



WEST VIRGINIA

DEPARTMENT OF ENVIRONMENTAL PROTECTION

STATEMENT OF BASIS

**Allegany Ballistics Laboratory  
Plant 2  
210 State Route 956  
Rocket Center, West Virginia 26726**

**EPA ID No: WVO170023691**

September 2019

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Attachment 1

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Figure 1

Facility Location Map

Figure 2

Corrective Action SWMU Location Map

## **1. Introduction**

The West Virginia Department of Environmental Protection (DEP) has prepared this Statement of Basis (SB) to solicit public comment on its proposed remedy for Allegany Ballistics Laboratory (ABL) Plant 2 located in Rocket Center, West Virginia (Facility). DEP's proposed remedy for ABL Plant 2 consists of aggressive source removal (soil removal and in situ treatment), groundwater monitoring, and institutional controls (ICs) for land and groundwater use.

The Facility is subject to the United States Environmental Protection Agency (EPA) Corrective Action program under the Solid Waste Disposal Act, as amended, commonly referred to as the Resource Conservation and Recovery Act (RCRA), 42 U.S.C. Section 6901, et seq. The Corrective Action program requires that facilities subject to certain provisions of RCRA investigate and address releases of hazardous waste and hazardous constituents, usually in the form of soil or groundwater contamination, that have occurred at or from their properties.

DEP is providing a thirty (30) day public comment period on this SB. DEP may modify its proposed remedy based on comments received during this period. DEP will announce its selection of a final remedy for ABL Plant 2 in a Final Decision and Response to Comments (Final Decision) after the public comment period has ended.

DEP will make a decision after considering all comments received during the public comment period, consistent with applicable RCRA requirements and regulations. If the decision is substantively unchanged from the one proposed, DEP will issue a Final Decision and inform all persons who submitted written comments or requested notice of DEP's final determination. If the Final Decision is significantly different from the one proposed, DEP will issue a public notice explaining the new decision and will reopen the public comment period. In the Response to Comments section attached to the Final Decision, DEP will respond in writing to each substantive comment received.

Information on the Corrective Action Program as well as information about the Facility can be found by navigating to <https://www.epa.gov/hwcorrectiveactionsites>. Information relevant to evaluating the proposed remedy can be found at the Information Repository located at the address in Section 8 of this SB.

## **2. Facility Background**

### **2.1 Site History**

ABL is a contractor-operated installation for the development and manufacturing of rocket motors, warheads, composites, munitions, metals, and electronics systems for the Department of Defense. It is located in Mineral County in the northeastern part of West Virginia, separated from Allegany County, Maryland by the North Branch Potomac River (see Figure 1). ABL consists of approximately 1,674 acres of land and 350 buildings and is divided into three distinct operating plants. Plant 1 (1,577 acres) and Plant 3 (41 acres) are Navy-owned but operated by Alliant Techsystems Operations LLC. Plant 2 (56 acres) is owned and operated by Alliant Techsystems Operations LLC; this SB is for Plant 2 only.

Prior to 1967, the Plant 2 area was primarily agricultural land. The property that became Plant 2 was deeded to the Hercules Powder Company (Hercules) in the mid-1960s and construction of Plant 2 began in 1967. In March 1995, Alliant Techsystems (ATK) acquired the Aerospace Division of Hercules and the deed to Plant 2. A merger between ATK and Orbital Science in 2015 resulted in the formation of Orbital ATK and establishment of Alliant Techsystems Operations LLC as the legal operating entity for Plant 2 under Orbital ATK. In 2018, Northrup Grumman acquired Orbital ATK while also maintaining Alliant Techsystems Operations LLC as the legal operating entity for the facility.

More than half the acreage of Plant 2 has been developed for operations that include rocket motor case preparation, propellant mixing, casting and machining, ammonium perchlorate grinding, and motor finishing. Load and pack operations and product and tooling storage also occur at Plant 2. Although most of Plant 2 is located in the 500-year floodplain of the North Branch Potomac River, a dike was constructed to prevent Plant 2 from flooding in the event of a 500-year flood.

## **2.2 Geology**

ABL is located in the Valley and Ridge Physiographic Province. The province is characterized by folded and faulted layers of sedimentary rocks. The rocks are predominantly Devonian and Silurian sandstone, whereas the lowlands are underlain by less-resistant shale and soluble limestone. The developed portion of Plant 2 is immediately underlain by fill and alluvial deposits with shale and limestone bedrock beneath. The fill material consists of clay with gravel and limestone pebbles from ground surface to a depth of approximately 14 to 16 feet below ground surface. Silty clay extends from the base of the fill material to within approximately 6 feet of the top of bedrock. Lying just above the bedrock is a saturated clayey/sandy gravel alluvium with rounded pebbles and increasing sand content with depth. The elevation of the top of the clayey/sandy gravel alluvium is approximately 655 feet above mean sea level, which corresponds to the approximate North Branch Potomac River elevation adjacent to Plant 2. The clayey/gravel alluvium appears to “pinch out” with distance across Plant 2 away from the river. Where the topography becomes steep near the base of Knobly Mountain, alluvium is not present and the unconsolidated material consists of weathered bedrock.

## **2.3 Hydrology and Hydrogeology**

The predominant hydrologic feature associated with ABL is the North Branch Potomac River, which borders the western and northern boundary of Plant 2 (see Figure 1). The elevation of the river is about 655 feet above mean sea level in the vicinity of Plant 2. The river flow at the Pinto gauging station, just downstream from Plant 2, averages about 850 cubic feet per second.

A series of open earthen drainage ditches, catch basins, and culverts are located throughout Plant 2 that serve as a stormwater drainage system. Stormwater from the ditches ultimately discharges to the North Branch Potomac River.

The lower, sandier portion of the alluvium at Plant 2 is saturated and constitutes the shallow aquifer. The fractured bedrock underlying the alluvium constitutes a second, deeper aquifer that is hydraulically connected with the alluvium to varying degrees. Lateral groundwater flow in the alluvial aquifer is through the porous matrix, whereas lateral groundwater flow in the bedrock aquifer is confined to partings along bedding planes, fractures, and solution channels. Groundwater flow in both the alluvial and bedrock aquifers at Plant 2 is generally toward the

North Branch Potomac River. It is noted here that the term “aquifer” is utilized when discussing the water-bearing unit(s) beneath Plant 2. However, the term is used as a matter of convenience and is not intended to denote the ability of the water-bearing unit(s) to transmit water in manner that would make its extraction possible or economical for potable use.

### **3. Summary of Environmental History**

On August 24, 2005, DEP issued a RCRA Corrective Action Permit (Permit Number WVO170023691) to ATK (now Alliant Techsystems Operations LLC under Northrup Grumman ownership) for ABL that would expire on July 24, 2015. This permit was renewed November 14, 2015, and expires on November 13, 2025. The Corrective Action Permit is specifically applicable to the solid waste management units (SWMUs) identified in Module IV of the Permit for Plant 2 and any SWMUs and Areas of Concern (AOCs) identified at ABL in the future. The Corrective Action Permit specifically provides for alternative and innovative approaches, while maximizing flexibility and efficiency within the Corrective Action program. For example, the Corrective Action Permit states that following review of the RCRA Facility Investigation (RFI) data, DEP and Alliant Techsystems Operations LLC may agree on a corrective action that meets the project goals, thereby removing the requirement for a Corrective Measures Study (CMS). In March 2014, representatives of DEP and Alliant Techsystems Operations LLC met to discuss the results of the RFI and the appropriate path forward. In accordance with the RCRA reforms embodied in the RCRA Corrective Action permit for Plant 2, DEP determined a CMS was not necessary for Plant 2. This determination was based not only on the flexibility provided in the permit, but also on the wealth of information gathered during the RFI (including the interim actions and pilot study) and Alliant Techsystems Operations LLC’s stated objective of aggressive source removal/treatment. The permit will be updated to incorporate the final remedy decision for Plant 2 once it is issued to the Facility.

Twenty-four SWMUs were identified at Plant 2 in Module IV, Section L of the Corrective Action permit. These SWMUs were evaluated as part of the RCRA Facility Assessment (RFA), RFI, or West Virginia Underground Storage Tank program. As a result, 19 of the 24 SWMUs were determined to require no further investigation or corrective action. However, the results of the RFI indicated corrective action is warranted at the five SWMUs listed here (hereafter referred to as the five corrective action SWMUs) and shown in Figure 2, the justification for which is described in the following Subsections 3.1 through 3.4.

- SWMU 25F – Building 8203 former solvent recovery still
- SWMU 37R – Building 2003 former wastewater sump
- SWMU 37S02 – Building 2000 former wastewater sump
- SWMU 37T02 – Building 2001 former wastewater sump
- SWMU 37U02 – Building 2008 former wastewater sump

#### **3.1 Contaminant Release Mechanisms**

Contaminant releases from the former sumps included discharges to the Plant 2 drainage ditch system. However, soil data indicate the more significant releases (in terms of environmental media concentrations) were likely overflow and/or seepage through cracks in the sump concrete to the surrounding soil.

Contaminant releases at the former solvent recovery still location were via discharges to the ground surface adjacent to where the still was located in Building 8203 with subsequent infiltration into the soil and overland flow into the adjacent drainage ditch.

### **3.2 RCRA Facility Investigation**

The RFI activities, including interim actions (see Section 3.3) and a groundwater treatment pilot study (see Section 3.4), were conducted between October 2005 and January 2013. This subsection describes the elements and findings of the RFI pertinent to the five corrective action SWMUs. As noted previously, the remaining 19 SWMUs were determined to require no further investigation or corrective action. Details of the RFI activities and findings can be found in the RCRA Facility Investigation Report for Plant 2 (CH2M, 2014).

Environmental data collected as part of the RFI that are pertinent to the five corrective action SWMUs comprised soil/sediment samples at the former sump and sump discharge areas, soil samples at the former solvent recovery still area, surface water and sediment samples in the adjacent Plant 2 drainage ditch system, and groundwater samples from the alluvial and bedrock aquifers. The environmental data are discussed in the context of the human health risk assessment and ecological risk assessment because these findings are the basis for the recommended corrective action.

#### **3.2.1 Soil**

Soil data collected during the RFI sampling activities found trichloroethene (TCE) and vinyl chloride concentrations at and adjacent to SWMUs 25F, 37S02, 37T02, and 37U02 above human health risk-based levels associated with residential use and in soil at SWMUs 37S02, 37T02, and 37U02 above risk-based levels associated with industrial use. Additionally, perchlorate was detected in soil at SWMUs 37R and 37U02 above risk-based levels associated with residential use. Although the planned land use for Plant 2 is industrial, the hypothetical residential land use scenario was evaluated in the human health risk assessment as a conservative measure because it represents an unrestricted use scenario for the site or portions of the site that may be appropriate for corrective action complete without controls determinations.

#### **3.2.2 Groundwater**

Potable water for the ABL is obtained from the undeveloped portion of Plant 1. There are no potable water supply wells at Plant 2, nor are their plans to derive potable water from Plant 2. Nonetheless, as a conservative approach, it was assumed that either the Plant 2 alluvial or bedrock aquifer groundwater could be used as a hypothetical residential potable water supply for the purposes of the human health risk assessment.

RFI groundwater data showed volatile organic compounds (VOCs) in the alluvial and bedrock groundwater at concentrations exceeding the EPA maximum contaminant levels (MCLs), which are the standards set by EPA for drinking water quality. The VOC concentrations in bedrock groundwater were found to be lower than in the alluvial groundwater, and VOCs were not detected in many of the bedrock groundwater samples. The highest number and concentrations of VOCs were detected in monitoring wells immediately downgradient of the former sumps at SWMUs 37S02, 37T02, and 37U02 and former still at SWMU 25F, which were also identified as the probable source areas for elevated VOCs detected in soil samples. VOC concentrations in groundwater have been decreasing over time, indicating that removal of the sumps and much of the contaminated soil associated with the sumps (see Section 3.3) effectively

reduced the concentration of VOCs migrating from soil to the alluvial aquifer and deeper. In addition, VOC concentrations detected in samples collected during the groundwater treatment pilot study at SWMU 25F indicated the substrate injection of emulsified vegetable oil effectively stimulated enhanced reductive dichlorination and reduced all VOC concentrations in the pilot study monitoring wells to below MCLs.

Perchlorate was also detected in Plant 2 alluvial and bedrock groundwater, but at relatively low concentrations. There is no MCL for perchlorate, but all concentrations (except one) were less than the tap water screening level, which is the risk-based screening level used in human health risk assessment. The only exceedance of the perchlorate risk-based screening level was in an alluvial groundwater sample collected adjacent to the former sump at SWMU 37U02.

### 3.2.3 Human Health Risk Assessment

Based on the current and planned use of Plant 2, the following types of people (referred to as “receptors”) were quantitatively evaluated in the human health risk assessment: maintenance workers and industrial workers. Future site use is expected to remain the same as current site use. Although unlikely, future residents were included as a hypothetical scenario to provide for potential consideration of corrective action complete without controls determinations (i.e., unrestricted site use) for all or portions of the site. Further, as noted in Section 3.2.2, Plant 2 groundwater was assessed as a hypothetical residential potable water supply for the purposes of the human health risk assessment. In addition, assessment of vapor intrusion (into buildings) risk was included in the human health risk assessment.

No unacceptable risks were identified for current site use based on maintenance worker exposure to surface soil, surface water in drainage ditches, or surface soil/sediment in drainage ditches.

Potentially unacceptable risks were identified for worker exposure to soil/indoor air and a hypothetical residential exposure to soil, groundwater, and indoor air as follows:

- Contaminants of Concern under continued industrial use of the site
  - Combined surface and subsurface soil associated with hypothetical excavations at the SWMU 37S02, 37T02, and 37U02 locations in certain areas due to presence of TCE
  - Indoor air (via vapor intrusion) in Building 2008 due to presence of TCE in subsurface media; the unacceptable risk was mitigated via an interim action (see Section 3.3)
- Contaminants of Concern under a hypothetical residential (unrestricted) use of the site
  - Combined surface and subsurface soil due to presence of TCE
  - Alluvial and bedrock groundwater due to presence of several VOCs
  - Indoor air (via vapor intrusion) due to presence of several VOCs in subsurface media

### 3.2.4 Ecological Risk Assessment

There are no significant exposure pathways or unacceptable risks in the terrestrial portions of Plant 2, nor are there unacceptable risks related to surface water and food web exposures in the Plant 2 drainage ditch system. There is little potential for groundwater transport



of site-related contaminants from Plant 2 to the river at levels that would result in unacceptable risk. Although groundwater and surface water may be discharging to the river, constituent concentrations detected at Plant 2 are similar to those detected in surface water and sediment samples collected upstream and downstream of Plant 2. More specifically, the aquatic invertebrate community at the downstream end of Plant 2 has been consistently rated as not impaired relative to a reference area just upstream of Plant 2, suggesting that Plant 2 activities have not had a negative impact on the aquatic invertebrate community in the river.

### 3.2.5 Environmental Indicators

While the ultimate goal of the RCRA Corrective Action Program is to achieve final cleanup, EPA and states with delegated authority measure intermediate success relative to the Government Performance Results Act goals. Intermediate cleanup progress at a facility in the RCRA Corrective Action Program is measured using two Environmental Indicators (EIs): (1) Human Exposure and (2) Contaminated Groundwater Migration. The Human Exposure EI is designed to document long-term human health protection on a sitewide basis by measuring the incremental progress achieved in controlling human exposures that may cause unacceptable risk. The Contaminated Groundwater Migration EI documents whether contamination is below protective, risk-based levels or, if not, whether migration of contaminated groundwater is stable and there is no unacceptable discharge.

In 2013, DEP determined that the current human exposures and migration of contaminated groundwater were under control for ABL Plant 2 based on information gathered during the RFI, including interim actions and pilot study. In other words, Plant 2 received a “yes” determination for both EIs.

## 3.3 Interim Measures

Several interim measures were implemented during the course of the RFI to address elevated levels of contaminants detected or potentially unacceptable risks identified, as described in this subsection. Additional detail regarding interim measures can be found in the RFI Report (CH2M, 2014) and CMS Report (CH2M, 2016).

### 3.3.1 Sump and Soil Removal

The four wastewater sumps (SWMUs 37R, 37S02, 37T02, and 37U02) and approximately 15 cubic yards of surrounding soil were removed in January 2006. Following removal, confirmatory soil samples were collected from the excavation walls and floors to assess the amount of contamination in the soils that remained. Because elevated contaminant concentrations were detected in the confirmatory soil samples, additional soil was excavated at each former sump location (about 23 cubic yards at SWMU 37R, 15 cubic yards at SWMU 37T02, 15 cubic yards at SWMU 37S02, and 5 cubic yards at SWMU 37U02) and another set of confirmatory soil samples was collected in April 2006. The April 2006 confirmatory sample data were utilized in the RFI human health risk assessment, which is discussed in Section 3.2.3.

### 3.3.2 Vapor Intrusion Mitigation

The vapor intrusion investigations for Plant 2 were conducted because of elevated levels of VOCs in shallow groundwater and residual soil vadose zone sources of VOC contamination adjacent to Buildings 2000, 2008, 2011, and 2033. Assessment results indicated that vapor intrusion was not occurring at Buildings 2000, 2011, and 2033 and did not result in indoor air VOC concentrations above regulatory screening levels under current and anticipated building use

and conditions. At Building 2008, assessment results indicated that vapor intrusion was likely occurring because indoor air TCE concentrations were above regulatory screening levels. Based on these findings, heating, ventilation, and air conditioning (HVAC) influent and effluent ducts were installed and tied into the building's main system, the ventilation fan and wall-mounted electric heater were removed, and cracks and seams in the concrete floor were sealed in 2013. While these measures produced a 10-fold reduction in indoor air TCE concentrations, the concentrations remained above acceptable levels. Therefore, a subslab depressurization (SSD) system was installed in 2013 that is effectively mitigating vapor intrusion such that TCE concentrations in both the control room and main room are below the regulatory screening level.

### 3.3.3 Wastewater Treatment Unit Replacement

The original Plant 2 wastewater treatment unit, also referred to as SWMU 17, began operation in 1967 and was used to manage sanitary sewage as well as discharges from various Plant 2 SWMUs. Additionally, some of the piping associated with the original wastewater treatment unit was below the water table (at times) and constructed with materials that facilitated groundwater infiltration into the piping. However, in 2014 the original wastewater treatment unit was replaced, including piping in the vicinity of the unit. Further, even before replacing the original wastewater treatment unit, SWMU 17 no longer managed or treated waste from any SWMU at Plant 2. The above activities eliminated a minor source of contamination identified in the RFI Report.

## 3.4 Pilot Study

In 2007 and 2008, a pilot study was conducted to evaluate the efficacy of enhanced reductive dechlorination as a treatment technology for groundwater at Plant 2. The pilot study was conducted at SWMU 25F and involved injection of emulsified vegetable oil to stimulate biodegradation of VOCs detected in groundwater and attributed to releases from the former solvent recover still operations. The test results indicate the substrate injection effectively stimulated enhanced reductive dechlorination of chlorinated VOCs to below their respective MCLs in all three monitoring wells used during the pilot test.

## 4. Corrective Action Objectives

The human health risk assessment conducted during the RFI determined there are no unacceptable risks for current site use (i.e., industrial facility) other than potentially unacceptable risk associated with vapor intrusion into Building 2008, which was subsequently mitigated via an interim action as described in Section 3.3.2. Potentially unacceptable risks were determined for a hypothetical construction worker exposed to soil during excavation and a hypothetical resident exposed to soil in localized areas, exposed to groundwater used as a potable water supply, or exposed to indoor air associated with vapor intrusion should any of these scenarios occur in the future. Further, no unacceptable ecological risks were identified. Because there are no unacceptable risks under current site use and because risk associated with exposure to soil by a construction worker performing excavation can be readily controlled, residual soil contaminant concentrations that may represent a leaching concern for groundwater contamination above acceptable levels are the primary focus of the recommended corrective action, with land and groundwater use controls to support potential exposure risks.

Based on this, DEP has identified the following overall goal for the Plant 2 corrective action:

- Control exposure to contaminants posing an unacceptable risk and reduce soil contaminant concentrations associated with leaching such that concentrations in groundwater can attenuate to near or below the MCLs (Drinking Water Health Advisory level [or MCL if promulgated] for perchlorate)

To attain the overall goal, DEP has identified the following Corrective Action Objectives for Plant 2:

- Control human exposure to soil contamination posing an unacceptable risk associated with industrial use of the facility
- Control human exposure to groundwater contamination above MCLs (Drinking Water Health Advisory Level [or MCL if promulgated] for perchlorate)
- Control human exposure, associated with industrial use of the facility, to indoor air concentrations caused by Facility-related contaminants (PCE and TCE) that were released to soil and/or groundwater

## 5. Proposed Remedy

For the following SWMUs, DEP has determined there is no unacceptable risk to human health or the environment and that the Corrective Action Objectives have been met; therefore, no further action is proposed:

SWMU 13 – Former Alodine Storage Area  
 SWMU 15 – Current Alodine Storage Area  
 SWMU 17 – Plant 2 Wastewater Treatment Unit  
 SWMU 24CC – Satellite Accumulation Areas  
 SWMU 24DD – Satellite Accumulation Areas  
 SWMU 24EE – Satellite Accumulation Areas  
 SWMU 24FF – Satellite Accumulation Areas  
 SWMU 24GG – Satellite Accumulation Areas  
 SWMU 24HH – Satellite Accumulation Areas  
 SWMU 25D – Solvent Recovery Still  
 SWMU 25E – Solvent Recovery Still  
 SWMU 27B – Plant 2 Drainage Ditch System  
 SWMU 28 – Silver Recovery Unit  
 SWMU 29L – Dust Collection System  
 SWMU 29M – Dust Collection System  
 SWMU 30 – Two Spray Booth Filters  
 SWMU 33 – Two Dumpsters  
 SWMU 34 – Three Oil/Water Separators  
 SWMU 38 – Parts Cleaner

With respect to potential risk associated with vapor intrusion in Building 2008, the proposed remedy is the vapor intrusion mitigation interim measure that was implemented as described in Section 3.3.2, effectively mitigating vapor intrusion such that TCE concentrations in both the control room and main room are below the regulatory screening level.

To achieve the corrective action goal stated in Section 4, a performance-based remedy (soil removal or treatment, coupled with land use controls) will be conducted to reduce the concentrations of VOCs and/or perchlorate potentially contributing to contamination in groundwater above drinking water standards. Remedy effectiveness will be evaluated by monitoring groundwater over time to identify whether the removal of contaminated soil has effectively reduced concentrations in groundwater to the drinking water standards. Additionally, controls will be placed on activities conducted on the Facility to appropriately manage exposure risks until the Corrective Action Objectives are met.

The proposed remedy for the five corrective action SWMUs at Plant 2 consists of various combinations of physical contaminant removal/treatment and land/groundwater use controls. Specifically, the remedy for the five SWMUs consists of:

- SWMUs 37R, 37S02, 37T02, and 37U02 – Excavation and removal of soil containing residual concentrations of contaminants that may pose an unacceptable risk from direct exposure (hypothetical construction and industrial worker scenario) or leaching concern to groundwater, land/groundwater use controls, and groundwater monitoring of both SWMU-specific and facility-wide wells
- SWMU 25F – Application of enhanced in situ bioremediation using a carbon substrate in areas where elevated TCE was observed in soil, land/groundwater use controls, and groundwater monitoring of both SWMU-specific and facility-wide wells

The details of these proposed corrective measures, including groundwater monitoring, are provided in the Plant 2 Corrective Measures Implementation Plan for Contaminant Source Areas (CMP; CH2M, 2016) and refined in the Source Area Soil Delineation Refinement, Baseline Groundwater Sampling Results, and Corrective Measures Recommendations for Plant 2 (CH2M, 2018). Following DEP selection of the final remedy, the CMP will be updated to reflect current conditions and any modifications made to the corrective action approach.

## **5.1 Land and Groundwater Use Controls**

Because contaminants remain in soil and groundwater at Plant 2 above levels appropriate for planned or potential uses, DEP's proposed remedy requires land and groundwater use controls to restrict activities that may result in exposure to those contaminant levels. DEP proposes that the controls be implemented and maintained primarily through ICs. ICs are non-engineered instruments, such as administrative and legal controls, that reduce the potential for human exposure to contamination and/or protect the integrity of a remedy by limiting land or resource use. In addition to ICs, use of personal protective equipment (PPE) can be required, when appropriate (e.g., excavation activities within source areas), to eliminate or reduce contact with contaminants.

DEP is proposing the following land and groundwater use controls be implemented at Plant 2:

- Plant 2 shall not be used for residential purposes unless it can be shown that contaminant concentrations in soil and groundwater have been reduced to levels that allow for unlimited use and unrestricted exposure

- Groundwater at Plant 2 shall not be used for any purpose, including, but not limited to, use as a potable water source, other than to conduct the maintenance and monitoring activities required by DEP and/or EPA, unless it can be demonstrated through treatment or natural attenuation that contaminant levels are acceptable for the intended use
- All earth moving activities (excavation, drilling, construction) in areas of Plant 2 where exposure to contaminant levels above acceptable levels may pose an unacceptable exposure risk shall be conducted in a manner that will not pose a threat to human health (in compliance with the Occupational Safety and Health Administration [OSHA] requirements and with the use of proper PPE, as applicable) or adversely affect or interfere with the final remedy

The land and groundwater use controls necessary to reduce the potential for human exposure to contaminants above acceptable levels at Plant 2 will be implemented through enforceable mechanisms such as a State’s Permit modification and an Environmental Covenant. If DEP determines that additional maintenance and monitoring activities, ICs, or other corrective actions are necessary to protect human health or the environment, DEP has the authority to require and enforce such additional corrective actions through an enforceable mechanism which may include a permit modification or Environmental Covenant, provided any necessary public participation requirements are met.

## **6. Evaluation of Proposed Remedy**

This section provides a description of the criteria DEP used to evaluate the proposed remedy consistent with “Corrective Action for Releases from Solid Waste Management Units at Hazardous Waste Management Facilities; Proposed Rule” (EPA, 1996). The criteria are applied in two phases. In the first phase, DEP evaluates three decision threshold criteria as general goals. In the second phase, for those remedies that meet the threshold criteria, DEP evaluates seven balancing criteria to determine which proposed remedy alternative provides the best relative combination of attributes. As noted previously, a CMS, where various remedy alternatives are commonly evaluated, was determined by DEP as not necessary. While a formal CMS was not prepared, throughout the RFI process various remedy technologies were evaluated via interim actions and pilot study, which led to the remedy proposed in this SB.

### **6.1 Threshold Criteria**

#### **6.1.1 Protect Human Health and the Environment**

This criterion is met with respect to current risk without the need for additional corrective actions. There are currently no activities being conducted that pose exposure risks to workers. Further, engineering controls (perimeter fence), plant security, and operational protocol prevent unplanned disturbance of soil or use of groundwater beneath Plant 2. The proposed remedy will continue to protect human health and the environment from exposure to contamination. Land and groundwater use controls will prohibit future uses that would pose an unacceptable risk via administrative mechanisms and PPE, as applicable. Additionally, source removal (via soil excavation or treatment) will provide additional, long-term protection by reducing contaminant levels that pose potentially unacceptable risks and leaching concerns.

### 6.1.2 Achieve Media Cleanup Objectives

DEP's proposed remedy will meet the cleanup objectives appropriate for the expected current and reasonably anticipated future land use. The cleanup objectives will be met through a combination of contaminant concentration removal/reduction and land and groundwater use controls to reduce the exposure potential.

### 6.1.3 Control the Sources of Releases

Through its RCRA Corrective Action Program, DEP seeks to eliminate or reduce further releases of hazardous wastes or hazardous constituents that may pose a threat to human health and the environment. Several interim actions were implemented early in the Plant 2 Corrective Action program that eliminated primary release mechanisms from facility operations as well as secondary release mechanisms resulting from residual contamination in environmental media. An integral component of DEP's proposed remedy for Plant 2 is additional aggressive source removal/treatment.

## **6.2 Balancing/Evaluation Criteria**

### 6.2.1 Long-term Reliability and Effectiveness

The proposed remedy of aggressive source removal/treatment and land/groundwater use controls will maintain protection of human health and the environment over time by controlling exposure to the hazardous constituents remaining in soils and groundwater as well as reducing their concentrations and ability to act as a continuing source. The long-term effectiveness is likely high because contaminant reduction via physical removal or chemical treatment is reliable and land/groundwater use controls can be readily implemented and maintained because the land use is anticipated to remain industrial and under the control of Alliant Techsystems Operations LLC.

### 6.2.2 Reduction of Toxicity, Mobility, or Volume of Waste

There is a statutory preference for selecting remedies that employ treatment that permanently and significantly reduces toxicity, mobility, or volume of hazardous substances. DEP's proposed remedy is designed to reduce the toxicity, mobility, and volume of contaminants posing unacceptable risk and/or leaching-to-groundwater concern at Plant 2. Through physical removal or in situ treatment of contaminated soil, the total mass and volume of toxic contaminants will be reduced, which will therefore reduce the ability of the original mass of contaminants to migrate.

### 6.2.3 Short-term Effectiveness

There is no unacceptable risk under current land use conditions, which will remain true through and after remedy implementation since the remedy enhances the protectiveness. During remedy implementation, workers involved in the remedy implementation will be protected by adherence to applicable OSHA standards and use of appropriate PPE. Workers at the Facility, members of the surrounding community, and the environment will be protected during remedy implementation by use of standard construction techniques, including work site controls and safe management of excavated soils and treatment chemicals. Therefore, the short-term effectiveness is high.

#### 6.2.4 Implementability

DEP's proposed remedy is readily implementable. The component of the proposed remedy focused on aggressive source removal/treatment can be completed with standard earth-moving, drilling, and associated equipment and in accordance with industry-standard methodologies. Additionally, land/groundwater use controls can be readily implemented through enforceable mechanism such as the State's Permit modification and an Environmental Covenant. Therefore, DEP does not anticipate any regulatory constraints in implementing its proposed remedy.

#### 6.2.5 Cost

The total cost to implement the proposed remedies at the five corrective action SWMUs is estimated to be between \$3,000,000 and \$4,500,000 in capital cost and \$50,000 to \$75,000 in annual operations and maintenance (O&M) cost. This cost range should be considered an order-of-magnitude estimate.

#### 6.2.6 Community Acceptance

DEP will evaluate any issues or concerns regarding the proposed remedy expressed by the community during the 30-day public comment period on this SB. As noted previously, DEP may modify its proposed remedy based on comments received during this period. DEP will announce its selection of a final remedy for ABL Plant 2 in a Final Decision and Response to Comments (Final Decision) after the public comment period has ended.

#### 6.2.7 State/Support Agency Acceptance

DEP considers the proposed remedy to be appropriate for the particular site conditions; contaminant types, concentrations, and properties; potential risks and exposures; and potentially applicable treatment technologies. Furthermore, EPA has provided input and has been involved throughout the investigation process.

### **7. Financial Assurance**

Alliant Techsystems Operations LLC will be required to demonstrate and maintain financial assurance for completion of the remedy pursuant to the standards contained in West Virginia regulations.

### **8. Public Participation**

Interested persons are invited to comment on DEP's proposed remedy. The public comment period will last thirty (30) calendar days from the date that notice of the start of the comment period is published in a local newspaper. Comments may be submitted by mail, email, or phone to Kenan Cetin at the address listed below.

A public hearing will be held upon request. Requests for a public hearing should be made to Kenan Cetin of the DEP Office by phone at (304)-238-1220 ext. 3507 or by email at [Kenan.Cetin@wv.gov](mailto:Kenan.Cetin@wv.gov). A hearing will not be scheduled unless one is requested.

Community support for the DEP's proposed remedy is ascertained through comments received during the public comment period. Therefore, the public is encouraged to review the

documents included in the Information Repository and provide comment on the proposed remedy presented in this SB.

The Information Repository contains the information considered by DEP for the proposed remedy at this Facility. The Information Repository is available to the public for review at the following location:

West Virginia Department of Environmental Protection  
131A Peninsula Street  
Wheeling, WV 26003  
Contact: Kenan Cetin  
Phone: (304) 238-1220 ext. 3507  
[Kenan.Cetin@wv.gov](mailto:Kenan.Cetin@wv.gov)

Attachment 1 – Index of Information Repository Documents

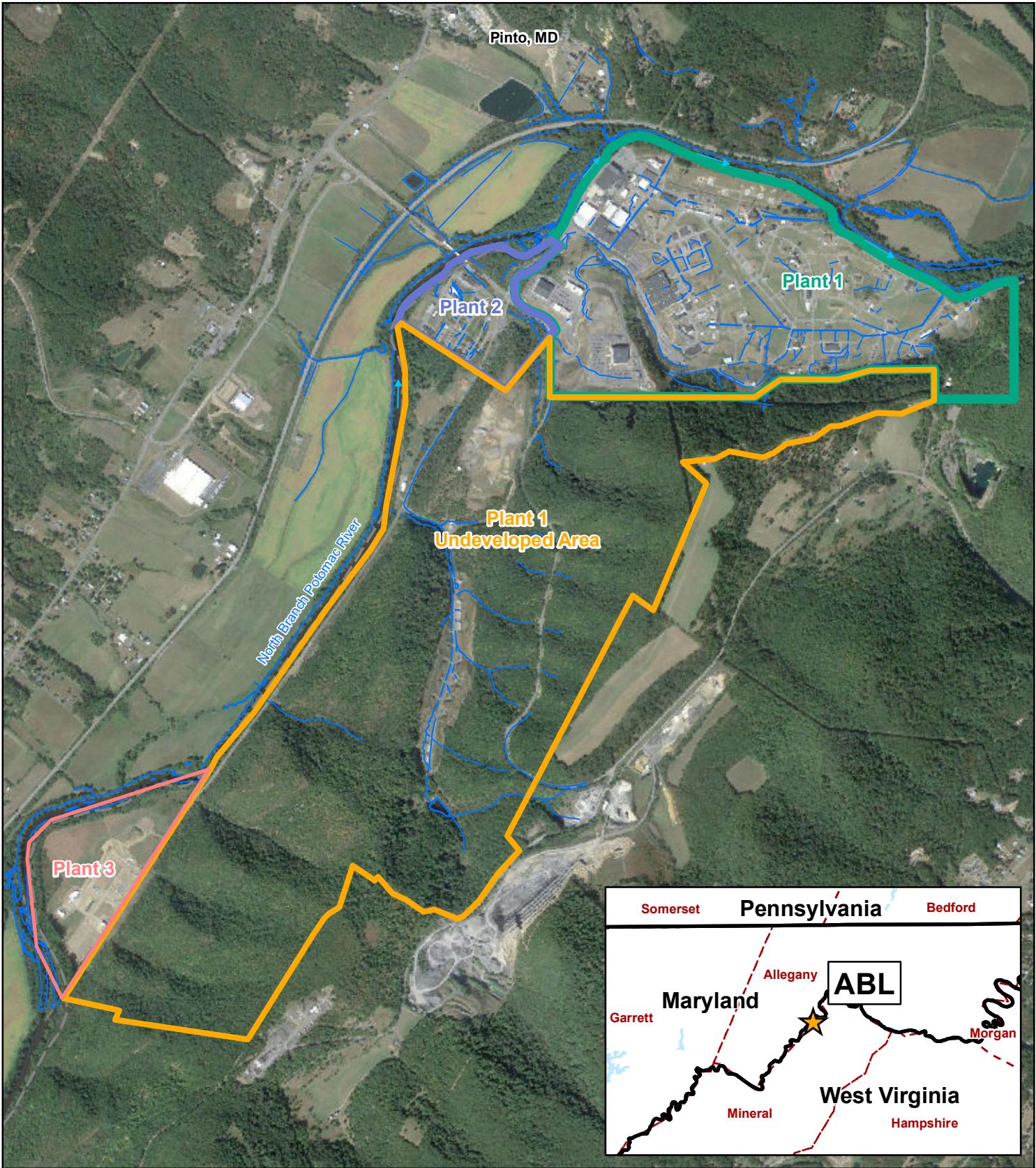
Figure 1 – Facility Location Map

Figure 2 – Corrective Action SWMU Location Map



**ATTACHMENT 1**  
**STATEMENT OF BASIS**  
**INDEX OF INFORMATION REPOSITORY DOCUMENTS**

- CH2M HILL, Inc. (CH2M). 2014. *RCRA Facility Investigation Report, Plant 2, Allegany Ballistics Laboratory, Rocket Center, West Virginia*. March.
- CH2M. 2016. *Corrective Measures Implementation Plan for Contaminant Source Areas, Plant 2, Allegany Ballistics Laboratory, Rocket Center, West Virginia*. July.
- CH2M. 2018. *Source Area Soil Delineation Refinement, Baseline Groundwater Sampling Results, and Corrective Measures Recommendations for Plant 2, Allegany Ballistics Laboratory, West Virginia*. May.
- West Virginia Department of Environmental Protection (WVDEP). 2005. West Virginia Department of Environmental Protection Division of Water and Waste Management Permit. Final Permit Number for ATK Tactical Systems Company LCC and Naval Sea Systems Command. August 24.
- United States Environmental Protection Agency (EPA). 1996. *Corrective Action for Releases from Solid Waste Management Units at Hazardous Waste Management Facilities*. 61 Federal Register 19432. May 1, 1996.



**Legend**

- Plant 1
- Plant 1 - Undeveloped Area
- Plant 2
- Plant 3
- Water Body
- State Boundary

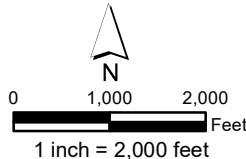
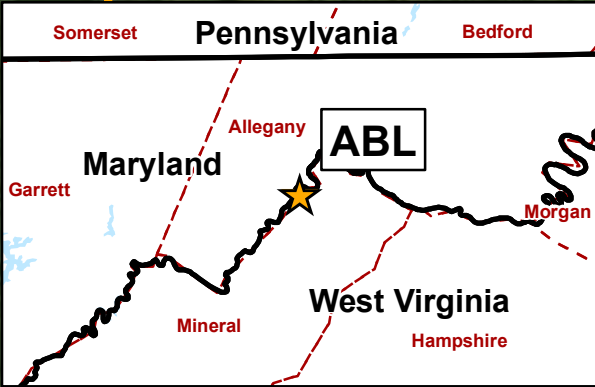
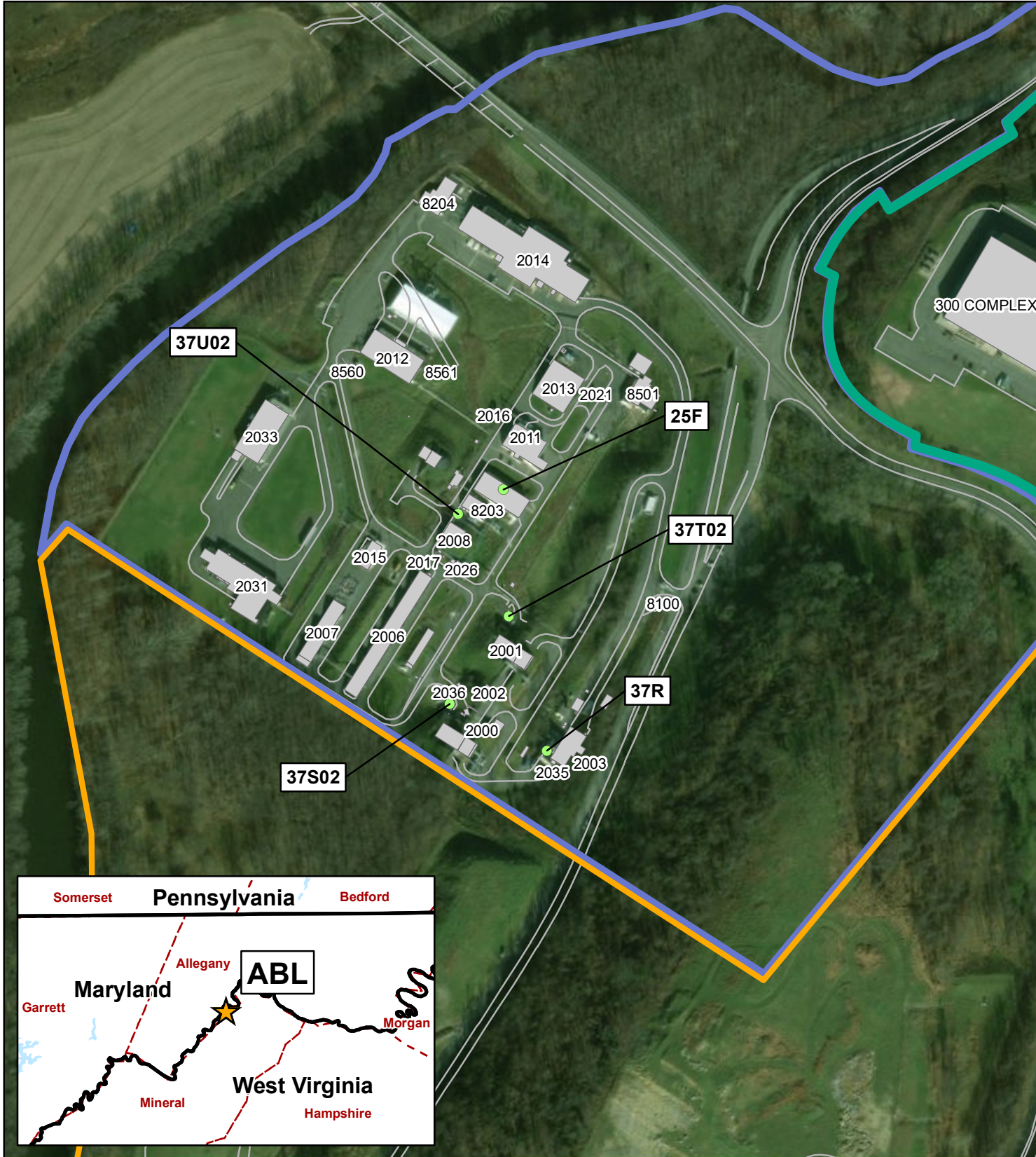


Figure 1  
 Allegany Ballistics Laboratory Plants and Location  
 Plant 2 Statement of Basis  
 Allegany Ballistics Laboratory  
 Rocket Center, West Virginia



**Legend**

- SWMU Locations
- Roads
- + Rail Road
- Structures
- Plant 1
- Plant 1 - Undeveloped Area
- Plant 2

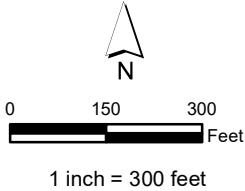


Figure 2  
SWMU Location Map  
Plant 2 Statement of Basis  
Allegany Ballistics Laboratory  
Rocket Center, West Virginia