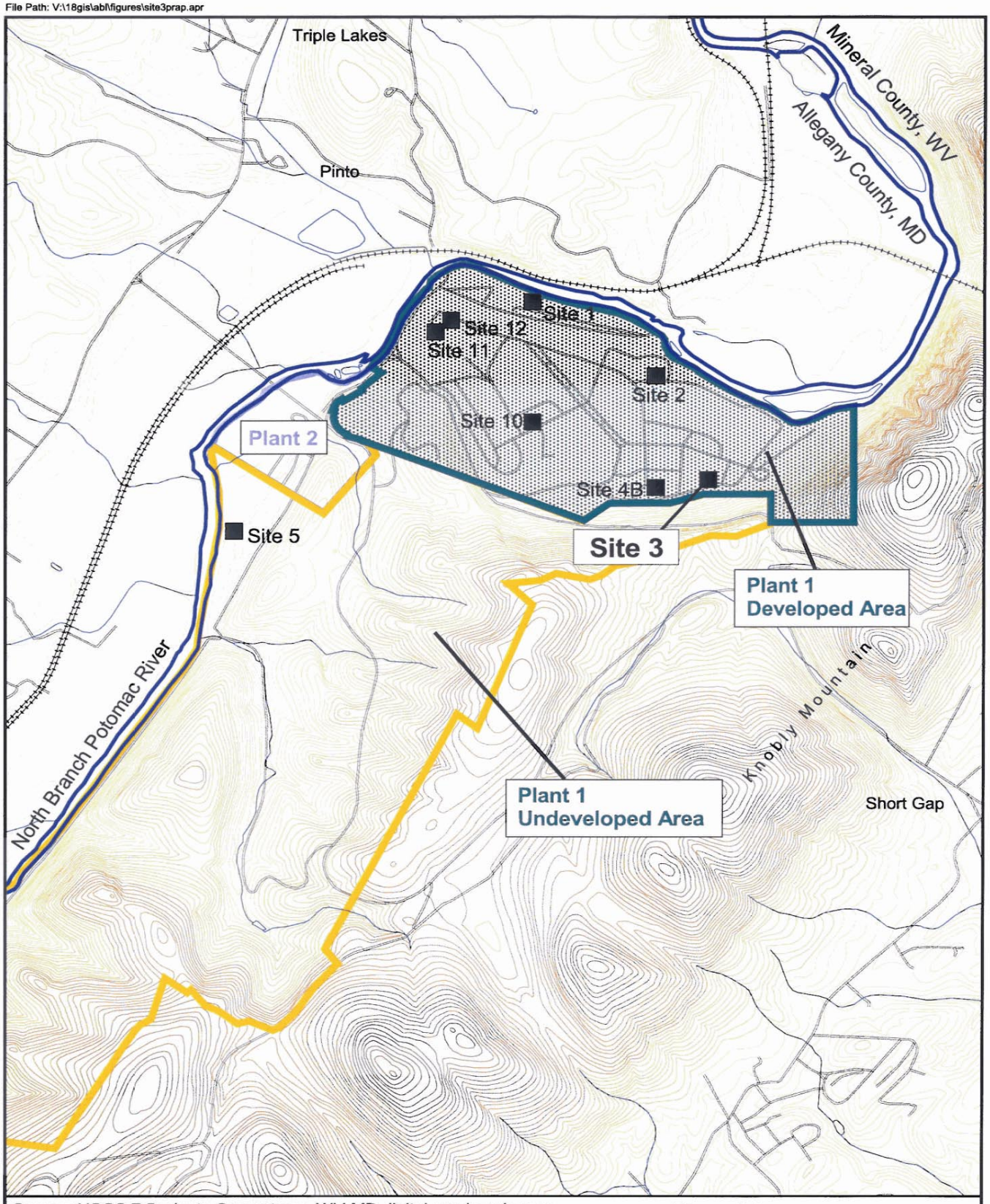

Source: USGS 7.5 minute Cresaptown, WV-MD digital quadrangle map

N
W E
S

One Inch Equals
Two Thousand Feet

Figure 1-1
Facility and Site Location Map
Proposed Remedial Action Plan - Site 3
Allegany Ballistics Laboratory
Rocket Center. West Virginia

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SECTION 2

Site Background

This section provides Site 3 background information compiled from literature review, existing documents, and site visits. 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 3 Background and History

The ABL facility is located in Mineral County, in the northeastern part of West Virg a, 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. 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 developed and undeveloped areas. Plant 2, owned and operated by ATK, occupies the remaining 57 acres.

Site 3, located in the southeastern developed portion of Plant 1, consists of a burning ground likely utilized at the facility from 1950 to 1958. When active, the site dimensions measured approximately 40 feet by 200 feet. Approximately 200 pounds of waste were burned daily at the site (CH2M HILL, 2005). The burning of waste is suspected to have caused release of contaminants into the environment. Analysis of historical aerial photograph analysis ini revealed two areas of disturbed soil and four linear features near the southern end of the current location of Building 362. When Building 362 was constructed, the area was re-graded and the building was constructed to cover most of the former burning ground; the remainder of the site was filled with soil and is now the mowed grassy area south of the building (Figure 2-1). Currently, there is no visual evidence of the former bum pad, and no areas of bare soil are present.

2.2 Previous Investigations

Site 3 was part of a number of investigations conducted at ABL in the mid-1980s and 90s and was part of a supplemental soil investigation in 2001. Investigations that included Site 3 are summarized below.

2.2.1 The Initial Assessment Study/Confirmation Study (1983 through 1987)

The Initial Assessment Study (IAS), performed at ABL in 1983 under the Navy Assessment and Control of Installation Pollutants (NACIP) program, identified and assessed sites that posed a potential threat to human health or the environment as a result of former hazardous materials handling and operations (ES&E, 1983). Site 3 was investigated based upon information obtained from historical records, photographs, site inspections, and personnel interviews. The IAS concluded that this site did not pose an immediate threat; however, a confirmation study (CS) was conducted at Site 3 to assess potential contamination. The CS, initiated in June 1984 and completed in August 1987, focused on identifying the existence, concentration, and extent of contamination.

As a result of the SARA the Navy changed its 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 remedial investigation activities for some sites, including Site 3, due to the presence of TCE in groundwater collected from alluvial monitoring wells. With the exception of some explosives detected in one well, other constituents were at concentrations below detection limits in groundwater (Roy F. Weston, 1989).

2.2.2 Remedial Investigation (1992) and NPL Listing

Based on the recommendations of the Interim RI Report 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 recommended further investigation at Site 3 based upon the detections of semi-volatile organic compounds (SVOCs), TCE, and several metals in soil samples as well as low concentrations of trichloroethene (TCE) detected in groundwater (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 3 (CH2M HILL, 1996b). During this investigation, baseline human health and ecologic risk assessments were performed to evaluate potential risks posed by each site. The results of the Phase II RI supported the 1992 RI findings that low levels of volatile organic compounds (VOCs), with respect to regulatory screening criteria, existed in groundwater at Site 3.

2.2.4 Site 3 Supplemental Sampling/Risk Assessment (2001 and 2005)

Subsequent to the Phase II RI, it was determined that additional data were required to adequately assess potential risks associated with exposure to soil at Site 3. Therefore, based on a review of historical soil data for Site 3, soil sampling was conducted in 2001 to supplement existing data at Sites 2, 3 and 10 (CH2M HILL, 2005).

Soil samples collected in the vicinity of Building 362 during the RI, Phase II RI, and the supplemental soil sampling activity, and groundwater samples collected from monitoring wells 3GW01, 3GW02, and XWO 3 during the RI and Phase II RI were utilized to evaluate potential human health and ecological risks at the site. Potential human-health risks associated with current and potential future exposures to surface soil, combined surface and subsurface soil, and groundwater at Site 3 were evaluated. In addition, the assessment evaluated potential ecological risks for both upper-trophic-level receptors (via food web exposures) and lower-trophic-level receptors (via direct exposure to groundwater discharging to surface water).

No unacceptable human health or ecological risks were identified by the risk assessments. The report concluded that no action is necessary for soil and groundwater at Site 3 to be protective of human health and the environment (CH2M HILL, 2005).

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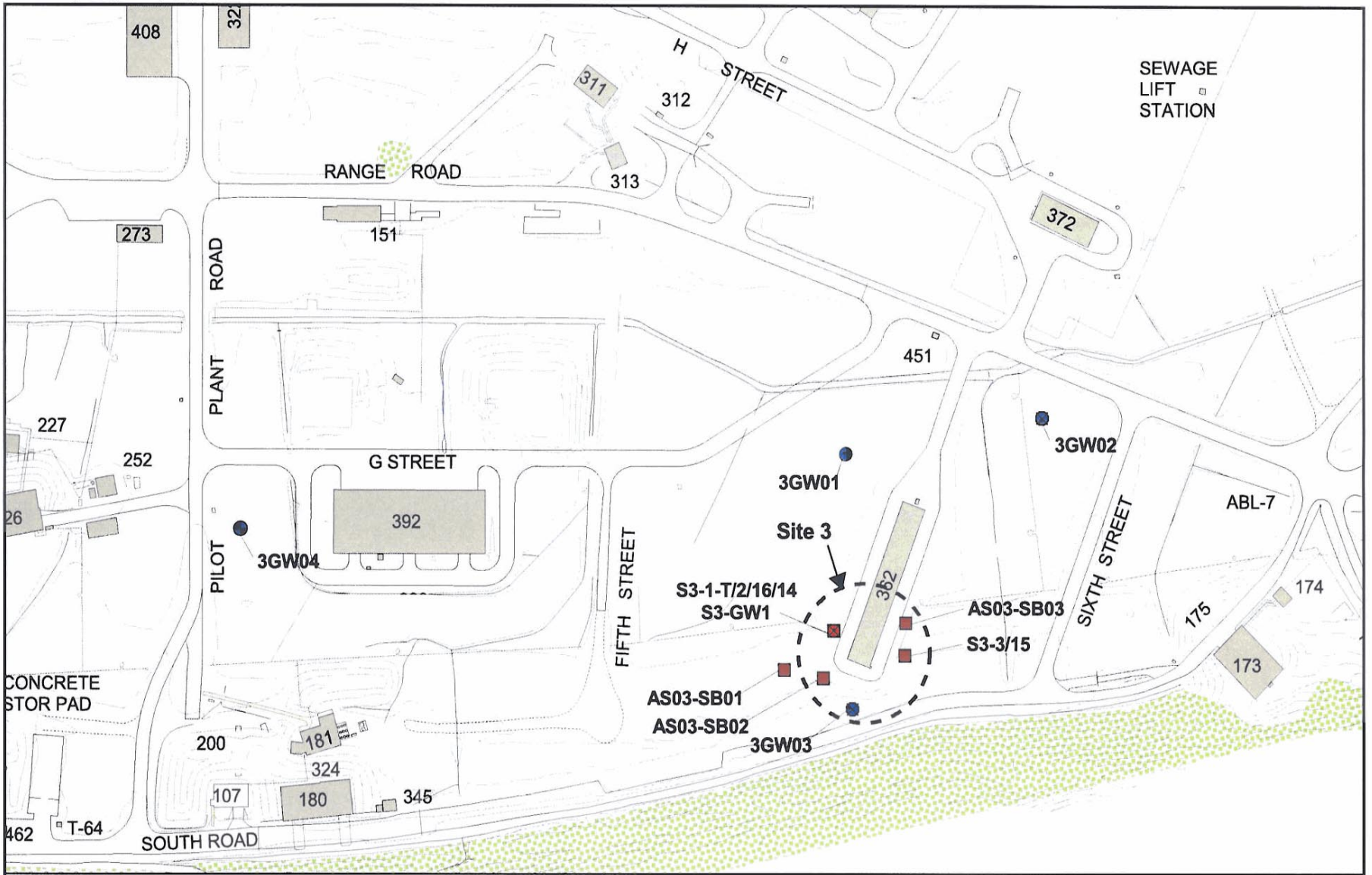

Figure 2-1
Site 3 and AOC R Site Features and Sample Locations
Proposed Remedial Action Plan - Site 3
Allegany Ballistics Laboratory
Rocket Center, West Virginia

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SECTION 3

Site Characteristics

This section describes general site characteristics for Site 3, 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 3 (Figure 1-1). Site 3 is located at the southern boundary of the 100-year floodplain of the North Branch Potomac River, near its terminus at the base of Knobly Mountain. The site is relatively flat, except on the southern end, where it is bordered by a steep upward slope.

The predominant hydrologic feature at ABL is the North Branch Potomac River, which is approximately 1,500 feet north of Site 3. The closest surface water features in the vicinity of Site 3 are intermittent drainage ditches located more than 100 feet east, west, and north of the site. Surface runoff from the site to these ditches is unlikely due to the level topography of the site (Figure 2-1). The elevation of the 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 U.S. Geological Survey (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 3 geology and hydrogeology are presented in the RI (CH2M HILL, 1996a) and Phase II RI (CH2M HILL, 1996b). A brief description of the subsurface conditions at Site 3 is presented below.

Groundwater in the alluvium at Site 3 has been calculated to flow approximately northeastward toward the North Branch Potomac River at a rate of approximately 65 ft/year (CH2M HILL, 1996b). However, historical data indicate the horizontal hydraulic gradient varies considerably across the facility with significantly lower velocities both upgradient and downgradient of the site (CH2M HILL, 1996b).

A shale bedrock with some interbedded limestone underlies Plant 1. Groundwater flow in the bedrock aquifer is confined to the bedding planes, fractures, and solution channels at Plant 1. The Wills Mountain anticlinorium axis bisects Plant 1 in a north-northeasterly direction. Site 3 is believed to lie on the southeast limb of the axis. where the bedding planes dip gently to the southeast at approximately 30 degrees. The southeastward trending dips of the bedrock bedding planes beneath Site 3 are believed to channel bedrock groundwater flow in an approximate northeastward direction.

3.3 Description of Contamination

This subsection describes the nature and extent of soil and groundwater contamination at Site 3, 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, 3-2, and 3-3 depict the surface soil, subsurface soil, and groundwater sampling locations, respectively, as well as COPC/COC concentrations detected at each sample location. Although COPCs (HHRA) and COCs (ERA) were identified, their concentrations were not found to represent an unacceptable level of potential risk.

3.3.1 Surface Soil

One surface soil sample was collected at Site 3 to determine the concentration of VOCs, SVOCs, explosives and metals. No VOCs, SVOCs, or explosives were detected in Site 3 surface soil. Fifteen metals were detected in the surface soil. Five of these metals (aluminum, arsenic, iron, manganese, and vanadium) were identified as COPCs for surface soil during the HHRA (see Section 5.1), based upon a comparison with USEPA Region III adjusted risk-based concentrations (RBCs) for residential soil. Sample locations as well as COPC concentrations are presented on Figure 3-1

Subsequent to the operation of Site 3 as a burning ground, filling activities occurred at the site during the construction of Building 362. The area surrounding Building 362 currently consists of a mowed lawn. As a result of these factors; no significant ecological exposure pathways are present at Site 3; thus surface soil data was not evaluated as part of the ERA.

3.3.2 Subsurface Soil

Subsurface soil samples were obtained from five locations at Site 3 for analysis of SVOCs and metals (Figure 3-2). Samples obtained from AS03-SB01 and AS03-SB02 were also analyzed for VOCs. Additionally, samples obtained from locations AS03-SB02 and AS03-SB03 were analyzed for dioxins/furans. Sample locations as well as COPC concentrations are presented on Figure 3-2.

Eight VOCs (1,2-dichloroethene [1,2-DCE], acetone, benzene, bromomethane, chloroethane, methylene chloride [MC], toluene, and TCE) and thirteen dioxins/furans were detected in the subsurface soil at concentrations below levels required to be identified as COPCs during the HHRA.

Only one SVOC, benzo(a)pyrene, detected in only one sample, was identified as a COPC for combined surface and subsurface soil during the HHRA.

Twenty-one metals were detected in one or more subsurface soil samples. Seven of these constituents (aluminum, antimony, arsenic, barium, cadmium, iron, and manganese) were identified as COPCs for combined surface and subsurface soil during the HHRA. Five of the seven constituents (aluminum, arsenic, barium, iron, and manganese) were detected in all six subsurface soil samples. 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 at Site 3 are statistically different from facility background concentrations (CH2M HILL, 2003). No comparison was made for surface soil alone because only one surface soil sample was collected at Site 3, primarily because the site had been covered during building construction.

The results of the statistical comparison indicate that barium is the only subsurface COPC determined to be statistically similar to background concentrations.

Background subsurface and surface soil sample results were combined only for a selected number of metals, as appropriate based upon statistical tests. The remaining six COPCs identified during the HHRA (aluminum, antimony, arsenic, iron, manganese, and vanadium) were statistically compared to background concentrations. The statistical comparison indicates that manganese is the only constituent at levels similar to background concentrations.

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 3 subsurface soil concentrations for each of the COPCs. However, these metals are not likely to be site-related based upon known site history.

3.3.4 Groundwater

Groundwater data from monitoring wells 3GW01 and 3GW02, located downgradient of Site 3 (Figure 3-3), were used to evaluate the nature and extent of contamination in Site 3 groundwater.. Because monitoring well 3GW03 is located hydrologically upgradient of Site 3, data from 3GW03 were utilized following the HHRA and ERA for background comparison purposes. Groundwater samples at Site 3 were analyzed for VOCs, SVOCs and metals. Two VOCs (1,2- DCE and MC) were detected in monitoring wells 3GW01 and 3GW02 (Figure 3-3), but at concentrations below the Maximum Contaminant Level (MCL). MCLs are the concentration limits of contaminants in drinking water as established by federal regulation pursuant to the Safe Drinking Water Act. Neither of the detected VOCs were identified as a COPC for groundwater during the HHRA based on the adjusted RBC screening criteria, or as a COC during the ERA based on ERA screening levels. Although groundwater itself is not considered an ecologically relevant medium for direct exposure, the groundwater constituent concentrations at Site 3 were conservatively evaluated in the ERA based on potential transport to the North Branch Potomac River where exposure to ecological receptors could occur (see Section 5.2).

No SVOCs or explosives were detected in groundwater in the Site 3 monitoring wells.

Sixteen total metals were detected in the groundwater at Site 3 and, nine of these constituents (aluminum, arsenic, barium, cadmium, chromium, iron, lead, manganese, and vanadium) were identified as COPCs during the HHRA. Aluminum and iron were identified as COCs in groundwater during the ERA.

Fifteen of the sixteen metals detected in 3GW01 and 3GW02 were also detected in the upgradient alluvial monitoring well 3GW03. All nine of the metals identified as COPCs in downgradient monitoring wells were also detected in the upgradient monitoring well. With

the exception of manganese and barium, concentrations of constituents detected in upgradient monitoring well 3GW03, the background well, were greater than those observed in downgradient well 3GW02. With the exception of chromium, concentrations of constituents detected in upgradient monitoring well 3GW03 were less than those concentrations observed in downgradient well 3GW01. It should be noted that well 3GW01 is a hybrid well (i.e., installed across both the alluvial and bedrock aquifers), which may account for the difference in metals concentrations when compared to upgradient alluvial well 3GW03. Three constituents (arsenic, cadmium, and lead) were detected above their respective federal MCLs or USEPA action levels in hybrid monitoring well 3GW01. These three constituents were also detected above MCLs or USEPA action levels in upgradient monitoring well X W 0 3 (the well used for background comparisons).

Four dissolved metals (calcium, magnesium, manganese, and sodium) were detected in downgradient monitoring wells, 3GW01 and 3GW02. Only one of these constituents, manganese, was identified as a COPC during the HHRA. The concentration of manganese was greater in upgradient monitoring well 3GW03 than in downgradient monitoring wells 3GW01 and 3GW02. No dissolved metals were identified as COCs during the ERA. No dissolved metals were detected in Site 3 monitoring wells above MCLs or USEPA action levels.

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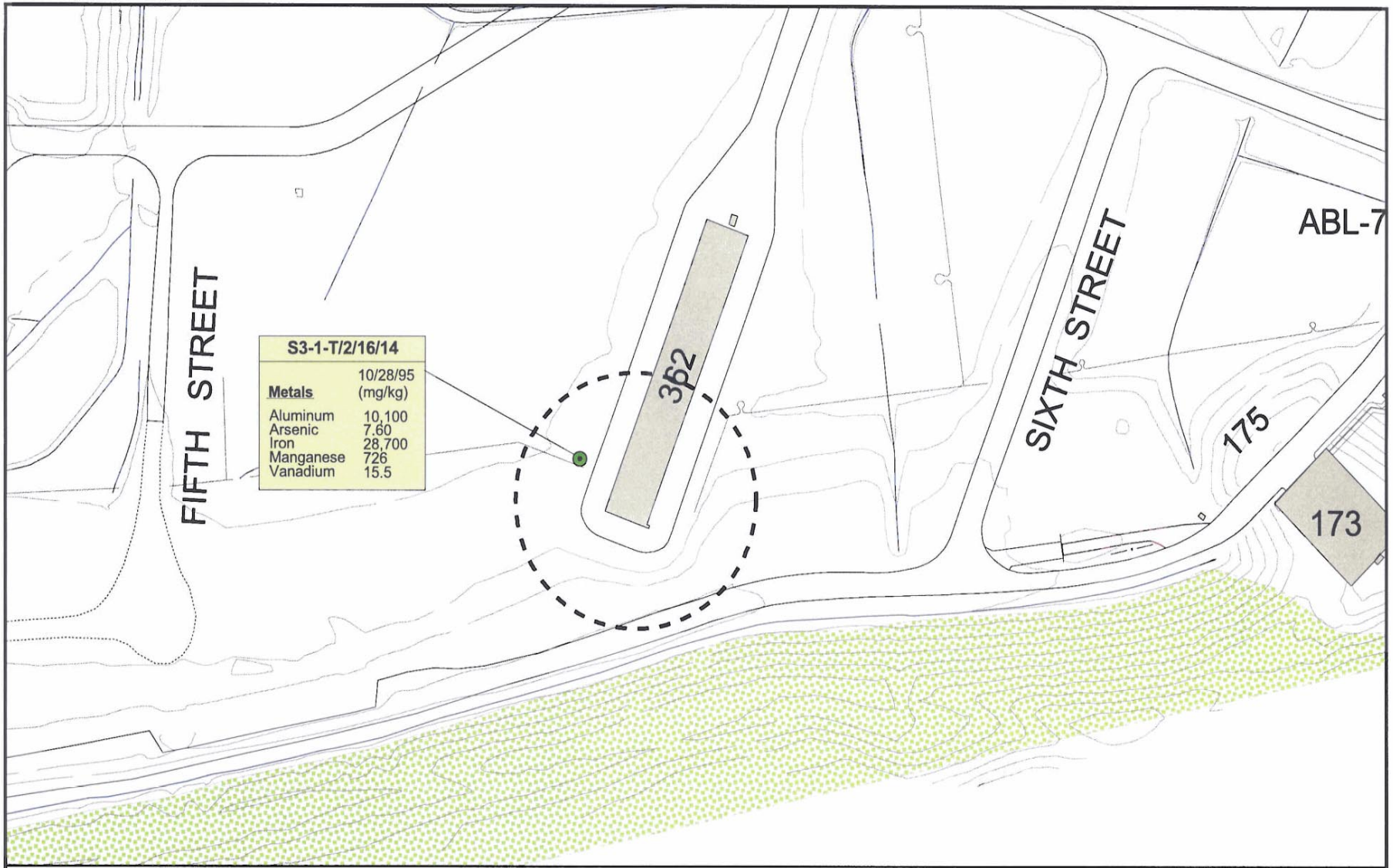

LEGEND

Surface Soil **Sample Location**

Qualifiers:
mg/kg = milligrams per kilogram

N

0 50 100 150 Feet

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

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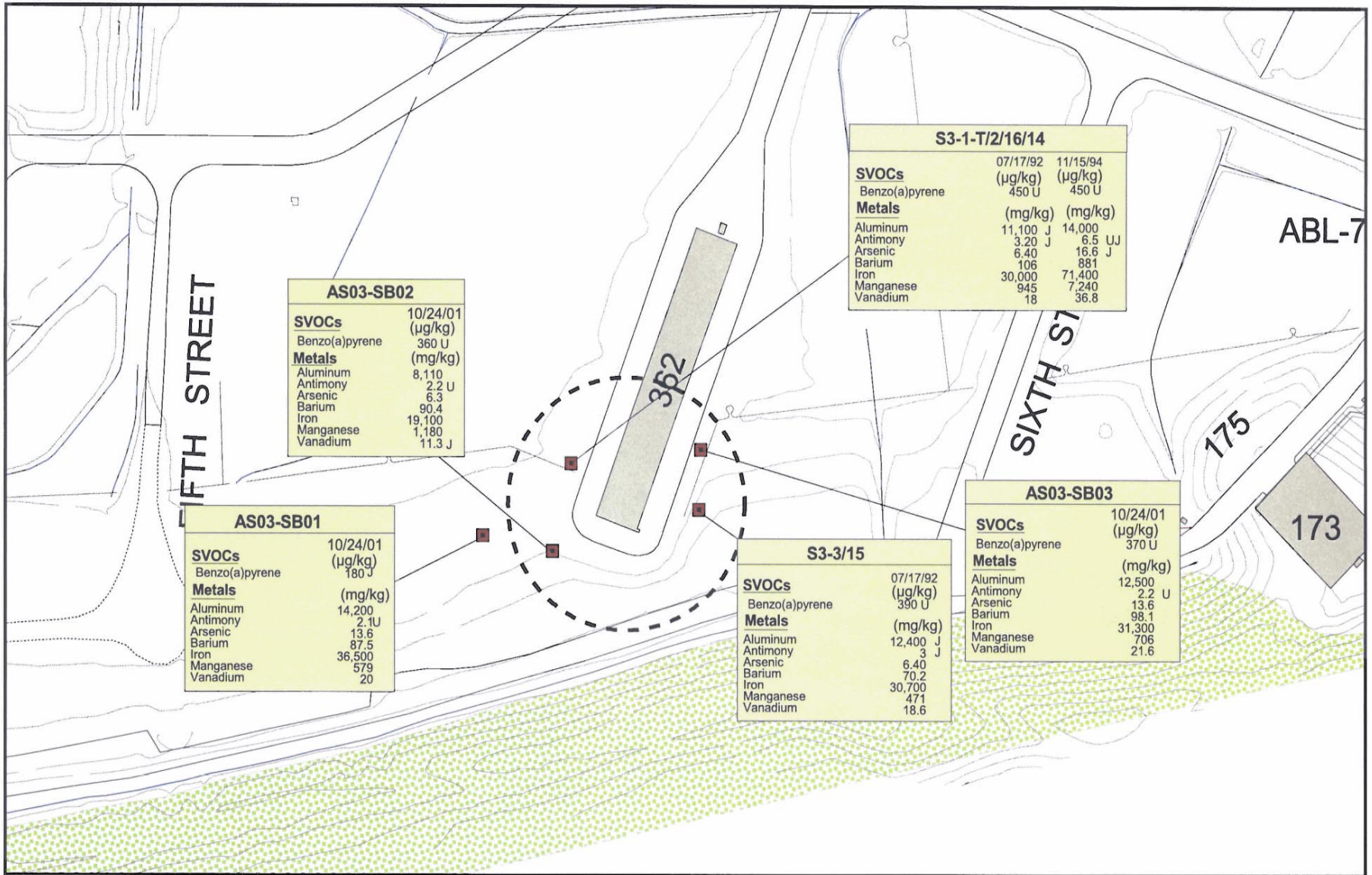


LEGEND

Subsurface Soil Sample Location

Qualifiers:
U = Analyte not Detected
J = Estimated
UJ = Not Detected, quantitation limit may be inaccurate
mg/kg = milligrams per kilogram
µg/kg = micrograms per kilogram

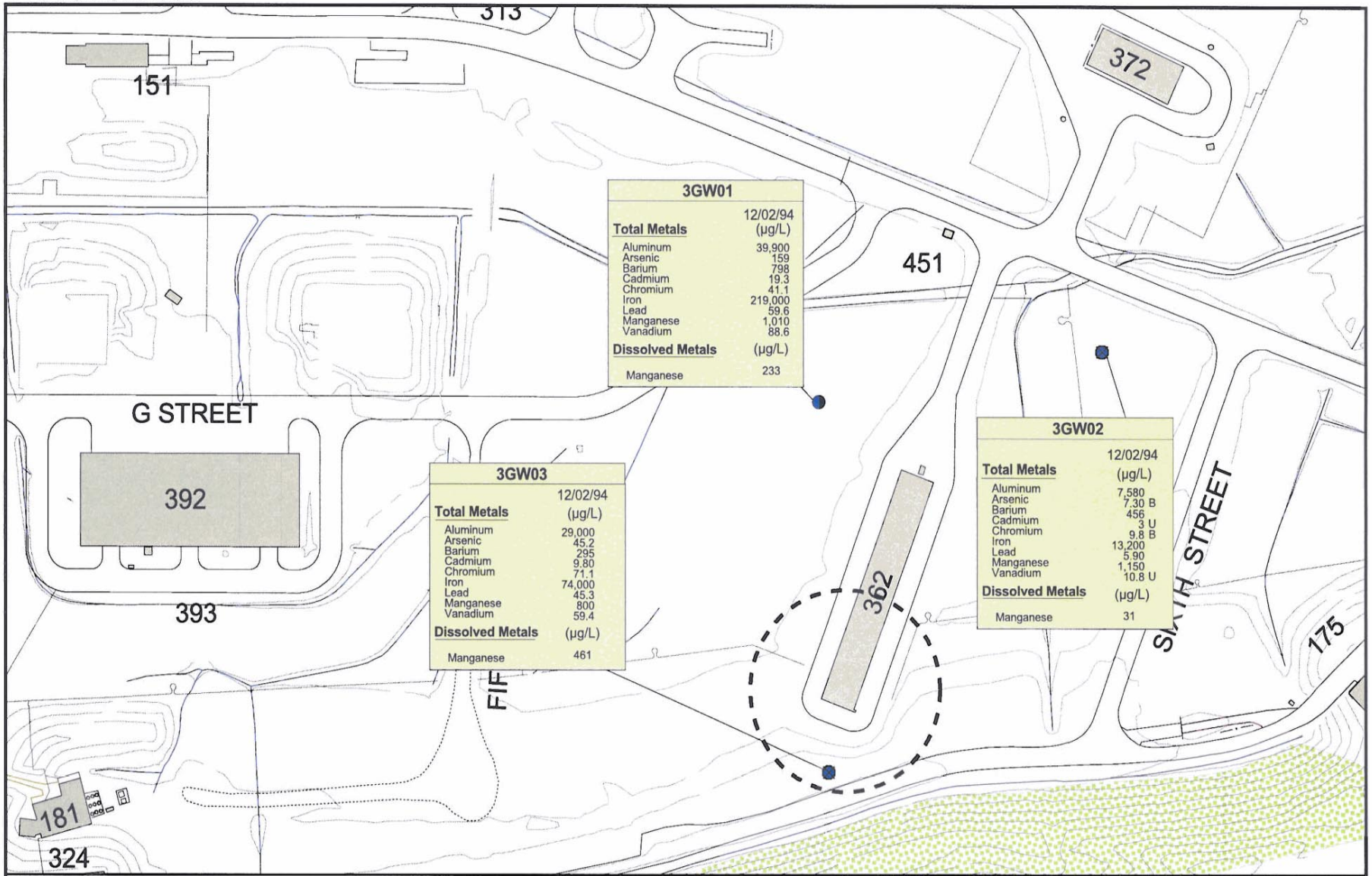
N

0 50 100 150 Feet

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

CH2MHILL

File Path: V:\18gis\abl\figures\Site3prap.apr



LEGEND

- Alluvial Monitoring Well
- Hybrid Monitoring Well

Qualifiers:
NA = Not Analyzed
B = Analyte not detected above associated blank
U = Analyte not detected
J = Reported value is estimated
µg/L = micrograms per liter

N

0 125 250 Feet

Figure 3-3
COPCs/COCs Detected in Groundwater Samples - Site 3
Proposed Remedial Action Plan - Site 3
Allegany Ballistics Laboratory
Rocket Center, West Virginia

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SECTION 4

Scope and Role of Response Action

Site 3 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 bamer, monitored natural attenuation, and long-term monitoring (ROD September 2005)

The Navy is investigating numerous other locations at ABL, including Site 3. This PRAP addresses potential contamination in Site 3 environmental media.

SECTION 5

Summary of Site Risks

This section summarizes the results of the baseline HHRA and ERA for Site 3. A baseline risk assessment evaluates site data to determine potential risks to human health and/or the environment. The potential risks are evaluated for chemicals in the media of concern (e.g., soil and groundwater) and for potential routes of exposure.

No unacceptable risks to human health or the environment were identified during the risk assessments prepared for Site 3, 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 3 soil and groundwater (CH2M HILL, 2005). The HHRA report is available at the information repositories listed in Sections 1 and 7. Site 3 soil and groundwater constituent concentrations were evaluated using current and future land use scenarios and conservative estimates of current and future human exposure to site contaminants.

As part of the Site 3 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 vrocess included collection of site soil and groundwater samples, analyzing those samples and screening the resultant data against constituent concentrations that could pose a risk to human health. All of the COPCs identified during the evaluation of Site 3 soil and groundwater were metals, with the exception of benzo(a)pyrene, which was a COPC for combined surface and subsurface soil.

Exposure refers to the potential contact of an individual with a contaminant. A conceptual exposure model showing potential exposure pathways identified under current and potential future conditions at Site 3 is presented in Figure 5-1. The 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 an exposure pathway is 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 3 lies within the developed portion of Plant 1. The current use of this area is for industrial purposes; therefore, based on current land use, an industrial or site worker and an adolescent trespasser or visitor may be exposed to surface soil, which includes the inhalation of associated airborne dust.

Land access to the site is currently restricted to onsite workers bv fences and security guards. Although unlikely due to security restrictions and the perimeter fencing around the facility, adolescent trespassers or visitors were conservatively evaluated as potentially exposed humans.

Groundwater is not currently used as a potable water supply at Site 3. In addition, there are no off-site groundwater residential receptors downgradient of Site 3. Therefore, current pathways associated with current groundwater use at the facility are incomplete.

5.1.2 Potential Future Uses

Site 3 is anticipated to remain an industrial area in the future; therefore, the currently exposed populations are also applicable for potential future site uses. For purposes of the HHRA, it was assumed that if any construction activities occur at Site 3, 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, along with the inhalation of associated airborne dust (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 3 risk assessment as a conservative scenario. It was assumed that the subsurface soil may be placed on the surface if the site is converted for residential use or during future construction or excavation activities.

The groundwater beneath Site 3 is not currently used and is not expected to be used as a future potable supply; however, potable use of the groundwater was evaluated as a conservative scenario. Exposure to the alluvial aquifer groundwater by future adult and child residents was evaluated. Exposure to the bedrock aquifer was not evaluated because the data from the hybrid well were not solely representative of this media. In addition to the residential scenario, groundwater exposures were also quantitatively evaluated under a construction worker scenario. It was assumed that adult construction workers could be exposed to alluvial aquifer groundwater that may seep into trenches or pits dug during future development activities at the site. This scenario is conservative and unlikely to occur in practice because, under normal excavation procedures, excavations may not encounter groundwater or, if encountered, the groundwater would be pumped from the excavation.

5.1.3 Conclusion

The Site 3 baseline HHRA was conducted to evaluate the potential human health risks associated with exposure to surface soil, combined surface and subsurface soil, and groundwater at the site. Tables 5-2 and 5-3 present the cancer risks and hazard indices determined for Site 3 under a reasonable maximum exposure (RME) and a CT exposure. The HHRA concluded that no unacceptable potential human health risks exist for current site use. Potential carcinogenic risks are within the USEPA acceptable risk range for current and future use. Additionally, the potential risks calculated for future potable groundwater use are within USEPA acceptable levels.

Potentially unacceptable levels of risk from the soil (driven by iron and manganese) were identified for future adult and child residents and construction workers exposed to soil (assumes combined surface and subsurface soil). The estimated RME intake of iron via incidental ingestion of Site 3 soil for child residents (0.57 mg/kg) and construction workers (0.23 mg/kg) exposed to soil are within or less than the National Academy of Sciences-Recommended Dietary Allowances (RDA) for children ages 6 months to 10 years (0.36 to 1.11 mg/ kg-day) (RDA,2003).

Like iron, manganese is an essential human nutrient, responsible for activating several enzymes (IRIS, 2004). 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. Based on the average weight of children, this correlates 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 (0.066 mg/day) were below these estimated safe and adequate daily dietary intake (ESADDI) doses. Therefore, the concentration of manganese in Site 3 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 3 soil or groundwater 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 3 (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 groundwater discharging to surface water). The ERA identified no unacceptable potential risks for any receptors. 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. Because the terrestrial areas consist of mowed lawn areas that were previously subjected to construction and filling activities subsequent to the operation of the site as a burning ground, there is very limited wildlife habitat. Although aluminum and iron were identified as ecological COCs based on discharge of groundwater to surface water, the site concentrations of these constituents are comparable to the background (upgradient)

concentrations, which indicates that the concentrations at Site 3 are attributable to background. Furthermore, dissolved concentrations of these two constituents, which are more representative of the fraction bioavailable to aquatic receptors, were not detected.

Based on the results of the ERA, no remedial action is needed for Site 3 to be protective of ecological health.

Table 5-1
Summary of Chemicals of Potential Concern for the HHRA - Site 3
Proposed Remedial Action Plan - Site 3
Allegany Ballistic Laboratory
Rocket Center, West Virginia

Surface Soil	Soil*	Groundwater	
		Alluvial Aquifer-Tap Water	Alluvial Aquifer-Water in Excavation Pit
Ingestion, Dermal, and *Inhalation of Airborne Particulates*	*Ingestion,* Dermal, and *Inhalation of Airborne Particulates*	*Ingestion* and Dermal	*Dermal*
Aluminum	Benzo(a)pyrene	Manganese	Arsenic
Arsenic	Aluminum		Aluminum
Iron	Antimony		Barium
Manganese	Arsenic		Cadmium
Vanadium	Barium		Chromium
	Iron		Iron
	Manganese		Lead**
	Vanadium		Manganese
			Vanadium

* Surface and subsurface soil combined.

** The maximum detected concentration of lead exceeded the screening level, however, the average concentration is below the screening level.

Table 5-2
Summary of Reasonable Maximum Exposure Cancer Risks and Hazard Indices - Site 3
Proposed Remedial Action Plan - Site 3
Allegany Ballistics Laboratory
Rocket Center, West Virginia

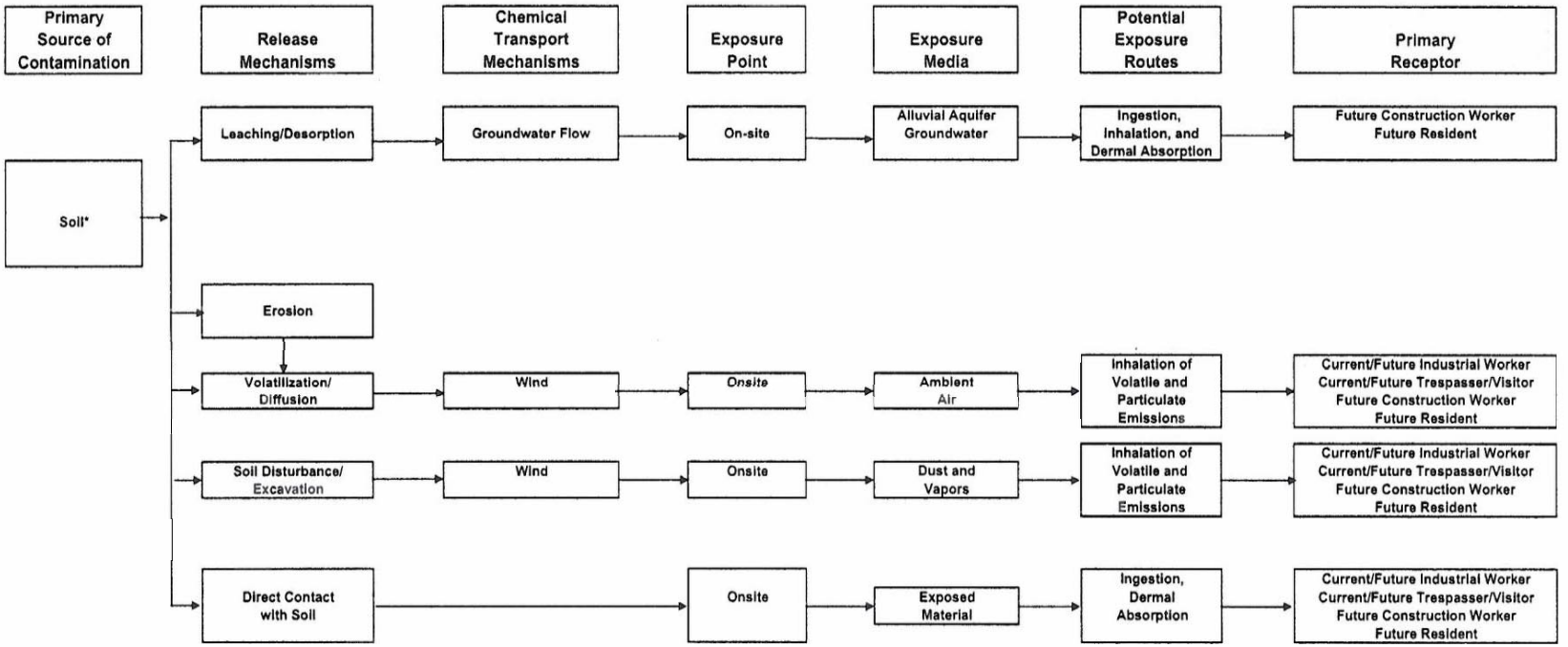
Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks $>10^{-4}$	Chemicals with Cancer Risks $>10^{-5}$ and $<10^{-4}$	Chemicals with Cancer Risks $>10^{-6}$ and $<10^{-5}$	Hazard Index	Chemicals with HI>1
Current/Future Industrial Worker	Surface Soil -	Ingestion	4.0E-06			Arsenic	1.8E-01	
		Dermal Contact	1.0E-06			Arsenic	1.4E-01	
		Inhalation	3.7E-09				5.5E-03	
		Total	5.0E-06				3.2E-01	
	All Media	Total	5.0E-06				3.2E-01	
Current/Future Adolescent Trespasser/Visitor	Surface Soil -	Ingestion	4.1E-07				5.1E-02	
		Dermal Contact	9.0E-08				3.5E-02	
		Inhalation	4.8E-11				2.0E-04	
		Total	5.0E-07				8.6E-02	
	All Media	Total	5.0E-07				8.6E-02	
Future Adult Resident	Soil* -	Ingestion	NA				7.6E-01	
		Dermal Contact	NA				3.9E-01	
		Inhalation	NA				8.8E-02	
		Total	NA				1.2E+00	
	Groundwater	Ingestion	NA				3.2E-01	
		Dermal Contact	NA				NA	
		Inhalation	NA				NA	
		Total	NA				3.2E-01	
	All Media	Total	NA				1.6E+00	
Future Child Resident	Soil* -	Ingestion	NA				6.4E+00	Iron, Manganese
		Dermal Contact	NA				2.2E+00	Manganese
		Inhalation	NA				2.7E-01	
		Total	NA				8.9E+00	
	Groundwater	Ingestion	NA				8.7E-01	
		Dermal Contact	NA				4.0E-02	
		Inhalation	NA				NA	
		Total	NA				9.1E-01	
	All Media	Total	NA				9.8E+00	
Future Child/Adult Resident	Soil* -	Ingestion	3.1E-05		Arsenic	Benzo(a)pyrene	NA	
		Dermal Contact	3.0E-06			Arsenic	NA	
		Inhalation	2.5E-08				NA	
		Total	3.4E-05				NA	
	Groundwater	Ingestion	NA				NA	
		Dermal Contact	NA				NA	
		Inhalation	NA				NA	
		Total	NA				NA	
	All Media	Total	3.4E-05				NA	
Future Construction Worker	Soil* -	Ingestion	1.4E-06			Arsenic	2.5E+00	Manganese
		Dermal Contact	3.6E-08				2.5E-01	
		Inhalation	5.7E-10				8.3E-02	
		Total	1.5E-06				2.9E+00	
	Groundwater	Ingestion	NA				NA	
		Dermal Contact	1.6E-06			Arsenic	2.0E+00	
		Inhalation	NA				NA	
		Total	1.6E-06				2.0E+00	
	All Media	Total	3.1E-06				4.9E+00	
Future Adolescent Trespasser/Visitor	Soil* -	Ingestion	7.7E-07				1.6E-01	
		Dermal Contact	2.1E-07				1.8E-01	
		Inhalation	8.3E-11				1.4E-03	
		Total	9.8E-07				3.4E-01	
	All Media	Total	9.8E-07				3.4E-01	

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

Table 5-3
Summary of Central Tendency Cancer Risks and Hazard Indices - Site 3
Proposed Remedial Action Plan - Site 3
Allegany Ballistics Laboratory
Racket 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 Adult Resident	Soil* -	Ingestion	NA				2.5E-01	
		Dermal Contact	NA				2.3E-01	
		Inhalation	NA				NA	
		Total	NA				4.8E-01	
	All Media	Total	NA				4.8E-01	
Future Child Resident	Soil* -	Ingestion	NA				2.1E+00	Manganese
		Dermal Contact	NA				1.3E+00	
		Inhalation	NA				NA	
		Total	NA				3.4E+00	
	All Media	Total	NA				3.4E+00	
Future Child/Adult Resident	Soil* -	Ingestion	3.6E-06			Arsenic	NA	
		Dermal Contact	6.0E-07				NA	
		Inhalation	NA				NA	
		Total	4.2E-06				NA	
	All Media	Total	4.2E-06				NA	
Future Construction Worker	Soil* -	Ingestion	NA				2.2E+00	Manganese
		Dermal Contact	NA				8.1E-02	
		Inhalation	NA				NA	
		Total	NA				2.3E+00	
	Groundwater	Ingestion	NA				NA	
		Dermal Contact	1.2E-06			Arsenic	1.5E+00	
		Inhalation	NA				NA	
		Total	1.2E-06				1.5E+00	
	All Media	Total	1.2E-06				3.8E+00	

Combined surface and subsurface soil
HI - Hazard Index
NA - Not Applicable



→ Complete Pathway

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

Figure 5-1
Conceptual Site Model for Potential Human Exposures-Site 3
Proposed Remedial Action Plan - Site 3
Allegany Ballistics Laboratory

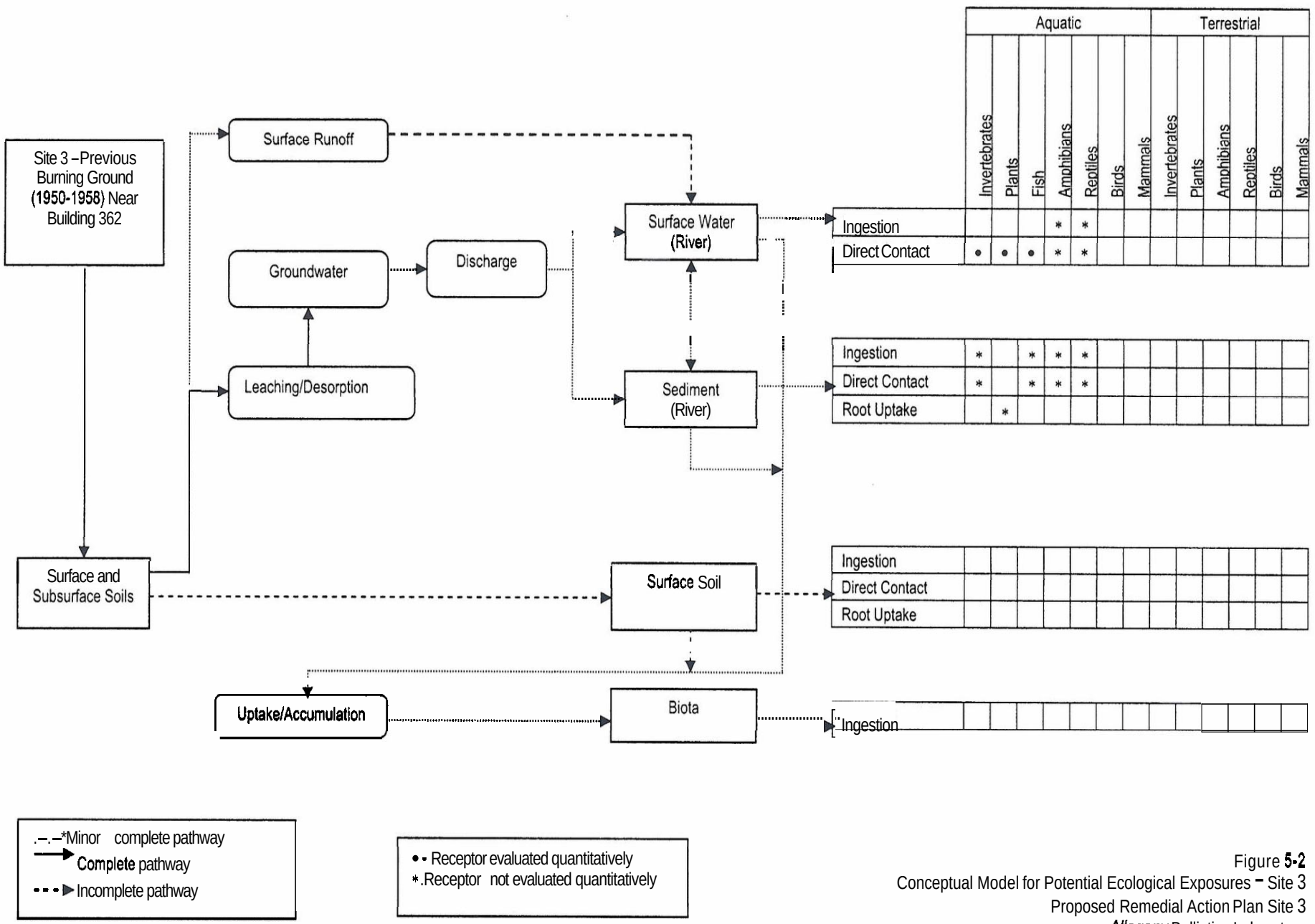


Figure 5-2
Conceptual Model for Potential Ecological Exposures – Site 3
Proposed Remedial Action Plan Site 3
Allegany Ballistics Laboratory

SECTION 6

Preferred Alternative

The Navy and EPA, with the support of WVDEP, are proposing the No Action alternative as the preferred alternative for Site 3. This proposed alternative is protective of human health and the environment. The Navy and EPA 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 the potential risks calculated for current site use (industrial worker, adolescent trespasser or visitor exposed to surface and subsurface soil and to groundwater) were all within USEPA target levels. A potential noncarcinogenic hazard was identified for future adult and child residents and for construction workers exposed to soil. The potential noncarcinogenic hazard is driven by 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 residents.

The ERA evaluated ecological risks for both upper-trophic-levels (via food web exposures) and lower-trophic-level receptors (via direct exposure to surface soil) and identified no unacceptable level of potential risks for any receptors. Although concentrations of metal constituents were identified as ecological COCs based on discharge of groundwater to surface water, the site concentrations of these constituents are comparable to the background (upgradient) concentrations, which indicates that the concentrations at Site 3 are attributable to background. Furthermore, dissolved concentrations of these two constituents, which are more representative of the fraction bioavailable to aquatic receptors, were not detected.

Based upon the results of the investigations conducted at Site 3, the Navy, EPA, 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 this site. On the basis of new information or public comments, the Navy and USEPA, in consultation with WVDEP, may later 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 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.
Norfolk, Virginia 23511-3095
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SECTION 8

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