UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY
REGION III

FINAL DECISION

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

BLACKSBURG, VIRGINIA

PURPOSE

The United States Environmental Protection Agency (EPA) is issuing this Final Decision and Response to Comments (FDRTC or Final Decision) selecting the Final Remedy for the Virginia Polytechnic Institute and State University facility located in Blacksburg, VA (hereinafter referred to as the Facility). The Final Decision is issued pursuant to the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act (RCRA) of 1976, and the Hazardous and Solid Waste Amendments (HSWA) of 1984, 42 U.S.C. Sections 6901, et seq. On January 5, 2015, EPA issued a Statement of Basis (SB) in which it described the information gathered during environmental investigations at the Facility and proposed a Final Remedy for the Facility. The SB is hereby incorporated into this Final Decision by reference and made a part hereof as Attachment A.

This FDRTC selects the remedy that EPA evaluated in the SB. Consistent with the public participation provisions under RCRA, EPA solicited public comment on its proposed Final Remedy. On January 15, 2015, notice of the SB was published on the EPA website: [http://www.epa.gov/reg3wcmd/publicnotice_vatech.html] and in the Roanoke Times newspaper. The comment period ended on March 27, 2015.

EPA did not receive any comments on the SB; thus, the remedy proposed in the SB is the Final Remedy selected by EPA for the Facility.

FINAL DECISION

EPA's Final Remedy for Solid Waste Management Units 1 and 2 at the Facility includes the following:

- Monitored natural attenuation until drinking water standards are met;
- Continuing groundwater monitoring according to Post Closure Permit and
- Compliance with and maintenance of land and groundwater use restrictions.

EPA's Final Remedy also includes No Further Action for 19 SWMUs and 9 Areas of Concern at the Facility.

DECLARATION

Based on the Administrative Record compiled for the corrective action at the Virginia Polytechnic Institute and State University facility, I have determined that the remedy selected in this Final Decision and Response to Comments, which incorporates the January 5, 2015 Statement of Basis, is protective of human health and the environment.

Date: 4.9.15

John A. Armstead, Director
Land and Chemicals Division
U.S. Environmental Protection Agency, Region III

Attachment A: Statement of Basis (January 5, 2015)

Attachment A

UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY
REGION III

STATEMENT OF BASIS

VIRGINA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY
BLACKSBURG, VIRGINIA

EPA ID No. VAD074747908

Prepared by
Office of Remediation
Land and Chemicals Division

January 2015

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List of Commonly Used Acronyms

ACL	Alternate Concentration Limit
AOC	Area of Concern
AR	Administrative Record
AST	Aboveground Storage Tank
CAMP	Corrective Action Monitoring Plan
COC	Constituent of Concern
EI	Environmental Indicator
EPA	Environmental Protection Agency
FDRTC	Final Decision and Response to Comments
GPS	Groundwater Protection Standard
HASP	Health and Safety Plan
HSWA	Hazardous and Solid Waste Amendments
MCL	Maximum Contaminant Level
MNA	Monitored Natural Attenuation
NFA	No Further Action
PAH	Polynuclear Aromatic Hydrocarbons
PR	Presumptive Remedy
RCRA	Resource Conservation and Recovery Act
RSL	Regional Screening Level
SB	Statement of Basis
SL	Screening Level
SSL	Soil Screening Level
SVOC	Semi-Volatile Organic Compound
SWDA	Solid Waste Disposal Act
SWMU	Solid Waste Management Unit
UST	Underground Storage Tank
VADEQ	Virginia Department of Environmental Quality
VHWMR	Virginia Hazardous Waste Management Regulations
VOC	Volatile Organic Compound
VRP	Voluntary Remediation Program
VSWMR	Virginia Solid Waste Management Regulations

Section 1: Introduction

The U.S. Environmental Protection Agency (EPA) has prepared this Statement of Basis (SB) under the Corrective Action Program to solicit public comment on its proposed remedy for the Virginia Polytechnic Institute and State University (Virginia Tech or the University) facility located at 459 Tech Center Drive in Blacksburg, Virginia 24061 (Facility or Site).

The Facility is subject to EPA's Corrective Action Program under the Solid Waste Disposal Act (SWDA), as amended by the Resource Conservation and Recovery Act (RCRA) of 1976, and the Hazardous and Solid Waste Amendments (HSWA) of 1984, 42 U.S.C. §§ 6901 *et seq.* (Corrective Action Program). The Corrective Action Program is designed to ensure that certain owners/operators of facilities subject to RCRA have investigated and cleaned up any releases of hazardous waste and hazardous constituents that have occurred at their property. The Commonwealth of Virginia (Commonwealth) was authorized for the Corrective Action Program under Section 3006 of RCRA on July 31, 2000 (65 Federal Register 46606).

The Commonwealth requested that EPA, in consultation with the Virginia Department of Environmental Quality (VADEQ), take the lead in overseeing Virginia Tech's completion of its corrective action obligations at the Facility. In October 2010, EPA and Virginia Tech entered into an Administrative Order on Consent, Docket No. RCRA-3-2010-0396CA, (Order) under Section 3008(h) of RCRA, 42 U.S.C. § 6928(h). Under the Order, Virginia Tech agreed to conduct a RCRA Facility Investigation (RFI) and Corrective Measures Study (CMS) at the Facility. Virginia Tech has completed the RFI and CMS for each of the Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs) at the Facility, with the exception of AOC 5 (Power Plant Underground Storage Tanks). Based on that information, EPA has prepared this SB.

This SB highlights key information relied upon by EPA in selecting its proposed remedy for each of the SWMUs and AOCs at the Facility, with the exception of AOC 5. EPA will issue a separate SB for AOC 5 to solicit public comment once that AOC has been further evaluated under the Corrective Action Program.

A detailed description of EPA's proposed remedy for the SWMUs and AOCs being addressed by this SB may be found in Section 6. For additional information, please refer to the Administrative Record (AR) for the Facility, which contains all documents, including data and quality assurance information, on which EPA's proposed remedy is based. The Index to the AR may be found in Section 10 of this SB. See Section 9,

Public Participation, for information on how you may review the documents contained in the AR and submit any comments you may have concerning this SB.

Section 2: Facility Background

2.1 Facility Description and History

The Facility is located at 459 Tech Center Drive in Blacksburg, Montgomery County, Virginia. The Site is bordered to the north and east by residential properties, to the west by residential and agricultural properties, and to the south by wooded areas and a research park. The Site covers approximately 4,420 acres. A Site Location Map and aerial photograph depicting the location and boundaries of the Site are attached to this SB as **Figures 1 and 2**, respectively.

Virginia Tech was founded in 1872 as a land-grant college named Virginia Agricultural and Mechanical College. Virginia Tech is now a comprehensive, innovative research university. In addition to the 2,600-acre main campus, which has more than 100 campus buildings, the Facility also includes a 1,700-acre agriculture research farm near the main campus, and a 120-acre area covered by the Virginia Tech Montgomery Executive Airport (formerly the Virginia Tech Airport) and the Virginia Tech Corporate Research Center.

2.2 Environmental Setting

The Town of Blacksburg is located in the Valley and Ridge physiographic province, which is a belt of folded and faulted clastic and carbonate sedimentary rocks situated west of the Blue Ridge crystalline rocks and east of the Appalachian Plateaus. The Ridge is held up by Silurian-age sandstone and quartzite. Virginia Tech is located on structural block called the Blacksburg Synform created by late Paleozoic movement. The Site is underlain by Cambrian age carbonate and shale bedrock of the Rome and Elbrook formations comprised primarily of phyllitic siliciclastics dolomite.

Depth to groundwater in the uppermost aquifer varies from less than 10 feet below ground surface (bgs) to more than 65 feet bgs. The uppermost aquifer resides in secondary porosity features including fractures, joints, and bedding planes in the underlying dolomite and shale bedrock. Groundwater levels and the local topography both indicate that groundwater in the uppermost aquifer discharges into Stroubles Creek and groundwater flow direction is generally to the north or west across the Site.

Section 3: Summary of Environmental Investigation

3.1 Environmental Investigations

EPA has identified a total of 21 SWMUs and 9 AOCs at the Site. Based on a review of all available information, EPA and the Virginia Department of Environmental Quality (VADEQ) Site visits on November 8, 2006 and September 23, 2010, and discussions with Facility representatives, EPA has determined that the only known soil and/or groundwater impacts relating to the SWMUs and AOCs addressed in this SB are at SWMUs 1 and 2, described below.

3.1.A SWMU 1 – Former Physical Plant/Quarry Area

Unit Description

SWMU 1 is located in the area between Cowgill Hall and the Perry Street Parking Lot near Whittemore Hall and contains the area where the Bishop-Favro Building currently stands. Please refer to **Figure 3.** From 1935 to 1968, the former Physical Plant was located in this area and provided maintenance for university buildings and equipment. The former Physical Plant was comprised of various buildings along with material storage. In addition, a former quarry that supplied building stone used on campus during the early part of the 20th century was located adjacent to the former Physical Plant in the area behind Derring and Cowgill Halls. The former quarry is believed to have operated from 1899 to 1935. From 1935 until the late 1940s, the former quarry was reportedly filled with water, and then, subsequently, filled with soil and other fill material from the late 1940s until 1952. The area of the former quarry is currently covered by asphalt, various buildings, and grassy areas.

SWMU 1 was discovered on April 21, 1988, during construction of a storm sewer line from Cowgill Hall toward Perry Street when a number of buried containers were encountered during the excavation of a trench. Virginia Tech determined that the containers held metal-bearing paints, tars and oils. The containers and contaminated soil were excavated and stockpiled adjacent to the trench (north of Cowgill Hall) pending disposal. VADEQ required Virginia Tech to prepare a Closure Plan under Virginia's Hazardous Waste Management Regulations (VHWMR) because the stockpiled materials, referred to as the "contaminated dirt pile," exhibited high levels of lead and arsenic and were determined to be a hazardous waste. Following removal of the contaminated dirt pile, sampling and analysis of soil beneath the pile area indicated that an additional 6-inches of soil needed to be removed. Approximately 380 tons of impacted soil were removed and transported for off-site for disposal. The excavated area was backfilled with clean fill. On February 24, 1993, Virginia Tech submitted a Certification of Clean Closure to VADEQ for review and approval. On April 26, 1993, VADEQ approved the certification.

Environmental Investigations

Due to uncertainty regarding the methods by which the former quarry was filled, as well as the waste handling procedures that were used at the former Physical Plant, Virginia Tech conducted extensive soil and groundwater investigations of these areas within SWMU 1 in 1993. In 2002, prior to construction of the Bishop-Favro Hall, Virginia Tech conducted additional characterization of SWMU 1. The findings of the additional Site characterization were consistent with the 1993 investigation.

Soil:
Subsurface soil investigations found that fill materials in the former quarry consisted of soil, organic soils, gravel, rock fragments, coal, ash, cinders, and various debris (i.e., bricks, wood, concrete, glass, and metal). The analytical results for soil samples collected in 1993 and 2002 detected 9 metals, 17 volatile organic compounds (VOCs), and 18 semi-volatile organic compounds (SVOCs). As part of the 2002 investigation, the sampling results were compared to VADEQs Tier II and Tier III Voluntary Remediation Program (VRP) screening levels (SLs).

Tier II SLs are used to evaluate a site for potential residential exposures and are applicable for unrestricted use of the Site (e.g., residential use). Tier II SLs for soil are based on the lower (more stringent) screening values of either the EPA Region 3 Risk-Screening Levels (RSLs) for residential use or the values derived from the EPA Soil Screening Level (SSL) guidance for migration from soil to air or groundwater assuming residential use.

Tier III SLs are used to evaluate sites that are or will be restricted to a specified non-residential use (e.g., industrial use). Tier III SLs for soils are the lower of either the EPA Region III industrial soil RSLs or the SSL for migration to air or groundwater assuming commercial or industrial use.

The results for the 2002 soil analyses and screening are discussed below:

- Metals

  Arsenic concentrations ranged from 5.55 milligrams per kilogram (mg/kg) to 10.4 mg/kg, which exceeded both the Tier II SL of 0.439 mg/kg and the Tier III SL of 1.60 mg/kg. However, the levels of arsenic detected are representative of background levels (6.68 to 10.3 mg/kg) based on a statistical comparison of on-Site arsenic levels to background.

  Chromium concentrations ranged from 6.3 mg/kg to 24.7 mg/kg, which exceeded the Tier II SL of 3 mg/kg but not exceeding the Tier III SL of 63 mg/kg.

  Lead concentrations ranged from 5.8 mg/kg to 648 mg/kg, with two samples exceeding the Tier II SL of 270 mg/kg (EPA RSL 400 mg/kg), but not exceeding the Tier III SL of 800 mg/kg.

Barium, cadmium, mercury, selenium, silver, and zinc concentrations did not exceed their respective Tier II or Tier III SLs.

- VOCs

VOCs were generally detected in soils at very low concentrations. Only two VOCs, methylene chloride and 1,1,2,2-tetrachloroethane, exceeded their respective Tier II SLs. Both exceedances were from samples taken near an area where hazardous materials were removed in 1988 during the installation of a storm water line. Methylene chloride was found at a concentration of 0.19 mg/kg, which exceeded the Tier II SL of 0.0187 mg/kg (EPA RSL 56 mg/kg), but not the Tier III SL of 960 mg/kg. 1,1,2,2-tetrachloroethane was found at a concentration of 0.01 mg/kg, which exceeded the Tier II SL of 0.000876 mg/kg (EPA RSL 0.056 mg/kg), but not the Tier III SL of 2.8 mg/kg.

- SVOCs

Polynuclear aromatic hydrocarbons (PAHs), a category of SVOCs, were detected in borings and are likely associated with cinders and ash. Out of the 18 SVOCs detected, five exceeded their respective Tier II SLs.

Benzo(a)anthracene concentrations ranged from less than 0.204 mg/kg to 0.812 mg/kg which exceed the Tier II SL of 0.15 mg/kg, but not the Tier III SL of 210 mg/kg.

Benzo(b)fluoranthene concentrations ranged from less than 0.204 mg/kg to 0.895 mg/kg, which exceeded the Tier II SL of 0.015 mg/kg, but not the Tier III SL of 2.10 mg/kg.

Benzo(a)pyrene concentrations ranged from less than 0.204 mg/kg to 0.685 mg/kg with samples exceeding the Tier II SL of 0.15 mg/kg but not exceeding the Tier III SL of 2.9 mg/kg.

Indeno(1,2,3-cd)pyrene concentrations ranged from less than 0.204 mg/kg to 0.380, which exceeded the Tier II SL of 0.15 mg/kg, but not the Tier III SL of 2.10 mg/kg.

Naphthalene concentrations ranged from less than 0.200 mg/kg to 0.531 mg/kg, which exceeded the Tier II SL of 0.0298 mg/kg (EPA RSL 3.60 mg/kg), but not the Tier III SL of 18 mg/kg.

Groundwater:

The Tier II SLs for groundwater are based on federal Maximum Contaminant Levels

(MCLs) promulgated at 40 C.F.R. Part 141 pursuant to Section 1412 of the Safe Drinking Water Act, 42 U.S.C. Section 300g-1. For contaminants that do not have an MCL, the results were screened against the EPA Region 3 RSLs for Tap Water.

The analytical results for groundwater samples collected in 1993 and 2002 detected 11 metals and one VOC. The results of the 1993 and 2002 groundwater analyses are discussed below:

- Metals

  Barium was detected in one monitoring well (MW-5) at a concentration of 3.75 mg/L, above its Tier II SL of 2.0 mg/L. EPA determined that the barium concentrations from well MW-5 are not representative because MW-5 is located in a parking lot and the well cap was loose at the time of sampling. Therefore, the well may have been impacted by run-off. In addition, the groundwater purged from well MW-5 was grayish and turbid. Based on these circumstances and the sampling method used, the sporadic detections of metals are most likely related to high turbidity (suspended solids) in the water samples.

  Chromium concentrations ranged from less than 0.001 mg/L to 0.185 mg/L, with one sample exceeding the Tier II SL of 0.100 mg/L. The sample exceeding the Tier II SL was collected in 1993 from monitoring well MW-7, which was reported to be turbid. As with MW-5, EPA determined that the chromium concentrations from well MW-7 are not representative due to the high turbidity in the water samples. MW-7 could not be located for resampling in 2002.

  Lead concentrations in 1993 ranged from less than 0.001 mg/L to 0.263 mg/L, and samples from three monitoring wells (MW-1, MW-2, MW-7) and one Geoprobe boring (CC-1) exceeded the Tier II SL of 0.015 mg/L. The concentrations of lead detected in MW-1 in 2002 were below the Tier II SL. Wells MW-2 and MW-7 could not be located for resampling in 2002.

  Nickel concentrations ranged from 0.00175 mg/L to 0.25 mg/L, with one sample exceeding the Tier II SL of 0.030 mg/L. The sample exceeding the Tier II SL was taken from well MW-7 in 1993. As previously stated, that well was reported to be turbid in 1993 and could not be located for resampling in 2002.

  Arsenic, beryllium, cadmium, copper, selenium, silver, and zinc concentrations did not exceed their respective Tier II SLs.

- VOCs

  Chloroform was the only VOC detected in the 1993 or 2002 groundwater sampling events: it was detected in the hydraulicly upgradient wells MW-1 and

MW-6. Chloroform concentrations ranged from 0.004 mg/L to 0.027 mg/L, which are below the Tier II SL of 0.080 mg/L.

Additional Groundwater Investigation:
Of the seven monitoring wells that were part of the 1993 Site investigation, only two monitoring wells remain: MW-1 and MW-6[1]. Wells MW-1 and MW-6 are hydraulically upgradient of SWMU 1. The other five wells were inadvertently destroyed or paved over during construction activities. In November 2010, Virginia Tech sampled and analyzed the groundwater from MW-1 and MW-6 for the presence of metals, VOCs and SVOCs (including PAHs). All of the constituents detected in MW-1 and MW-6 were at extremely low concentrations, and none of the constituents were detected above their respective Tier II SLs.

3.1.B SWMU 2 – Closed Sanitary Landfill (Solid Waste Facility Permit No. 109)

Unit Description
SWMU 2 is a closed, solid waste landfill located to the west of Route 460 Bypass and to the north of Prices Fork Road. Please refer to **Figure 4**. The landfill was approximately 4.5 acres in size, was unlined and received general University solid waste. On May 30, 1973, the Virginia Department of Health, subsequently renamed VADEQ, issued Solid Waste Permit No. 109 (Permit No. 109) to Virginia Tech for this landfill. Waste was last placed in the landfill on June 30, 1989. The University's solid waste is now shipped off-site for disposal to a local permitted sanitary landfill.

During operation of SWMU 2, Virginia Tech constructed eight trenches which received waste without a base liner or leachate collection system. Additionally, asbestos was placed in one section of the landfill. In accordance with applicable regulations, trenches 1 through 6 were closed prior to December 1988 and capped with a soil cover. Trenches 7 and 8 were closed in October 1994 and capped with a soil cap in accordance with a January 1994 VADEQ-approved Closure Plan. On October 7, 1994, Virginia Tech submitted a certification of closure for SWMU 2 to the VADEQ for approval.

Constituents of Concern, Post-Closure Care & Groundwater Monitoring
Permit No. 109 was amended on June 14, 2002 to establish Groundwater Protection Standards (GPSs) and to update the Groundwater Monitoring Program for SWMU 2. GPSs are based on MCLs or VADEQ-approved, site-specific, background concentration levels, when applicable. For a contaminant that does not have an MCL and a site-specific, background concentration has not been established, the Virginia Solid Waste Management Regulations (VSWMR) requires landfill owners/operators to adopt risk-based Alternative Concentration Limits.

[1] During early investigations of the Facility, well MW-6 had been identified as a separate area of concern and referred to as AOC 6. Upon further evaluation, EPA has included MW-6 in SWMU 1.

On July 7, 2005, VADEQ issued a second amendment to Permit 109 to establish a groundwater Corrective Action – Presumptive Remedy (PR) Program due to the detection of VOCs (i.e., chloroethane and vinyl chloride) hydraulically downgradient of SWMU 2 at concentrations greater than the GPSs.

The groundwater Corrective Action – PR for SWMU 2 includes the following passive and active engineering controls to prevent exposure to solid waste, reduce source concentrations and limit migration impact: closing and covering of the waste unit to limit the source of impact; restricting Site access to authorized personnel; managing landfill gas to remove VOCs from the waste and reduce saturation to limit leachate production; and, monitoring natural attenuation of VOCs to evaluate migration of impacted groundwater. In addition, under Permit No. 109, VADEQ requires Virginia Tech to maintain the landfill cap in accordance with the provisions for post-closure care in the VSWMR.

In October 2005, Virginia Tech began implementing a VADEQ-approved Corrective Action Monitoring Plan (CAMP) as part of the groundwater Corrective Action - PR. The current contaminants of concern (COCs) which exceed their applicable GPSs for SWMU 2 and are actively being monitored under the CAMP include:

- 1,1-Dichloroethane – 11 gram per liter (ug/l) (MW-3) compared to GPS (1.878 ug/l)
- Arsenic – 13.9 ug/l (MW-2) compared to GPS (10 ug/l)
- Cobalt – 21.2 ug/l (MW-4) compared to GPS (4.695 ug/l)
- Vinyl Chloride - 11 ug/l (MW-3) compared to GPS (2.0 ug/l)

Every three years Virginia Tech prepares and submits to VADEQ for approval, a Corrective Action Evaluation Report (Evaluation Report) in which it assesses how effective monitored natural attenuation is preforming. On July 8, 2014, Virginia Tech submitted an Evaluation Report which shows that 1,1-dichloroethane and vinyl chloride concentrations in groundwater are decreasing. Cobalt and arsenic groundwater concentrations are stable. All COC groundwater concentrations are below ten times their GPS.

The Evaluation Report also shows that the natural attenuation processes are limiting COC migration to approximately 150 feet downgradient of the waste unit. Groundwater flow and constituent migration appear to be at a steady-state. The predicted maximum extent of COC migration will remain within the Facility property, and does not threaten off-site groundwater sources. In addition, there are no complete exposure pathways for contaminated groundwater within the Facility property. Therefore, under the current use scenario, there is no threat to human health or the environment presented by Facility-related contaminated groundwater.

Section 4: Summary of Facility Risks

EPA has determined that soils and groundwater associated with SWMUs 1 and 2 do not pose a threat to human health or the environment under the current and anticipated non-residential use EPA sets national goals to measure progress toward meeting the nation's major environmental goals. For Corrective Action, EPA evaluates two key environmental indicators for each facility: (1) current human exposures under control and (2) migration of contaminated groundwater under control. EPA has determined that the Facility met these indicators on March 21, 2011 and December 27, 2011, respectively.

Section 5: Corrective Action Objectives

5.1 Soil

EPA's Corrective Action Objective for Facility soils is to control exposure to the hazardous constituents remaining in soils.

5.2 Groundwater

EPA's Corrective Action Objectives for Facility groundwater is to restore the groundwater to drinking water standards (MCLs) or site specific background levels as applicable and until such time as those standards are achieved, to control exposure to the hazardous constituents remaining in the groundwater through engineering and/or groundwater use restrictions.

Section 6: Proposed Remedy

6.1 Soils

The proposed remedy for soils in SWMUs 1 and 2 consists of land-use restrictions to be implemented through use restrictions (See Section 6.3) which will restrict those areas to non-residential uses. EPA has determined that VADEQ's VRP Tier III SLs (based on EPA Region 3's RSLs for Industrial Soils) for direct contact with soils are protective of human health and the environment for individual contaminants at this Facility, provided that the Facility is not used for residential purposes at SWMUs 1 and 2. Based on the available information, there are currently no unacceptable risks to human health and the environment via the soil or vapor intrusion pathways for the present and anticipated non-residential use of SWMUs 1 and 2.

6.2 Groundwater

SWMU 1

The proposed remedy for the groundwater associated with SWMU 1 is no further action.

SWMU 2

The proposed remedy for the groundwater associated with SWMU 2 is natural attenuation with continuation of the groundwater monitoring program already in place for SWMU 2 until drinking water standards are met and, until those standards are met, the implementation of groundwater use restrictions (See Section 6.3).

Monitoring at the Facility for groundwater has shown that the contaminants are effectively being addressed by natural attenuation. The groundwater plume associated with SWMU 2 appears to be stable (not migrating), and concentrations of COCs are either stable or declining over time. The most contaminated groundwater is less than ten times levels appropriate for use as drinking water. While groundwater is not used on the Facility for drinking water, and no downgradient users of off-site groundwater have been identified, EPA is requiring groundwater use restrictions be implemented to prohibit use of the groundwater.

In accordance with Permit No. 109, Virginia Tech is required to conduct post-closure care activities including maintaining the landfill cap, addressing leachate issues, and monitoring groundwater and landfill gas in accordance with the CAMP. Therefore, EPA has determined that the operation and maintenance and monitoring actions necessary to assure continued protection of human health and the environment at SWMU 2 are already in place and required by Permit No. 109 issued in accordance with the provisions of § 10.1-1408.1.A, Chapter 14, Title 10.1, Code of Virginia (1950), as amended.

6.3 Use Restrictions and Other Requirements

Under this proposed remedy, some contaminants remain in the soil and groundwater at the subject SWMUs above levels appropriate for residential uses. Because some contaminants remain in the soil and groundwater at the Facility at levels which exceed residential use, EPA's proposed decision requires the compliance with and maintenance of land and groundwater use restrictions at SWMUs 1 and 2.

The restrictions shall include, but not be limited to, the following land and groundwater use restrictions:

1. Groundwater at the Facility shall not be used for any purpose other than the operation, maintenance, and monitoring activities required by VADEQ in consultation with EPA, unless it is demonstrated to EPA, in consultation with VADEQ, that such use will not pose a threat to human health or the environment or adversely affect or interfere with the selected remedy and EPA, in consultation with VADEQ, provides prior written approval for such use;

2. The property within SWMU 1 and SWMU 2 shall not be used for residential purposes unless it is demonstrated to EPA, in consultation with VADEQ, that such use will not pose a threat to human health or the environment or adversely affect or interfere

with the final remedy, and EPA, in consultation with VADEQ, provides prior written approval for such use;

3. All earth moving activities, including excavation, drilling and construction activities, in the areas at SWMUs 1 and 2 at the Facility where any contaminants remain in soils above EPA's Screening levels for non-residential use or in groundwater above MCLs, or Tap Water RBCs, if applicable, shall be prohibited unless it is demonstrated to EPA, in consultation with VADEQ, that such activity will not pose a threat to human health or the environment or adversely affect or interfere with the final remedy, and EPA, in consultation with VADEQ, provides prior written approval for such use;

4. The Facility property will not be used in a way that will adversely affect or interfere with the integrity and protectiveness of the final remedy;

5. No new wells will be installed on Facility property unless it is demonstrated to EPA, in consultation with VADEQ, that such wells will not pose a threat to human health or the environment or adversely affect or interfere with the final remedy, and EPA, in consultation with VADEQ, provides prior written approval to install such wells.

In addition to the above use restrictions, the following obligations and requirements shall also be met. Owner agrees to allow the EPA, VADEQ, and/or their authorized agents and representatives, access to the Property to inspect and evaluate the continued effectiveness of the final remedy and, if necessary, to conduct additional remediation to ensure the protection of the public health and safety and the environment based upon the final remedy to be selected by EPA in the Final Decision and Response to Comments (FDRTC). In addition, the Facility shall provide EPA with a coordinate survey as well as a metes and bounds survey, of the Facility boundary. Mapping the extent of the land use restrictions will allow for presentation in a publicly accessible mapping program such as Google Earth or Google Maps.

If EPA or VADEQ determines that additional use restrictions or other corrective actions are necessary to protect human health or the environment, EPA and VADEQ have the authority to require and enforce such additional corrective actions, provided any necessary public participation requirements are met.

6.4 No Further Action

EPA is proposing No Further Action (NFA) for 19 SWMUs and 9 AOCs at the Facility that have been investigated and remediated or that have been investigated and determined to pose no unacceptable risk to human health and the environment. For a detailed description and environmental summary of the NFA SWMUs and AOCs, please refer to **Attachment A**.

Section 7: Evaluation of Proposed Remedy

This section provides a description of the criteria EPA used to evaluate the proposed remedy consistent with EPA guidance. The criteria are applied in two phases. In the first phase, EPA evaluates three decision threshold criteria as general goals. In the second phase, for those remedies which meet the threshold criteria, EPA then evaluates seven balancing criteria.

Threshold Criteria	Evaluation
1) Protective of Human Health and the Environment	With respect to soils, contaminated soil is below the surface and contained within Facility property. To prevent or control the exposure to impacted soil where contamination above residential screening levels remains in place, EPA has proposed land-use restrictions in order to minimize the potential for human exposure to that contamination. With respect to groundwater, while low levels of contaminants are present in the groundwater hydraulically downgradient of SWMU 2, the migration of such contaminants has stabilized and the contaminants have not migrated beyond the Facility property (see Exhibit 17). For this reason, the area of contaminated groundwater associated with SWMU 2 is contained. The groundwater monitoring program already in place for SWMU 2 will continue MCLs or background levels are met. In addition, the implementation of groundwater use restrictions will prevent the use of impacted groundwater at SWMU 2.
2) Achieve Media Cleanup Objectives	EPA's proposed remedy meets the appropriate cleanup objectives based on assumptions regarding current and reasonably anticipated land and groundwater use(s). The anticipated future land use for SWMUs 1 and 2 is non-residential. The majority of impacted soils contain contaminant concentrations that are below the Tier II SLs for residential use. For those areas where contaminant concentrations are above the Tier II SLs, use restrictions will be implemented to control potential risks and eliminate exposure pathways.

3) Remediating the Source of Releases	In all remedy decisions, EPA seeks to eliminate or reduce further releases of hazardous wastes or hazardous constituents that may pose a threat to human health and the environment. There are no remaining large, discrete sources of waste at the Facility from which hazardous constituents would be released to the environment. Wherever possible and practical, contaminated soils from SWMU 1 were excavated and disposed off-site. The Facility has remediated the source of releases from SWMU 2 through closure and post-closure activities as required by the VSWMR. In addition, the groundwater beneath SWMU 2 is actively monitored to ensure that contaminated groundwater is not migrating off-site. For both SWMUs 1 and 2, use restrictions will be established to control earth moving activities and restrict residential use at these units. Therefore, EPA has determined that this criterion has been met.

Balancing Criteria	Evaluation
4) Long-term effectiveness	The proposed remedy will remain protective of human health and the environment over time by controlling exposure to the hazardous constituents remaining in soils and groundwater. EPA's proposed remedy requires the compliance with and maintenance of land and groundwater use restrictions at the Facility. In addition, a groundwater monitoring program already in place for SWMU 2 will continue until groundwater clean-up standards are met.
5) Reduction of toxicity, mobility, or volume of the Hazardous Constituents	Contaminated soils were removed from SWMU 1 eliminating the known source of contamination and greatly reducing the toxicity, mobility and volume of hazardous constituents remaining in the soils. With respect to SWMU 2, the groundwater monitoring system confirms that contamination from SWMU 2 is not migrating off-site and the plume has stabilized. In addition, the Facility is required to monitor the groundwater annually to ensure that COCs are not being released and/or migrating from SWMU 2 above clean-up standards.
6) Short-term effectiveness	EPA's proposed remedy does not involve any activities, such as construction or excavation, which would pose short-term risks to workers, residents, and the environment.

7) Implementability	EPA does not anticipate any regulatory constraints in implementing its proposed remedy. EPA proposes to implement the use restrictions through an enforceable mechanism such as an order, environmental covenant and/or state regulations. With respect to SWMU 2, all necessary components for post-closure care and groundwater monitoring activities are being implemented under Permit No. 109 issued pursuant to the VSWMR.
8) Cost	EPA's proposed remedy is cost effective. The cost of the post-closure activities and groundwater monitoring of SWMU 2 is approximately $80,000 per year.
9) Community Acceptance	EPA will evaluate community acceptance of the proposed remedy during the public comment period and it will be described in the Final Decision and Response to Comments.
10) State/Support Agency Acceptance	VADEQ has reviewed and concurred with the proposed remedy for the Facility during November 2014. Furthermore, EPA has solicited VADEQ input and involvement throughout the investigation process at the Facility.

Section 8: Financial Assurance

EPA has evaluated whether financial assurance for corrective action is necessary to implement EPA's proposed remedy at the Facility. Given that EPA's proposed remedy does not require any further engineering actions to remediate soil, groundwater or indoor air contamination at this time and given that the post-closure activities and groundwater monitoring of SWMU 2 is approximately $80,000 per year, EPA is proposing that no financial assurance be required.

Section 9: Public Participation

Before EPA makes a final decision on its proposed remedy for the Facility, the public may participate in the decision selection process by reviewing this SB and documents contained in the Administrative Record (AR) for the Facility. The Index to the AR may be found in Section 10 of this SB. The AR contains all information considered by EPA in reaching this proposed remedy. It is available for public review during normal business hours at:

U.S. EPA Region III
1650 Arch Street
Philadelphia, PA 19103
Contact: Ed Hotham
Phone: (215) 814-2820
Fax: (215) 814-3113
Email: hotham.leonard@epa.gov

Interested parties are encouraged to review the AR and comment on EPA's proposed remedy. The public comment period will last thirty (30) calendar days from the date that notice is published in a local newspaper. You may submit comments by mail, fax, or e-mail to Mr. Ed Hotham. EPA will hold a public meeting to discuss this proposed remedy upon request. Requests for a public meeting should be made to Mr. Ed Hotham.

EPA will respond to all relevant comments received during the comment period. If EPA determines that new information warrants a modification to the proposed remedy, EPA will modify the proposed remedy or select other alternatives based on such new information and/or public comments. EPA will announce its final remedy and explain the rationale for any changes in a document entitled the Final Decision and Response to Comments (FDRTC). All persons who comment on this proposed remedy will receive a copy of the FDRTC. Others may obtain a copy by contacting Ed Hotham at the address listed above.

Date: 1.5.15

John A. Armstead, Director
Land and Chemicals Division
US EPA, Region III

Section 10: Index to Administrative Record

1. Draft RCRA Site Visit Report for Virginia Tech, prepared by Tetra Tech, Inc. for VADEQ and USEPA, April 2007.

2. Site Visit Memo to File, prepared by Jeanna R. Henry, USEPA Project Manager, September 28, 2010

3. 3008(h) Administrative Order on Consent, Docket No. RCRA-03-2010-0396CA, entered into by Virginia Tech and USEPA, September 29, 2010

4. Description of Current Conditions for Virginia Polytechnic Institute and State University, prepared by Environmental, Health and Safety Services Virginia Tech and Draper Aden Associates for USEPA, December 20, 2010

5. Supplemental Information associated with December 2010 Description of Current Conditions prepared by Virginia Tech for USEPA, July 1, 2011

6. Hazardous Materials Survey Report for Davidson Hall Virginia Polytechnic Institute and State University, prepared by Professional Service Industries, Inc. for Einhorn Yaffee Prescott Architecture & Engineering, P.C., September 25, 2008

7. Elizabeth Lohman, Environmental Program Planner, VADEQ, e-mail dated 5/14/2012 to Jeanna R. Henry, Project Manager, USEPA – addresses potential soil contamination discovered at Davidson Hall during renovation activities.

8. Elizabeth Lohman, Environmental Program Planner, VADEQ, e-mail dated 5/4/2012 to Rob Lowe, Project Manager, Virginia Tech, – addresses soil contamination discovered at Davidson Hall during renovation activities.

9. Closure of Davidson Hall Hazardous Waste Accumulation Area, Memo from Frank Imperatore to File, February 2, 2012

10. Correspondence from Draper Aden Associates to Elizabeth Lohman, VADEQ, Environmental Program Planner, regarding Davidson Hall Renovations and Soil Sampling Results and Recommendations, DAA Job No. B10131B-05, May 16, 2012

11. Correspondence from Virginia Tech to Jeanna Henry, USEPA, Project Coordinator, regarding Davidson Hall Soils Management, June 14, 2012

12. Quarterly Progress Report for Virginia Polytechnic Institute and State University, prepared by Environmental, Health and Safety Virginia Tech and Draper Aden Associates for USEPA, September 1, 2012

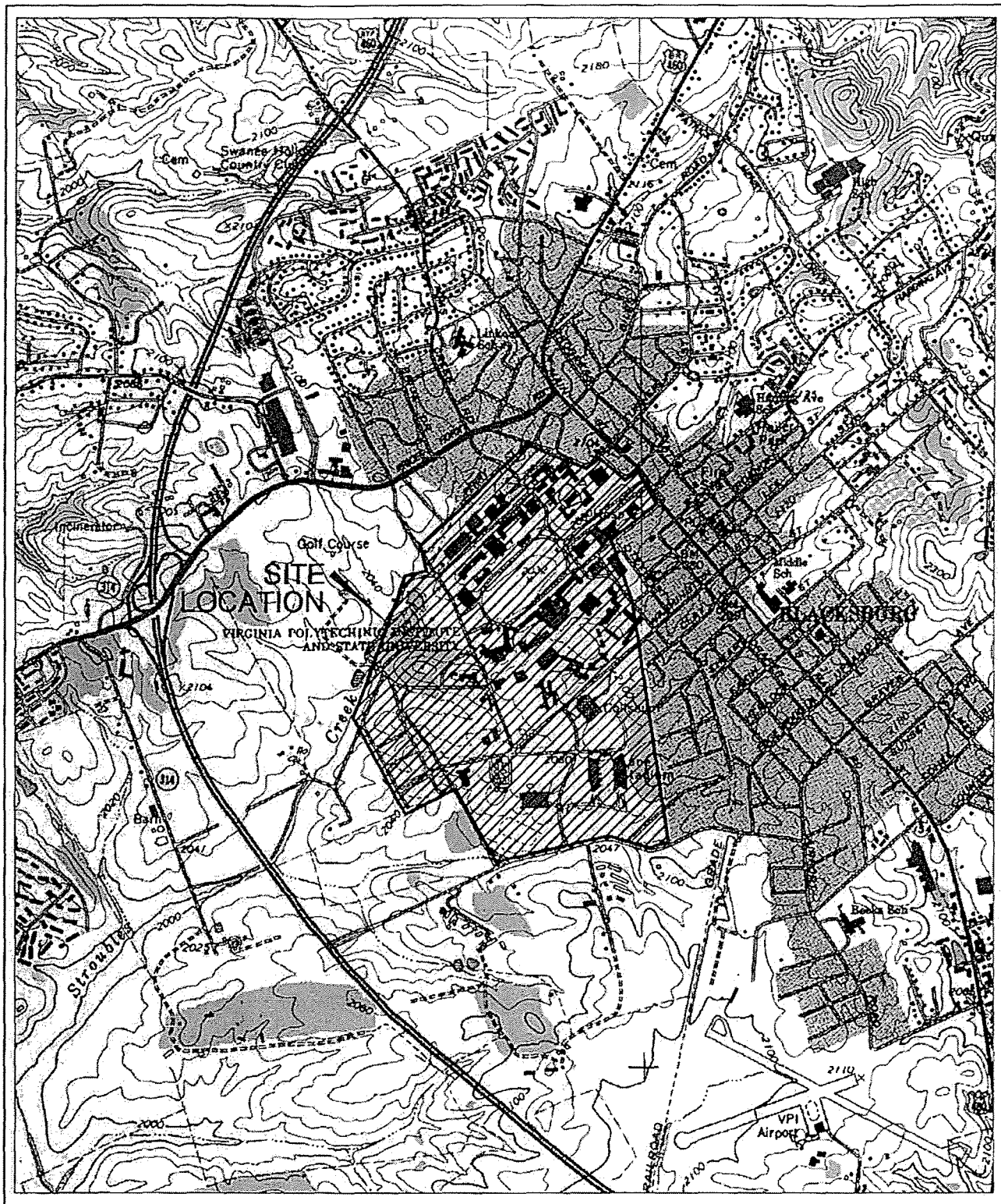
13. Davidson Hall Soil Sampling, prepared by Draper Aden Associates for USEPA, July 8, 2014

14. Quarterly Progress Report for Virginia Polytechnic Institute, prepared by Environmental, Health and Safety Virginia Tech and Draper Aden Associates for USEPA, December 1, 2012

15. Documentation of Environmental Indicator Determination, Current Human Exposures Under Control, completed by Jeanna Henry, EPA Project Manager, 3/21/2011

16. Documentation of Environmental Indicator Determination, Migration of Contaminated Groundwater Under Control, completed by Jeanna Henry, EPA Project Manager, 12/22/2011

17. Corrective Action Status Evaluation, prepared by Environmental, Health and Safety Virginia Tech and Draper Aden Associates, July 8, 2014



VIRGINIA

Quadrangle Location Map

0 2000 4000 Feet

N

SOURCE: U.S.G.S. TOPOGRAPHIC MAP (7.5 Minute)
BLACKSBURG, VIRGINIA.

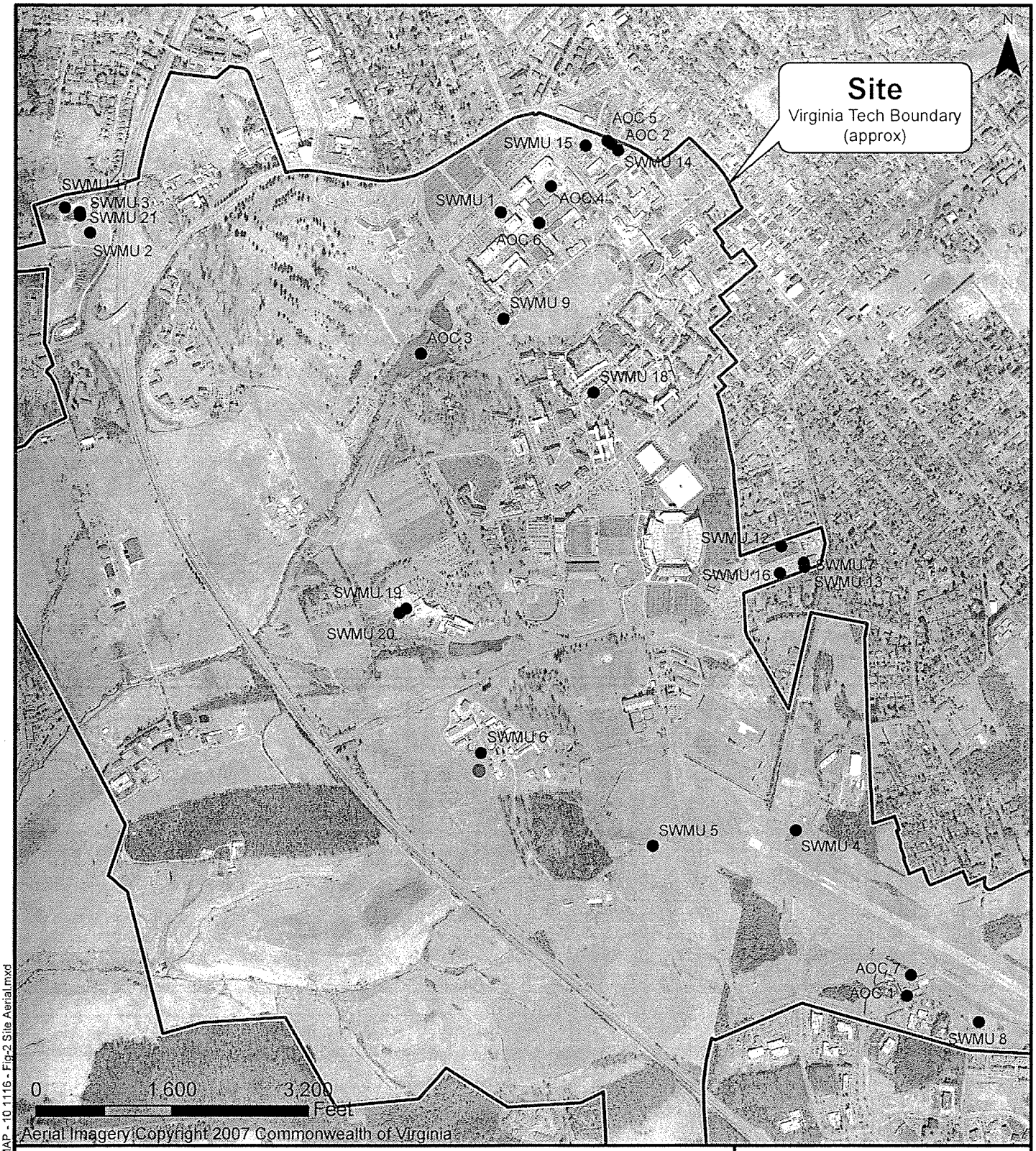
United States Environmental Protection Agency

VIRGINIA TECH
Blacksburg, Virginia

FIGURE 1
SITE LOCATION MAP

TETRA TECH EC, INC.

P:\Fls\2006\07\CAD\VA TECH\VA TECH FIG 1.dwg, 1/24/2007 3:41:03 PM



Path: P:\B10\100\B10131B\B10131B-05\GIS\MAP - 10 1116 - Fig-2 Site Aerial.mxd

Aerial Photograph

Description of Current Conditions
Virginia Polytechnic Institute and State University
Blacksburg, Virginia
EPA Administrative Order on Consent
Docket No. RCRA-03-2010-0396CA

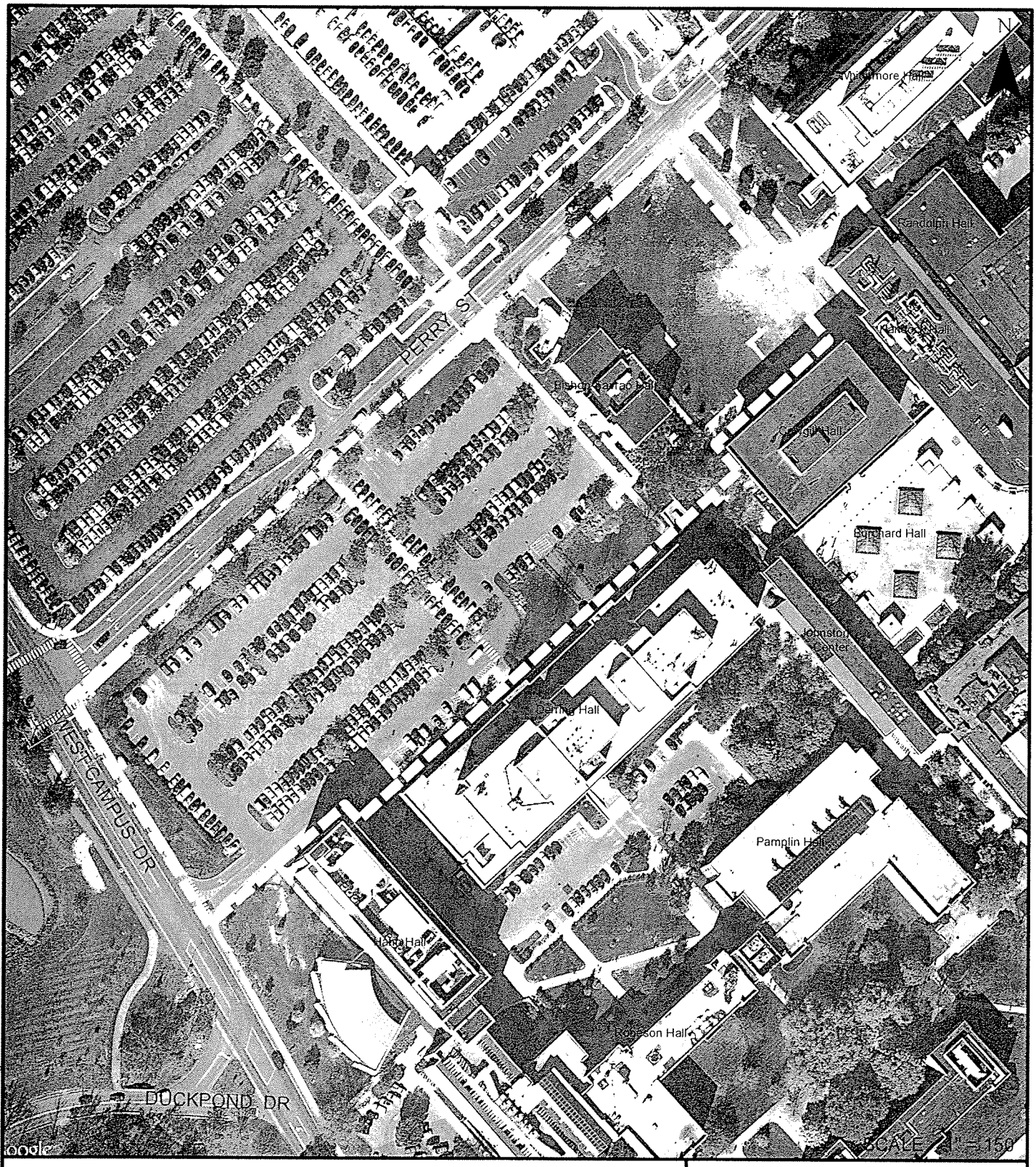
SCALE 1" = 1600'

PLAN NO. B10131B-05

Draper Aden Associates
Engineering • Surveying • Environmental Services
2206 South Main Street
Blacksburg, VA 24060
540-552-0444 Fax: 540-552-0291
Richmond, VA
Charlottesville, VA
Hampton Roads, VA

DESIGNED SN
DRAWN MF
CHECKED SN
DATE 11-23-10

FIGURE
2



Area Limited to Non-Residential Buildings

Virginia Polytechnic Institute and State University
Blacksburg, Virginia

0 150 300 Feet

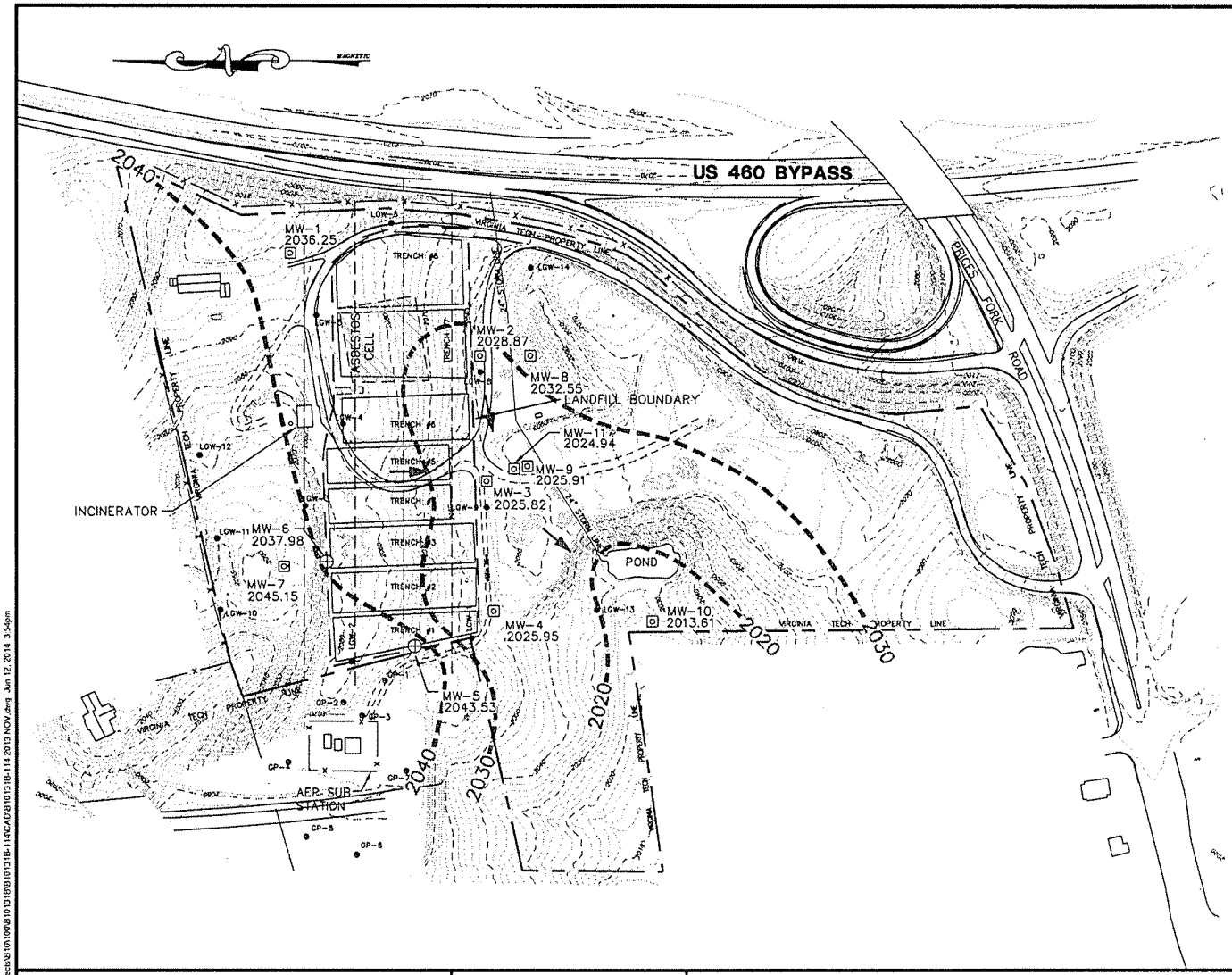
Aerial Imagery: Oct. 24, 2011, Google Maps licensed via Arc2Earth.com

Draper Aden Associates
Engineering • Surveying • Environmental Services
2206 South Main Street
Blacksburg, VA 24060
540-552-0444 Fax: 540-552-0291
Richmond, VA
Charlottesville, VA
Hampton Roads, VA

DESIGNED	SN
DRAWN	MF
CHECKED	SN
DATE	08-08-12

FIGURE 3

Path: P:\B10\100\B10131B\B10131B-05\GIS\MAP - 12 0808 - Fig-1 non-Residential.mxd



WELL	GROUND ELEVATION (FT.)	PVC RISER (FT.)	CASING ELEVATION (FT.)
MW-1	2097.50	2.44	2099.94
MW-2	2055.70	2.98	2058.68
MW-3	2056.50	2.27	2058.77
MW-4	2054.40	2.12	2056.52
MW-5	2071.56	2.68	2074.24
MW-6	2079.00	2.59	2081.59
MW-7	2056.00	3.00	2059.00
MW-8	NA	NA	2058.03
MW-9	NA	NA	2065.63
MW-10	NA	NA	2035.44
MW-11	NA	NA	2064.47

LEGEND

- ASBESTOS AREA
- LANDFILL BOUNDARY
- PROPERTY LINE
- TOPOGRAPHIC CONTOURS
- MW-3 2025.82 — GROUNDWATER MONITORING WELL GROUNDWATER ELEVATION
- MW-6 2037.98 — PIEZOMETER (USED ONLY TO OBTAIN GROUNDWATER ELEVATIONS) GROUNDWATER ELEVATION
- GROUNDWATER FLOW DIRECTION
- 2040 — GROUNDWATER POTENTIOMETRIC SURFACE (BASED ON NOVEMBER 18, 2013 GROUNDWATER ELEVATION DATA)

GRAPHIC SCALE

200 0 100 200 400

(IN FEET)

1 Inch = 200 ft.

Draper Aden Associates
Engineering • Surveying • Environmental Services
2206 South Main Street
Blacksburg, VA 24060
540-552-0444 Fax: 540-552-0291
Richmond, VA
Charlottesville, VA
Hampton Roads, VA

DESIGNED	RGM
DRAWN	DLD
CHECKED	MDL
DATE	04-29-14

POTENTIOMETRIC SURFACE MAP - 11/18/2013
VIRGINIA TECH SANITARY LANDFILL
BLACKSBURG, VIRGINIA

SCALE: 1"=200'

PLAN NO. B10131B-114

FIGURE 4

V:\draperaden.net\data\Projects\B10\0008101318\B10131B-114\CAD\B10131B-114 2013 NOV.dwg Jun 12, 2014 3:54pm

ATTACHMENT A

NO FUTHER ACTION DETERMINATION

VIRGINA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

BLACKSBURG, VIRGINIA

EPA ID No. VAD074747908

Supporting Information for
No Further Action Determination

Based on a review of all available information, EPA and VADEQ November 8, 2006 and September 23, 2010 Site visits, and discussions with Facility representatives, EPA has concluded that there are no unaddressed releases of hazardous waste or hazardous constituents from the SWMUs and AOCs described below. All documents on which EPA's proposed decision is based are contained in the Administrative Record (AR) and available upon request.

1. SWMU 3 – Closed Pathological Incinerator

SWMU 3 is located to the west of the Route 460 Bypass and to the north of Prices Fork Road, adjacent to SWMU 2. VADEQ issued Virginia Tech a solid waste permit (Permit No. 185) on April 30, 1975 for the operation of this unit (ECP Model 1000-T Oil-Fired Pathological Incinerator), which was used to incinerate pathological waste. The incinerator accepted animal wastes generated by various Virginia Tech animal research and production facilities and typically operated one day per week. Wastes were delivered to the incinerator facility by the individual generators where they were immediately loaded into the charging chute of the incinerator and incinerated.

On January 7, 2003, Virginia Tech submitted a Closure Plan for the incinerator which was subsequently approved by VADEQ on April 17, 2003. Closure activities included the removal of all waste residuals (ash), decontamination of all interior building surfaces that may have come into contact with pathogens, and dismantling and removal of incinerator equipment. All waste residuals were shipped off-site for disposal to a permitted sanitary landfill, and the dismantled incinerator equipment was either shipped off-site for recycle or disposed. On February 24, 2004, Virginia Tech submitted a Certification of Closure to VADEQ for SWMU 3. In correspondence dated April 5, 2004, VADEQ confirmed closure of SWMU 3 in accordance with the approved Closure Plan.

EPA has concluded that this unit does not pose an unacceptable risk to human health and/or the environment taking into consideration there are no known or documented releases or environmental impacts associated with SWMU 3; the incinerator was housed within a brick building constructed with a concrete floor ensuring any spills would have been contained; and, staining was not observed in the area of the building that housed the unit. Moreover, the wastes handled by this unit did not contain hazardous constituents.

2. SWMU 4 – Closed Sanitary Landfill (Permit No. 248)

On June 16, 1978, Virginia Tech was issued Solid Waste Permit No. 248 by the Virginia Department of Health for the operation of a sanitary landfill (SWMU 4). The landfill was only

permitted to receive institutional fly ash, presumably from Virginia Tech's coal-fired Power Plant (SWMU 14). According to the Permit, SWMU 4 is located at the western end of the east-west runway at the Virginia Tech Airport (now known as the Virginia Tech Montgomery Executive Airport) located on Ramble Road. The landfill was closed by the Virginia Department of Waste Management prior to 1988.

EPA has concluded that this unit does not pose an unacceptable risk to human health and/or the environment. There are no known or documented releases or environmental impacts associated with SWMU 4.

3. SWMU 5 – Asbestos Waste Storage Trailer

During university maintenance and renovation projects, small amounts of asbestos wastes are generated (e.g., pipe insulation, floor tiles). These wastes are contained and stored in a designated, locked storage trailer (SWMU 5) located on Tech Center Drive. Once the trailer contains a sufficient amount of material, the asbestos waste is shipped off-site in accordance with applicable regulations to a permitted asbestos landfill (i.e., H.A.M. Sanitary Landfill in Peterstown, WV).

EPA has concluded that this unit does not pose an unacceptable risk to human health and/or the environment. There are no known or documented releases or environmental impacts associated with SWMU 5.

4. SWMU 6 – Dairy Science Lagoons

The Virginia Tech Dairy Science Center (Center) is located at the intersection of Southgate Drive and the Route 460 Bypass. The Dairy Science Center maintains the university's dairy herd and includes feed lot, feed storage, milking center, barn, offices and other associated buildings. Manure generated from the feed lot and barn is conveyed by water to manure lagoons located at the Center under General Permit No. VPG100013. SWMU 6 includes three concrete-lined lagoons used by the Center to manage animal waste and an unlined lagoon used to manage stormwater.

Historically, the unlined lagoon, currently used to manage the Center's stormwater, was used to manage a mixture of manure and water. In February 1994, the unlined lagoon was filled to the point of overflowing during a period of wet weather. A Virginia Tech employee siphoned the excess manure and water to prevent an overflow and possible breaching of the lagoon. VADEQ was notified regarding the discharge and it was discovered during an inspection that the discharge manure/water mixture was being directed to a tributary of Stroubles Creek, resulting in the issuance of a Notice of Violation (NOV) by VADEQ on April 8, 1994.

Immediately following the VADEQ inspection, Virginia Tech partially emptied the lagoon and shipped the effluent to the local publically owned treatment works (POTW) for treatment. Analysis of the material that was siphoned from the lagoon indicated that human waste was present

in the manure/water mixture. A subsequent investigation of the restrooms and sinks at the Center revealed they discharged to the manure lagoon. The restrooms were immediately closed and portable toilets were installed on-site until a new sanitary sewer line could be constructed and connected to the restrooms. Following the 1994 release, Virginia Tech also developed a University Nutrient Management Plan which specifies how manure is managed and land applied under the its Virginia Pollution Abatement (VPA) Permit, issued by VADEQ on March 10, 1995.

EPA has concluded that this unit does not pose an unacceptable risk to human health and/or the environment taking into consideration there are no known environmental impacts associated with SWMU 6 and the wastes handled by this unit did not contain hazardous constituents. The Center's lagoons are managed under VADEQ oversight.

5. SWMU 7 – Sterrett Center Maintenance Complex Former Hazardous Waste Accumulation Area

The former hazardous waste accumulation area located at the Sterrett Center Maintenance Building was a less than 90-day accumulation unit used to store hazardous lead and paint related wastes generated from maintenance activities. This unit consisted of an exterior concrete pad surrounded by a wire fence with a capacity of approximately twenty 55-gallon drums.

In correspondence dated April 26, 1993, Virginia Tech notified VADEQ of its intent to close SWMU 7 and transfer hazardous waste from this accumulation area to another hazardous waste accumulation area (SWMU 8) located at the Virginia Tech Airport. All wastes would be removed from SWMU 7 and transferred to SWMU No. 8 by April 29, 1993. The concrete pad and wire fence associated with SWMU No. 7 were removed and shipped off-site for disposal. The adjacent maintenance facility was expanded and now covers the area where SWMU 7 was previously located.

EPA has concluded that this unit does not pose an unacceptable risk to human health and/or the environment. There are no known or documented releases or environmental impacts associated with SWMU 7. This former hazardous waste accumulation area was used to accumulate hazardous wastes in containers on a concrete pad. In the event of a spill, the concrete would ensure containment of the spilled material avoiding a release of hazardous waste or hazardous constituents into the environment. In addition, access to the accumulation area was restricted to protect against improper management of the hazardous wastes. All materials of construction associated with this unit have been removed from the Facility and properly disposed off-site.

6. SWMU 8 – Virginia Tech Airport Former Hazardous Waste Accumulation Area

SWMU 8, located on Ramble Road, was Virginia Tech's main less than 90-day hazardous waste accumulation area used to store hazardous and non-hazardous waste. This unit, commonly referred to as "the Hill," was in operation between 1995 and 2010. SWMU 8 consists of a covered concrete

pad, two waste storage buildings, and various storage areas for supplies all surrounded by a locked, barbed wire fence. Hazardous and non-hazardous wastes generated by the University were transported to SWMU 8 from various waste accumulation areas and shipped off-site for disposal. Hazardous wastes were segregated by class and stored in the waste storage buildings. Non-regulated, petroleum and electronic wastes were stored on the covered pad.

In October 2010, Virginia Tech opened its newly constructed Materials Management Facility (MMF); as a result, all wastes were removed from SWMU 8 and either shipped off-site or transferred to the MMF, and all hazardous and non-hazardous wastes are now stored at the new MMF.

EPA has concluded that SWMU 8 does not pose an unacceptable risk to human health and/or the environment. To safe guard against vandalism and/or improper management of hazardous waste, access to the accumulation area was restricted to selected Virginia Tech employees. No major spills, leaks or releases have occurred at SWMU 8 and there are no known environmental impacts associated with this unit. Minor releases of petroleum at the site have been contained and immediately cleaned up. EPA did not observe any staining or signs of releases for this area during its November 2006 and September 2010 Site visits.

7. SWMU 9 – Former Davidson Hall Hazardous Waste Accumulation Area

SWMU 9 was a less than 90-day hazardous waste accumulation area located in Room 15 of the former Davidson Hall located at Drillfield Drive. This unit was equipped with secondary containment. Containers of hazardous waste were accumulated in metal cabinets, on open metal shelves, the floor, and in covered bins. The wastes were transferred from SWMU 9 to SWMU 8 up until October 2010, at which time SWMU 8 was taken out of operation and all hazardous wastes were transferred to Virginia Tech's new MMF. SWMU 9 underwent closure on February 2, 2012 which is documented in a Virginia Tech Memo from Frank Imperatore to File.

EPA has concluded that this unit does not pose an unacceptable risk to human health and/or the environment. There are no known or documented releases or environmental impacts associated with SWMU 9. This former hazardous waste accumulation area was used to accumulate hazardous wastes in containers on a concrete pad. In the event of a spill, the concrete would ensure containment of the spilled material avoiding a release of hazardous waste or hazardous constituents into the environment. In addition, access to the accumulation area was restricted to protect against improper management of the hazardous wastes. All materials of construction associated with this unit were removed and disposed following demolition of the section of Davidson Hall that housed SWMU 9.

8. SWMU 10 – Former Hazardous Waste Accumulation Areas; HWMU 1, HWMU 2, HWMU 3 and HWMU 4

SWMU 10 includes four former less than 90-day hazardous waste accumulation areas in the following locations:

- Room 13-A located in the Health and Safety Building. This former hazardous waste accumulation area, formerly referred to as Hazardous Waste Management Unit (HWMU) 1 consisted of a flammable storage cabinet used to store mercury and flammable materials. This unit was in operation from pre-January 1992 until January 1994.

- Room 15 located in the basement of Davidson Hall. This former hazardous waste accumulation area, formerly referred to as HWMU 2, consisted of three metal cabinets, one set of open-face metal shelves, and an area of concrete floor under a 4'x4' wooden table. This unit was used to accumulate ignitable, corrosive and toxic characteristic wastes, in addition to listed spent halogenated and non-halogenated solvents between November 1991 and 1996.

- Room 4 located in the basement of Randolph Hall. This former hazardous waste accumulation area, formerly referred to as HWMU 3, consisted of a 14'x18' section of cement floor and was used to accumulate ignitable, corrosive and toxic characteristic wastes, in addition to listed spent halogenated and non-halogenated solvents. The dates of operation for this unit are unknown.

- Section of the Insecticide and Fungicide Storage Building located at the Glade Road Plant Pathology Facility. This former hazardous waste accumulation area, formerly referred to as HWMU 4, consisted of six metal shelves used to store various pesticides. In 1991, a 5-gallon container holding a mixture of kerosene/crude oil, water, sand, and sodium dodecyl butane sulfonate (surfactant) was found to be leaking. The leaked material was immediately cleaned up by Virginia Tech personnel. This unit was in operation for six years; however, the exact dates of operation are unknown.

During VADEQ compliance inspections conducted in 1991, 1992, 1993, and 1994, it was discovered that several containers of hazardous waste in each of the areas identified above had been stored on-site for greater than 90-days. As a result, the Facility was found to be in violation of VHWMR and operating without a permit. Virginia Tech was issued an Enforcement Order by VADEQ on March 8, 1995, which required the Facility to develop a Closure Plan for each of the areas. The Closure Plan included sampling and analysis to determine whether contamination existed at either of these units. In correspondence dated June 8, 1999, VADEQ confirmed closure of HWMUs 1-4 (SWMU 10) in accordance with the approved Closure Plan.

EPA has concluded that SWMU 10 does not pose an unacceptable risk to human health and/or the environment. All potential hazards posed by this unit have been addressed by VADEQ.

9. SWMU 11 – Satellite Hazardous Waste Accumulation Areas

Virginia Tech operates over 1,000 research laboratories throughout its campus. Each laboratory has the potential to generate hazardous waste, which would be initially accumulated in a satellite accumulation area (SAA) within the laboratory. The following bullets provide examples of SAAs that are included as part of SWMU 11:

- Former Davidson Hall Chemistry Laboratories, formerly referred to as HWMU 7;
- Derring Hall Chemistry and Biology Laboratories, formerly referred to as HWMU 8;
- Hahn Hall Chemistry Laboratories, formerly referred to as HWMU 9;
- Norris Hall Environmental Engineer Laboratory, formerly referred to as HWMU 10; and,
- Randolph Hall Chemical Engineering Laboratories, formerly referred to as HWMU 11.

EPA has concluded that the SAAs operated by Virginia Tech do not pose an unacceptable risk to human health and/or the environment. All laboratories, or other areas that use chemicals, are governed by the University's Chemical Safety Program which covers the proper management of hazardous materials. The hazardous wastes are managed in containers within buildings. In the event a spill or leak did occur at one of these areas, the hazardous wastes or hazardous constituents would be contained within the generating laboratory. In addition, each laboratory is regularly inspected by Virginia Tech's Environmental Health and Safety (EHS) personnel for safety and compliance. There are no known or documented releases or environmental impacts associated with these units.

10. SWMU 12 – Sterrett Facilities Complex Bay 3 Hazardous Waste Accumulation Area

SWMU 12 consists of a flammable storage cabinet that is used to accumulate hazardous paint and solvent waste generated by the Sterrett Facilities Complex (referred to as Bay 3) paint shop. The wastes are accumulated in containers and placed in the flammable storage cabinet that is situated on asphalt. In the event of a spill, the asphalt would ensure containment of the spilled material avoiding a release of hazardous waste or hazardous constituents to the environment SWMU 12 is inspected weekly to ensure the proper management of hazardous waste.

EPA has concluded that this unit does not pose an unacceptable risk to human health and/or the environment. There are no known or documented releases or environmental impacts associated with SWMU 12.

11. SWMU 13 – Former Sterrett Facilities Complex Buildings and Grounds Former Hazardous Waste Accumulation Area

This former SWMU was a less than 90-day hazardous waste accumulation area located in the Sterrett Facilities Complex and was used to accumulate paint and paint thinner wastes. EPA has

concluded that this unit does not pose an unacceptable risk to human health and/or the environment. There are no known or documented releases or environmental impacts associated with SWMU 13. Wastes accumulated in this area were in containers on a concrete pad. In the event of a spill, the concrete would ensure containment of the spilled material avoiding a release of hazardous waste or hazardous constituents into the environment.

12. SWMU 14 – Power Plant

Virginia Tech operates a Title V permitted Power Plant that generates steam for heating the majority of the buildings on campus. The Power Plant was constructed in the 1920s, and consists of two coal fired boilers and three natural gas boilers, with fuel oil as a backup fuel source. Ash from the Power Plant is sent to a local sanitary landfill for use as alternate daily cover.

The coal at the Power Plant is stored in a coal yard adjacent to the facility. Storm water run-off from the coal pile is directed to a drop inlet which leads to a sedimentation tank (SWMU 15). Virginia Tech monitors and addresses storm water discharge in accordance with the facility Virginia Pollutant Discharge Elimination System (VPDES) storm water discharge permit and in accordance with the Virginia State Water Control Law.

EPA has concluded that this unit does not pose an unacceptable risk to human health and/or the environment. There are no known or documented releases or environmental impacts associated with SWMU 14.

13. SWMU 15 – Sedimentation Tank at Coal Yard

Storm water runoff from the Power Plant (SWMU 14) coal yard is directed to a drop inlet which leads to a sedimentation tank, SWMU 15. Coal fines settle out of the storm water into the sedimentation tank and are periodically removed and transported off-site for disposal at a local sanitary landfill. The water is discharged to the Blacksburg Virginia Polytechnic Institute (VPI) Sanitary Authority's Wastewater Treatment Plant.

EPA has concluded that this unit does not pose an unacceptable risk to human health and/or the environment. There are no known or documented releases or environmental impacts associated with SWMU 15.

14. SWMU 16 – Maintenance Shop Parts Washers

The Facility operates 9 parts washers in various maintenance shops, including the Motor Pool Building. EPA has concluded that SWMU 16 does not pose an unacceptable risk to human health and/or the environment. There are no known or documented releases or environmental impacts associated with the parts washers which are managed on a concrete pad. In the event of a spill,

the concrete would ensure containment of the spilled material avoiding a release of hazardous waste or hazardous constituents into the environment.

15. SWMU 17 – Former Universal Waste Accumulation Area

Virginia Tech collects universal waste, such as spent fluorescent bulbs and ballasts, generated throughout the Facility. These wastes are managed in containers, typically cardboard boxes. Prior to 2011, the Facility's universal wastes were stored in a box trailer located behind the closed incinerator building (SWMU 3) for accumulation prior to off-site shipment. In early 2011, the Facility ceased using SWMU 17 for the accumulation of universal wastes. These wastes are now stored at the Facility's MMF prior to off-site shipment.

EPA has concluded that SWMU 17 does not pose an unacceptable risk to human health and/or the environment. There are no known or documented releases or environmental impacts associated with SWMU 17.

16. SWMU 18 – Hydraulic Trash Compactors

The Facility utilizes six hydraulic trash compactors, including one at the West End Dining Hall as observed during the November 2006 Site visit. These units are situated on top of impermeable surfaces, such as concrete or asphalt. Two known small releases of hydraulic oil have occurred from the hydraulic lines associated with the compactors being accidentally broken. Both releases were immediately contained and cleaned up by the Facility. EPA has concluded that SWMU 18 does not pose an unacceptable risk to human health and/or the environment. There are no known or documented environmental impacts associated with these units. The wastes handled by this unit do not contain hazardous waste or hazardous constituents.

17. SWMU 19 – Former Animal Carcass Rendering Unit

Virginia Tech formerly operated an animal carcass rendering unit at the Veterinary Hospital that was used to render animal carcasses from the hospital or other animal related areas on campus. The liquids from the unit were discharged to the sanitary sewer and the rendered solid material was transported off-site for disposal in a local sanitary landfill. The carcasses formerly processed by this unit are now transported off-site for disposal in a local sanitary landfill.

EPA has concluded that this unit does not pose an unacceptable risk to human health and/or the environment. There are no known or documented environmental impacts associated with this unit. The unit is located inside a building constructed with a concrete floor ensuring any spills would have been contained. The wastes handled by this unit did not contain hazardous waste or hazardous constituents.

18. SWMU 20 – Medical Waste Storage Shed

SWMU 20 is located behind the Veterinary Hospital and is used to accumulate animal and human medical waste (blood, fluids, etc.), medical devices and sharps. These wastes are generated primarily from the Veterinary Medicine Complex, in addition to various other locations throughout the Facility. From SWMU 20, the medical waste is shipped off-site to a regulated medical waste treatment and disposal facility. There are no known or documented environmental impacts associated with these units.

EPA has concluded that this unit does not pose an unacceptable risk to human health and/or the environment. There are no known or documented environmental impacts associated with these units. The wastes handled by this unit do not contain hazardous waste or hazardous constituents.

19. SWMU 21 – Former Mass Burn Facility

Prior to operation of SWMU 2, the Facility's closed sanitary landfill (Permit No. 109), Virginia Tech operated a mass burn incinerator (SWMU 21) which was located in the same building as the former closed pathological incinerator (SWMU 3). Solid waste generated by the Facility was transported to the unit to be incinerated. This unit was taken out-of-service and dismantled prior to 1980 as a result of changes in air pollution regulations to cover these types of units. Therefore, due to the time period of operation, no records of operation for the former Mass Burn Facility exist. The location and operation of this unit is based on an examination of the remaining building that housed the unit.

EPA has concluded that this unit does not pose an unacceptable risk to human health and/or the environment. There are no known or documented releases or environmental impacts associated with SWMU 3, as evidenced by active groundwater monitoring of SWMU 2 located hydraulically downgradient. In addition, the incinerator was housed within a brick building constructed with a concrete floor ensuring any spills would have been contained.

20. AOC 1 – Virginia Tech Airport Aviation Fuel Release

On May 3, 1994, a leak of aviation fuel was discovered coming from one of the manholes used to enter the 12,000-gallon aboveground aviation fuel tank at the Virginia Tech Airport. Approximately 2,400-gallons of aviation fuel was released due to an improperly installed gasket on the manhole. VADEQ issued Pollution Complaint Number 1994-3737 in response to the release. The release was remediated through free product recovery trenches, soil vapor extraction and air sparging, excavation of contaminated soil, and groundwater monitoring.

The success of the remediation and potential impacts of the release were evaluated in an Initial Abatement Measures and Site Characterization Report dated August 25, 1994. Characterization of the site indicated successful remediation of the release and no significant risk to human health of the environment was identified. Following VADEQs review of the information presented in

the August 1994 report, VADEQ notified Virginia Tech on November 18, 1994 that no further action was required for the release of aviation fuel.

EPA has concluded that AOC 1 does not pose an unacceptable risk to human health and/or the environment. All potential hazards posed by AOC 1 have been addressed by VADEQ.

21. AOC 2 – Fuel Release from Power Plant

On June 18, 1995, a sheen was discovered on the Duck Pond (AOC 3), a man-made pond located on the Virginia Tech campus fed by two major branches of Stroubles Creek. The source of the sheen was determined to be a release of No. 6 Fuel Oil from a leaking supply line at the Power Plant (SWMU 14) which was entering a stormwater drain. An estimated 1,400-gallons of fuel oil was spilled; however, the majority of the fuel was contained in a coal elevator pit at the Power Plant. VADEQ was immediately notified and Pollution Complaint No. 95-0682 was issued. A Pollution Complaint Initial Abatement Measures Report dated July 1995 detailing the action taken to contain, abate, and clean up the release was provided to VADEQ on July 11, 1995. Subsequently, VADEQ closed this Pollution Complaint with no further action required on July 14, 1995.

EPA has concluded that AOC 2 does not pose an unacceptable risk to human health and/or the environment. All potential hazards posed by this unit have been addressed by VADEQ.

22. AOC 3 – Duck Pond/Stroubles Creek

The Duck Pond is located on the Virginia Tech campus and was created in the 1930s by erecting a dam along Stroubles Creek and is fed by two major branches of Stroubles Creek, a tributary of the New River which flows north into the Kanawha River. Due to the topography of the Town of Blacksburg, the Duck Pond also receives storm water and runoff from streets and properties throughout the town, in addition to the Virginia Tech campus.

EPA has concluded that AOC 3 does not pose an unacceptable risk to human health and/or the environment. There is no known risk to human health or impacts to the environment associated with past releases to the Duck Pond. To ensure the water quality of the Duck Pond and Stroubles Creek, VADEQ monitors these surface water bodies under the Total Maximum Daily Load (TMDL) Program. In addition, Virginia Tech installed a boom attachment system at the Duck Pond so that booms can be deployed quickly to contain a release at the pond.

23. AOC 4 – Hydraulic Fluid Release from Wind Tunnel

In February 1994, approximately 600-gallons of hydraulic fluid was released from the Wind Tunnel located on Barger Street due to a mechanical failure. The release occurred during a

significant storm. Most of the hydraulic fluid was contained at the source; however, a small amount was released into the storm sewer and eventually to the Duck Pond. VADEQ was immediately notified and Pollution Control No. 1994-1796 was issued. A Pollution Complaint Initial Abatement Measures Report dated February 1994 detailing the action taken to contain, abate, and clean up the release was provided to VADEQ. Subsequently, VADEQ closed this Pollution Complaint with no further action required on October 25, 1994.

EPA has concluded that AOC 4 does not pose an unacceptable risk to human health and/or the environment. All potential hazards posed by this unit have been addressed by VADEQ.

24. AOC 6 – MW-6 – Up gradient Well at SWMU 1

AOC 6 is associated with SWMU 1 and is addressed under Section 3.1.A of the Statement of Basis to which this No Further Action determination is attached.

25. AOC 7 – Former Virginia Tech Airport

The former Virginia Tech Airport was formerly operated by Virginia Tech. The airport is now known as the Virginia Tech Montgomery Executive Airport and is operated by an authority comprised of Virginia Tech, the Town of Blacksburg, and Montgomery County. Virginia Tech owns the airport property and assists with the management of wastes generated by airport activities.

With the exception of the aviation fuel release in 1994 that was remediated under the direction of VADEQ (AOC 1), there are no other known or documented releases for the airport. Therefore, EPA has concluded that AOC 7 does not pose an unacceptable risk to human health and/or the environment.

26. AOC 8 – Remote Detonation Site

In February 1987, an emergency permit was issued to Virginia Tech for the detonation of old peroxides and ethers that were discovered in laboratories at the university. The materials were deemed too dangerous to transport to a waste disposal facility. Instead the Virginia State Police transported the waste to an off-site location and detonated the materials.

EPA has concluded that AOC 8 does not pose an unacceptable risk to human health and/or the environment. There are no known or anticipated environmental impacts associated with the management of these materials, which were ultimately removed from the Facility.

27. AOC 9 – Davidson Hall Soil Contamination

Davidson Hall is a chemistry building located at Drill field Drive undergoing renovation and reconstruction. Davidson Hall was first constructed in 1926 with additions in 1932 and 1937. Part of the original 1926 structure is being renovated and the remaining building has been demolished. In preparation for the demolition work, Professional Service Industries, Inc. (PSI) was contracted in 2008 to complete a Hazardous Materials Survey (Survey) of the building. The September 2008 Survey included the collection and analysis of composite soil samples (CS-1 and CS-2) from the east and west side of the building (outside of the building footprint).

EPA compared the sampling results to the EPA Region 3 Risk-Screening Levels (RSLs) for residential soil and industrial soil use or the values derived from the EPA Soil Screening Level (SSL) guidance for migration from soil to air or groundwater assuming residential use.

The Survey identified the presence of benzo(a)anthracene and benzo(b)fluoranthene above their respective EPA Region 3 RSLs for residential soil. Arsenic, chromium, mercury, and benzo(a)pyrene were detected at concentrations above their respective EPA Region 3 RSLs for industrial soil in one or both samples. Please refer to the tables below for a summary of the COCs detected in samples CS-1 and CS-2.

Sample CS-1			
Constituent	**Concentration**	**VRP Tier II SL[a]**	**VRP Tier III SL[a]**
Arsenic[b]	**4.4 mg/kg**	0.390 mg/kg	**1.60 mg/kg**
Chromium[c]	**19 mg/kg**	0.290 mg/kg	**5.60 mg/kg**
Mercury	**5.2 mg/kg**	1.000 mg/kg	**4.30 mg/kg**
Selenium	10 mg/kg	390 mg/kg	5,100 mg/kg

Sample CS-2			
Constituent	**Concentration**	**EPA Residential Soil Screening Level**	**EPA Industrial Soil Screening Level**
Antimony	5.1 mg/kg	31 mg/kg	410 mg/kg
Arsenic[b]	**3.6 mg/kg**	0.390 mg/kg	**1.60 mg/kg**
Chromium[c]	**19 mg/kg**	0.290 mg/kg	**5.60 mg/kg**
Mercury	**52 mg/kg**	10 mg/kg	**43 mg/kg**

Benzo(a)anthracene	**1.6 mg/kg**	0.150 mg/kg	2.10 mg/kg
Benzo(b)fluoranthene	**1.7 mg/kg**	0.150 mg/kg	2.10 mg/kg
Benzo(a)pyrene	**1.3 mg/kg**	0.015 mg/kg	**0.21 mg/kg**

(a) VRP Tier II SLs revised on 7/19/12.
(b) The risk-based SL for arsenic is usually below the naturally occurring background concentration. The levels of arsenic detected are representative of background levels (6.68 to 10.3 mg/kg) based on a statistical comparison of on-site arsenic levels to background levels.
(c) Results compared to Carcinogenic SL for Chromium (VI).
(d) VRP Tier III SLs revised on 6/26/12.

As part of the Davidson Hall construction project, soils were excavated from the Site. On May 9, 2012, on behalf of Virginia Tech, Draper Aden Associates (DAA) collected composite soil samples from three stockpiles of soil (samples SP-1 through SP-3) excavated from within the footprint of Davidson Hall, in addition to six grab soil samples (SMP-4 through SMP-9) from areas where excavation was to occur. The soil sample locations, analytical results and a discussion on sampling procedures and interpretation are documented in a May 16, 2012 letter/report from DAA to Virginia Tech.

The soil samples were analyzed for total mercury, TCLP (toxicity characteristic leaching procedure) mercury and benzo(a)pyrene. The soil samples were analyzed for TCLP mercury to determine if the soils would be characterized as a hazardous waste. Total mercury concentrations from all samples were below the Region 3 RSLs for residential soil, and TCLP mercury results for all samples were below the laboratory detection limit. Benzo(a)pyrene concentrations reported in samples collected from the three soil stockpiles (SP-1 through SP-3), and the subgrade soil sample SMP-8 exceeded the EPA Region 3 Industrial Soil Screening Level of 0.21 mg/kg, and soil sample SMP-4 exceeded the EPA Region 3 Residential Soil Screening Level of 0.015 mg/kg for benzo(a)pyrene.

With respect to the presence of benzo(a)pyrene in facility soils, this constituent is a poly-nuclear aromatic hydrocarbon (PAH) that is ubiquitous in urban environments and is found in asphalt, coal combustion products, automobile exhaust fumes (especially from diesel engines), and smoke from the combustion of organic material (e.g., cigarette smoke). The benzo(a)pyrene detected in the 2008 and 2012 sample results is most likely influenced by normal activities in an urban, high traffic area and do not indicate a specific point source derived impact nor a significant threat to human health or the environment from exposure to these soils.

Virginia Tech, under the direction of VADEQ, is managing the excavated soils (approx. 5,500 cubic yards) from within the footprint of the former building as solid waste. The excavated soils are being sent to the New River Source Authority (municipal landfill) to be used as daily cover.

The results from the April 3, 2014 Soil Sampling Event at Davidson Hall show that mercury concentrations in the soil, reported on an "as-received" basis, in the Davidson Hall area do not exceed the RSLs for elemental mercury and the RSLs for mercuric salts in both residential or industrial scenarios. The results show that the soil surrounding Davidson Hall does not pose unacceptable risks to humans or the environment. No further action was recommended, in the report.

EPA has concluded that AOC 9 does not pose an unacceptable risk to human health and/or the environment.