PILE AREA AND PHASE V AFTER ACTION REPORT FOR BORIT ASBESTOS NPL SITE AMBLER, PENNSYLVANIA

TDD: WS01-10-07-002
Amendment#: E
Contract: EP-S3-10-05

BoRit Asbestos Site
www.epaosc.net/BoRit

Prepared For

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Pile Area and Phase V
After Action Report
for
BoRit Asbestos NPL Site
Ambler, Pennsylvania

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Eduardo Rovira, Jr. USEPA – On-Scene Coordinator (OSC) EPA Region III Philadelphia, Pennsylvania	Date

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LIST OF ACRONYMS

°	degree
<	less than
µm	micrometer
%	percent
ABS	activity-based sampling
ACM	asbestos-containing material
AHERA	Asbestos Hazards Emergency Response Act
ARAR	Applicable or Relevant and Appropriate Requirement
ATSDR	Agency for Toxic Substance and Disease Registry
BoRit	BoRit Asbestos NPL Site
BTAG	Biological Technical Assistance Group
CCM	cable concrete mat
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CIC	Community Involvement Coordinator
CL	center line
DOI	Department of Interior
EPA	U. S. Environmental Protection Agency
ERRS	Emergency and Rapid Response Services
ERT	Environmental Response Team
ESA	Environmental Site Assessment
ESC	Erosion and Sedimentation Control
f/cc	fibers per cubic centimeter
FIT	Field Investigation Team
FEMA	Federal Emergency Management Agency
ft	feet
ft^2	square feet
ft/s	feet per second
ft^3/s	cubic feet per second

LIST OF ACRONYMS (CONTINUED)

Gilmore	Gilmore Associates, Inc.
gpm	gallons per minute
HDPE	high density polyethylene
KMC	Keasby and Mattison Company
lbs	pounds
MCHD	Montgomery County Health Department
MCL	maximum contaminant level
MFL	million fibers per liter
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
OSC	On-Scene Coordinator
OSHA	Occupational Safety and Health Administration
PADEP	Pennsylvania Department of Environmental Protection
PADER	Pennsylvania Department of Environmental Resources
PADOH	Pennsylvania Department of Health
PAH	polynuclear aromatic hydrocarbon
PCB	polychlorinated biphenyl
PCM	phase contrast microscopy
PCME	phase contrast microscopy equivalency
PennDOT	Pennsylvania Department of Transportation
PEL	permissible exposure limit
Pile	Asbestos Pile Area
POC	point of contact
RI/FS	Remedial Investigation / Feasibility Study
RVC	Rose Valley Creek
SARA	Superfund Amendments and Reauthorization Act
SI	Site Investigation
START	Superfund Technical Assessment and Response Team
SVOC	semi-volatile organic compound

LIST OF ACRONYMS (CONTINUED)

TEM	transmission electron microscopy
TRC	Tannery Run Creek
TRW	Technical Review Workgroup
TWA	time-weighted average
USACE	U. S. Army Corps of Engineers
USGS	United States Geological Survey
VOC	volatile organic compound
WC	Wissahickon Creek
WESTON®	Weston Solutions, Inc.
WRS	WRScompass
WVWA	Wissahickon Valley Watershed Association
WVWP	Wissahickon Valley Waterfowl Preserve
yd^2	square yards
yd^3	cubic yards

FOREWORD

As mandated by the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), Title 40 of the *Code of Federal Regulations* (CFR), Part 300, the U.S. Environmental Protection Agency (EPA) On-Scene Coordinator (OSC) is required to provide coordinated federal response capabilities at the scene of an unplanned or sudden release of oil or hazardous substance that poses a threat to public welfare or the environment. In addition, the provisions of Section 104 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), promote a coordinated federal, state, and local response to situations whenever any hazardous substance is released or there is a substantial threat of such a release into the environment.

Conditions at the BoRit Asbestos National Priority List (NPL) Site presented a substantial threat to human health and the environment because of the potential of an uncontrolled release of a hazardous substance (asbestos) to the environment, thereby providing a legal basis for federal response activities. EPA Region III of Philadelphia, Pennsylvania, implemented the provisions of the NCP, Section 300.415.

The OSC would like to thank all agencies and individuals who provided their assistance and expertise to ensure the successful completion of Pile and Phase V activities.

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Eduardo Rovira, Jr.
On-Scene Coordinator
EPA Region III
Philadelphia, Pennsylvania

FACT SHEET (Pile Area)

Region III
Removal Action **TDD No.** WS01-10-07-002

Site:	BoRit Asbestos National Priority List (NPL) Site
Size:	The site consists of an Asbestos Pile Area (~ 6 acres), Reservoir Area (~15 acres), and Park Area (~11 acres), totaling about 32 acres. The site also contains portions of three creeks: Wissahickon, Rose Valley, and Tannery Run.
Location:	Ambler, Montgomery County, Pennsylvania
Approval Dates:	Original Funding Request: August 14, 2006 Increase in Funding Request: April 14, 2008 Additional Funding Request: October 15, 2009
Pile Area Dates:	August 23, 2011 – May 22, 2012, 2012
Description:	The Pile area encompasses approximately six acres located between Maple Street, TRC, the Reservoir, and WC. Between August 23, 2011 and May 22, 2012, the Pile was further excavated and regraded to achieve a more uniform shape and to create 3H:1V slopes from the crest to the toe of the slope. A 3H:1V slope was selected in order to minimize erosion, promote vegetative growth, and to facilitate future maintenance activities (i.e., mowing). To achieve this design, the following steps were taken: trees and other vegetation were cleared, chipped, and spread across the Pile; ACM soils at the Pile were graded to meet design specifications for subgrade elevation; the entire pile was covered with Geotextile fabric; the pile was capped and compacted in lifts with a minimum two feet of clean fill; top soil was then spread across the entire Pile; and the Pile was then hydro-seeded and covered in straw matting to promote growth of vegetation. In addition, an access ramp was installed on the Reservoir-side of the Pile to facilitate future operations and maintenance activities (e.g., mowing of vegetation) and drainage swales were cut around the toe of the Pile to ensure storm water runoff was directed away from Maple Street and into TRC and the Reservoir. Additional tasks in the area of the Pile included capping a small area between the Pile and Reservoir, installing a handrail at TRC, and placing R8 boulders along the shoulders of the access roads.
National Priorities List Status:	The site was proposed for the NPL on September 3, 2008, and was listed on the NPL on April 8, 2009.
Hazardous Materials:	ACM waste.
Quantities Removed:	Debris and tree stumps totaling 185 tons (combined Pile and Phase V).
On-Scene Coordinator:	Eduardo Rovira, Jr.

Removal Contractor:	WRScompass (WRS)
Disposal Location:	Pioneer Landfill and York Landfill
Site Information:	For additional information, please visit the site's website at www.epaosc.net/BoRit.

FACT SHEET (Phase V)

Region III
Removal Action **TDD No.** WS01-10-07-002

Site:	BoRit Asbestos NPL Site
Size:	The site consists of an Asbestos Pile Area (~ 6 acres), Reservoir Area (~15 acres), and Park Area (~11 acres), totaling about 32 acres. The site also contains portions of three creeks: Wissahickon, Rose Valley, and Tannery Run.
Location:	Ambler, Montgomery County, Pennsylvania
Approval Dates:	Original Funding Request: August 14, 2006 Increase in Funding Request: April 14, 2008 Additional Funding Request: October 15, 2009
Phase V Dates:	June 21, 2011 – September 8, 2011
Description:	The Phase V area consists of approximately 300 linear feet on the left bank of the Wissahickon Creek. It extends from the "old dam" in the Wissahickon Creek to the Tannery Run confluence with the Wissahickon Creek. Between June 21, 2011 and September 8. 2011, the slope along Phase V was excavated and regraded to achieve a more uniform shape and to permit the installation of erosion control measures. To achieve this design, the following steps were taken: all trees and other vegetation were cleared from the slope; tree stumps and bulk ACM removed from the slope were placed in roll-off containers for disposal; the toe of the slope was lined with and R8 stone and then backfilled approximately 12 feet up the slope with R5; from the "old dam" to about 65 feet downstream, the slope was graded to 1.5H:1V and covered with ArmorMax© erosion control mats; from approximately 65 feet downstream to 110 feet downstream, the slope was gradually laid back until it reached 3H:1V and covered with geocells to stabilize the slope; from 110 feet to the Tannery Run discharge (approximately 300 feet downstream of the "old dam"), the slope was graded to be 3H:1V and covered with geocells to stabilize the slope Once installed all geocells were infilled with clean fill. The entire Phase V slope was then covered with topsoil, hydroseeded, and covered in straw mats. .
National Priorities List Status:	The site was proposed for the NPL on September 3, 2008, and was listed on the NPL on April 8, 2009.
Hazardous Materials:	ACM waste.
Quantities Removed:	Debris and tree stumps totaling 185 tons (combined Pile and Phase V).
On-Scene Coordinator:	Eduardo Rovira, Jr.
Removal Contractor:	WRS
Disposal Location:	Pioneer Landfill and York Landfill.

Site Information: For additional information, please visit the site's website at www.epaosc.net/BoRit.

1. INTRODUCTION

This report describes Phase V and Asbestos Pile Area activities at the BoRit Asbestos NPL Site (herein named the "BoRit") in Ambler, Montgomery County, Pennsylvania. Pile activities commenced on August 23, 2011, and were completed on May 22, 2012. Phase V activities began commenced on June 21, 2011, and were completed on September 8, 2011.

1.1 REPORT ORGANIZATION

This report is organized into the following 8 sections:

Section 1 – Introduction: Introduces the project and presents the objectives, management, and organization of the report.

Section 2 – Site Background: Describes the location, history of the site, and past actions taken which lead to the Removal Phase.

Section 3 – Roster of Agencies, Organizations, and Individuals: Describes the entities associated with the site.

Section 4 – Resources Committed: Summarizes initial and additional funding requests, as well as total cost for activities.

Section 5 – Pile Final Design and Activities: Describes the steps taken to accomplish this Phase.

Section 6 – Phase V Design and Activities: Describes the steps taken to accomplish this Phase.

Section 7 – Air Monitoring Activities: Summarizes the number, type, and results of air monitoring activities.

Section 8 – Waste Disposal: Summarizes the methods and quantities of waste disposal.

Section 9 – Challenges Encountered: Describes challenges encountered during each Phase.

Section 10 – References: Describes the sources of information.

2. SITE BACKGROUND

The BoRit site consists of three adjacent properties: a property on which a pile of asbestos-containing material (ACM) is located (Pile Area), a property on which a water reservoir is located (Reservoir area), and a park where disposal of ACM occurred (Park Area). The Site also contains portions of three creeks: Wissahickon Creek (WC), Rose Valley Creek (RVC), and Tannery Run Creek (TRC).

2.1 SITE LOCATION

The Site is located at the northwest corner of the intersection of West Butler Pike and West Maple Street behind a McDonald's restaurant in Ambler, Pennsylvania. The Pile Area and TRC are within the Borough of Ambler limits; the Reservoir Area is located in Upper Dublin Township; and the Park Area is located in Whitpain Township. The geographic coordinates at the approximate center of the Park Area are 40.1561 latitude and -75.2306 longitude.

The Site is bordered to the north by residential properties; to the northeast and east by Chestnut Avenue, West Maple Street, and commercial / residential areas; to the south by commercial properties (McDonald's, Classic Coachworks, and Sons of Italy); to the southwest by open space owned by Montgomery County and the Pennsylvania Department of Transportation (PennDOT); and to the northwest by residential properties. A playground, Westside Tiny Tot Park, and Westside Park (basketball courts) are located to the northeast and north, respectively. See **Appendix A** for a Site Location Map (**Figure 1**) and a Site Layout Map (**Figure 2**).

The Ambler Asbestos Site, a former NPL site, is located approximately 1,000 feet (ft) southeast from the Pile Area of the BoRit site. The Ambler Asbestos Site was used as a disposal area by the Keasbey and Mattison Company (KMC) plant located within close proximity of the BoRit Site. The EPA performed a cleanup action at the Ambler Asbestos Site in the early 1990s, and the site was removed from the NPL in December 1996.

Wissahickon Creek borders the Site to the southwest. The approximate length of WC from the northwest corner of the Site (close to Mt. Pleasant Avenue) to the confluence of RVC is 1,550 ft, and from RVC to the confluence of TRC is 890 ft. One dam, in a deteriorated condition, exists on WC approximately 200 ft upstream from the confluence of TRC. The total length of WC

under consideration is approximately 2,440 ft. Based on data obtained on June 10, 2008, by EPA and the Superfund Technical Assessment & Response Team (START), the average width of the creek is 50 ft, and the average velocity under normal conditions is 1.26 ft per second (ft/s). United States Geological Survey (USGS) stream flow measurements obtained in December 2003, at the Fort Washington station during a flood event indicated a creek width of 76 ft, a cross-section area of 652 square ft (ft^2), a velocity of 5.48 ft/s, and water height at the station gauge of 10.66 ft. Additionally, Federal Emergency Management Agency (FEMA) study information specifies a velocity measurement of 7.2 to 8 ft/s for a 100-year flood stage. Based on the information obtained from these three sources, the velocity of WC can vary from an average of 1.26 ft/s to as much as 10 ft/s or higher during a major storm event.

Rose Valley Creek is located between the Reservoir and the Park Area. The approximate length of RVC from Chestnut Avenue to the confluence of WC is 770 ft. Based on data acquired on June 10, 2008, the average width of the creek is 15 ft, and average velocity during normal conditions is 1.2 ft/s; however, during a major storm event, the velocity can be more than double the normal velocity.

Tannery Run Creek borders the BoRit site to the southeast (adjacent to the Pile Area) and flows to the southwest. Commercial areas (McDonald's, Classic Coachworks, and Sons of Italy) are located south/southeast of TRC. The approximate length of TRC is 720 ft, and the average width (prior to Phase IV construction) of the creek is 13 ft. However, in one location (behind Sons of Italy parking lot), the width of the creek is 24 ft. As measured on June 10, 2008, the average velocity of the creek is 1.3 ft/s. However, during storm events the velocity tends to be significantly higher than the normal condition. The creek flows over bedrock in a general southeast to southwest direction. The approximate elevation difference between the two ends of the creek adjacent to the site is 10 ft. The bedrock drops approximately 4 ft in the area behind Classic Coachworks. Close to the McDonald's parking lot, the south bank of TRC is approximately 10 ft high. Behind the Sons of Italy parking lot, the south bank is approximately 20 ft high.

2.2 SITE HISTORY

KMC manufactured asbestos products in the Borough of Ambler from the late 1800s until 1934 when Turner & Newhall, Ltd. (T&N), purchased the company (Horowitz, 2012). T&N operated the company under KMC's name until 1962, when the company was closed. In 1963 the facility was sold to Nicolet, Inc., and CertainTeed Corporation. In response to local concerns the EPA conducted a field survey in 1971, which lead the EPA to ordering both Nicolet, Inc. and CertainTeed Corporation to stop dumping ACM in 1974 (Missanelli, 2012). It is not know if the dumping from both these companies were directly related to the BoRit site or Ambler Asbestos Site during the later period. Asbestos waste from the manufacturing process was dumped in the areas described below.

2.2.1 Pile Area

The Pile Area is a 6-acre parcel located at the northwest corner of West Maple Street and TRC. ACM waste from the KMC facility was disposed of at the parcel, creating the asbestos pile. The asbestos pile is approximately 20 to 25 ft above the surrounding ground surface.

Review of historical aerial photographs suggests that KMC began waste disposal at the Pile Area during the 1930s. Asbestos waste disposal appears to have continued until the 1960s. Reportedly, this area primarily received slurry of spent magnesium and calcium carbonate, as well as waste products from the manufacture of asbestos pipe, insulation, sound dampeners, and ceiling/roof tiles. Based on aerial photographs between 1970 and 1973, the Pile was covered with vegetation. The site was first fenced in the mid-1980s. For short periods of time in the 1980s and 1990s, portions of the Pile Area were used as a trash transfer station or trash storage location, and for firefighting training. During this period, the Pile appears to have been vegetated. Asbestos waste was visible on the surface in several locations from the aerials. A two-dimensional electrical survey estimated the volume of the Pile to be 149,500 cubic yards (yd^3).

2.2.2 Reservoir Area

The 15-acre Reservoir Area, located north-northwest of the Pile, was used by the KMC plant for storage of process and fire water. Water from the Reservoir was carried to the plant through a

metal pipe, which was located in TRC (behind the McDonald's) prior to Phase IV activities. The banks of the Reservoir are constructed of ACM waste (asbestos shingles, millboard, and soil) from the KMC plant.

The Reservoir is present in a 1937 aerial photograph and likely was in place before this date. ACM waste lies on portions of the reservoir bottom. The Wissahickon Valley Waterfowl Preserve (WVWP), a local conservation group, wants to keep the Reservoir as a natural habitat and is planning a viewing platform along West Maple Street for the general public to enjoy the wildlife.

2.2.3 Park Area

The Whitpain Wissahickon Park (Park Area), located northwest of the existing Reservoir property, also received ACM waste from the KMC plant. The 11-acre park is triangular in shape.

The Park Area reportedly received out-of-specification asbestos manufacturing products and other solid wastes. It is not clear when disposal activities began in this area. However, aerial photos indicate disposal may have started as early as 1937. Aerial photographs suggest that waste disposal ceased in the mid 1960s, when the Pile was covered with soil. A 1970 aerial photograph shows a baseball diamond in the park. The park has been officially closed for public access for more than 20 years.

2.3 PREVIOUS SITE INVESTIGATIONS AND ACTIVITIES

This section describes previous site investigations and activities at the Pile Area, the Reservoir Area, and the Park Area of the BoRit site, and in the portions of the three tributaries within the BoRit site (WC, RVC, and TRC).

2.3.1 Pile Area

In 1984, the Pennsylvania Department of Environmental Protection (PADEP – previously known as the Pennsylvania Department of Environmental Resources [PADER]) – collected samples from the Pile portion of the BoRit site; all samples contained asbestos. PADEP issued a notice of violation to Nicolet, owner of the Pile property at the time, for not complying with the

asbestos waste disposal regulations. In 1984, the pile was determined by PADEP to be inadequately covered, and no warning signs were posted on the property. PADEP directed Nicolet to either cover the Pile with 6 inches of compacted material (clay/soil) and vegetation, or cover it with 2 ft of compacted material; to post warning signs; and to construct a fence around the Pile. In response to these directives, Nicolet constructed a fence along the eastern portion of the property along West Maple Street to control access. Available information does not indicate whether the Pile was covered at the time or signs were posted.

On March 30, 1984, EPA's contractor, the NUS Field Investigation Team (FIT) 3, conducted a preliminary assessment of the Pile portion of the BoRit site. A small trash transfer station was located on the property, and the asbestos pile was covered with vegetation (NUS, 1984).

On October 27, 1987, NUS FIT 3 conducted a site investigation (SI) of the Pile Area. Seven soil samples were collected from the Pile and surrounding areas, three water samples were collected from TRC, and two water samples were collected from the Wissahickon Creek. The soil samples contained up to 22% total asbestos. The water samples results ranged from non-detect to 2.5 million fibers per liter (MFL). The maximum contaminant level (MCL) for asbestos in drinking water is 7.0 MFL.

Observations during the 1987 SI indicated that individuals were using the Pile Area for unauthorized disposal of household wastes. In addition, although about 95 percent (%) of the Pile Area was covered with heavy vegetation, there were small areas with no vegetation, and six abandoned vehicles were located on-site. Runoff from the Pile Area entered TRC. The Pile measured 2 acres in areal extent, and the height of the Pile was approximately 25 ft above the surrounding grade. Four empty 55-gallon drums were located in the Reservoir north of the Pile, and asbestos shingles were observed on the ground throughout the property (NUS, 1988). It was not clear from the report whether the drums were floating or were stuck at the bottom of the Reservoir.

In April 2006, an EPA Site Assessment Group conducted a baseline sampling event at the site. Results from the sampling event showed the presence of asbestos in air, soil, surface water, and sediments. ACM was visible throughout the entire site (EPA, 2006).

2.3.2 Reservoir Area

In June 2004, a Phase I Environmental Site Assessment (ESA) was conducted in the 15-acre water Reservoir area by O'Brien & Gere for the Wissahickon Valley Watershed Association (WVWA). The ESA identified non-friable ACM along the banks of the Reservoir that included asbestos shingles, millboard, and soil. ACM was also observed within the Reservoir. Asbestos-containing cement pipe sections and various other types of ACM were scattered around the banks of the Reservoir and along RVC and WC. ACM observed near the Reservoir consisted of transite, a mixture of cement and asbestos. These materials are generally non-friable; however, it was observed that the transite was beginning to degrade and become friable at the weathered ends of the material (O'Brien & Gere, 2004).

The Phase I ESA included collection of Reservoir water, sediment, waste, soil, and air samples. The Reservoir water and sediment samples were analyzed for metals, volatile organic compounds (VOC), and semi-volatile organic compounds (SVOC). The samples were not analyzed for asbestos. No significant concentrations of contaminants were detected in the samples. Gray-white soil or soil-like material in 5- to 10-square-foot patches was observed on the east side of the Reservoir. One sample of this material was collected, and analysis showed 30% chrysotile asbestos. The same gray-white material was observed below the vegetation around the Reservoir. Three samples of this material were collected, and analysis indicated 20 to 25% chrysotile asbestos. Two air samples from downwind of the Reservoir were collected during a period of 2.5 hours. The air samples were analyzed using phase contrast microscopy (PCM) and contained 0.0004 asbestos fibers per cubic centimeter (f/cc) (O'Brien & Gere, 2004). Although PCM method of analysis is not generally used when evaluating public exposure to airborne asbestos, this value is below the Occupational Safety and Health Administration's (OSHA) permissible exposure limit of 0.1 f/cc for an 8-hour time-weighted average (TWA)], and below EPA's limit for schools after indoor asbestos remediation (0.01 f/cc).

It should be noted, that the preferred method for analyzing air samples for asbestos for human health risk assessment purposes is transmission electron microscopy (TEM). PCM is primarily used for estimating asbestos concentrations, though PCM does not differentiate between asbestos

and other fibers. TEM is capable of identifying asbestos fibers; therefore, the PCM method may underestimate the actual asbestos concentration.

In March 2005, three surface soil samples were collected from beneath a pole-mounted transformer located near the southern corner of the Reservoir and analyzed for polychlorinated biphenyls (PCB). No PCBs were detected. In addition, three surface soil samples were collected near a discarded metal storage tank and analyzed for polynuclear aromatic hydrocarbons (PAH). The soil samples contained the following PAHs: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene. Levels found did not pose a threat to human health and/or the environment. The detected compounds are common components of heating oil and petroleum-based products, and may be formed by incomplete combustion of some fuels. Three sediment samples were collected from the bottom of the Reservoir and analyzed for asbestos, and one sediment sample was collected from the outflow of the Reservoir and analyzed for asbestos. Asbestos was not detected in any of the four sediment samples (EPA, 2006).

2.3.3 Park Area

In response to public concerns, EPA's Removal Program collected two soil samples from the Park Area in December 1983. Results for both samples revealed chrysotile asbestos ranging from 10 to 15%. EPA subsequently collected 24 surface soil samples from the Park and three soil samples from areas adjacent to the Park in October 1984. Of the 24 samples, five contained approximately 1% chrysotile asbestos and one contained less than 1%. One of the three off-site samples contained 1% asbestos. No asbestos fibers were detected in the other 20 samples (EPA, 2006).

2.3.4 Pile Area

In December 1984, EPA collected seven on-site vacuum samples from the Park Area. No fibers were detected using PCM analyses. In addition, soil core, surface soil, and vacuum samples were collected from seven nearby yards and roads adjacent to the yards. For comparison, two background samples from Fort Washington State Park were collected. Chrysotile asbestos fibers were found (using TEM analyses) in several of the samples from both the nearby yards and Fort

Washington Park locations. Public health officials concluded that the asbestos levels present in the yards could not be differentiated from background area locations (EPA, 2006).

In July 1996, EPA and PADEP collected 96 soil samples, including both surface and subsurface samples (down to 14 inches below ground surface) from the Park. Results revealed asbestos in all but six samples (using both PCM and TEM analyses). Amosite asbestos was detected in six samples and chrysotile in 86 samples. Asbestos concentrations ranged from trace to 15%. Generally, the higher percentage values were found at depth.

Between July 8, 2008, and June 30, 2009, as part of Phase I removal activities, approximately 8,400 square yards (yd^2) of Park Area was cleared and approximately 2,000 yards of approach roads were constructed at the Park. Once the site was cleared and the approach roads were constructed, erosion and sedimentation control (ESC) measures were implemented for the east bank of the WC (adjacent to the Park). Those activities included: preparation of the slope; placement of geotextile fabric on the slope; installation of geocells; infilling of geocells with stone and/or topsoil; placement of rip-rap along the water's edge; hydroseeding of the slope; and placement of erosion control mat over the hydroseeded area. Summarizing all activities on-site during the Phase I actions, an After Action Report (AAR) for the BoRit Asbestos NPL Site, was prepared by the START contractor and submitted to the EPA on March 1, 2010.

2.3.5 Removal and Site Assessments

In April 2006 on the 20th and 27th air, soil, surface water, sediment, and waste samples were collected by the START contractor from the site. Only two soil samples were collected from the Park. The results for both samples indicated that the soil from the Park Area contained asbestos. The trip report for the April 2006 sampling event indicated that all air samples contained detectable asbestos fibers; however, the analytical data did not allow a reliable determination of health risks or comparison to a health-based standard for asbestos.

Four of the six air samples were found overloaded with dust/particles. The analytical technique used to analyze such samples is not the preferred method when results are used to perform risk analyses. Values ranged from 0.00061 to 0.039 f/cc. The higher values were significantly above

"typical" background levels for urban areas (0.0001 f/cc) and approached the occupational permissible exposure limit (PEL).

Asbestos fibers were detected in five surface soil samples and four waste samples collected from the Pile and Park Areas. Asbestos fibers were also detected in both the upstream and downstream sediment samples collected from WC. Asbestos fibers were not detected in the surface water samples collected from WC, but were detected in one of the surface water samples collected from the Reservoir (EPA, 2006). Results prompted referral to EPA's Removal Program.

From October 2006 to September 2007, EPA's Removal Program collected a total of eight rounds of air samples at and around the BoRit site. Approximately 382 samples were collected and analyzed by TEM. Some of those rounds included activity-based sampling (ABS). During ABS, personnel wore personal air sampling pumps while conducting physical activities such as soil sample collection, hiking, brush cutting, and raking. The air samples were collected and analyzed using methods recommended by the EPA Asbestos Technical Review Workgroup (TRW). The detection limits set were 0.0005 f/cc for stationary pumps and 0.003 f/cc for personal pumps.

Asbestos fibers were counted from approximately 382 samples by use of the PCM Equivalency (PCME) method of counting asbestos fibers (ordinarily used to determine airborne health risk). The PCME results revealed only one positive result for an off-site sampling location during May 2007. The sampling station was located on an industrial facility property, and the result was 0.00049 f/cc. Stationary samplings located at the perimeter of the site or on-site resulted in six positive PCME results ranging from 0.00048 to 0.00098 f/cc. The highest result was recorded at a station in the park during September 2007, the driest month of the sampling period. The ABS raking scenarios at both the Pile and Park Areas resulted in personal air sample concentrations of 0.021, 0.012, and 0.0058 f/cc; the highest result was found for a sample collected when raking along the WC bank adjacent to the Park. These ABS results are well above 0.0009 f/cc (PCME), which is the value calculated to present a $1x10^{-4}$ cancer risk at the World Trade Center.

Only PCME results are routinely used by EPA to determine airborne health risks. Nonetheless, it is recognized that the shorter fibers captured by the Asbestos Hazards Emergency Response

Act (AHERA) counting method may play a role in increased potential for non-cancer health effects (e.g., pulmonary fibrosis). Of the 382 samples, 75 detections occurred using the AHERA (fiber length > 0.5 µm) counting method, which yielded a majority of samples at or near the analytical detection limit. Out of the 75 detections, 18 were off-site (<0.0005 to 0.005 f/cc), 44 were on-site or at the perimeter (<0.0005 to 0.0029 f/cc), two were in the nearby town (0.0005 to 0.005 f/cc), and 11 were ABS (0.0029 to 0.076 f/cc). Health threats from asbestos exposure are generally presented in terms of cancer risk because limited information is available to quantify non-cancer risks from asbestos.

3. ROSTER OF AGENCIES, ORGANIZATIONS, AND INDIVIDUALS

This section describes the roles, names and contact information of the primary agencies, organizations, and key individuals involved in Pile Area and Phase V of the Removal Action, and illustrates the organization of the response. Table 3-1 provides a list of all points of contact (POC) for each agency listed below. Figure 3-1 displays a chain of command.

3.1 FEDERAL AGENCIES

U.S. Environmental Protection Agency (EPA)

EPA is the lead agency. On-Scene Coordinator (OSC) Eduardo Rovira, Jr. is the project manager for the site. OSC Jack Kelly, a member of the TRW, dealt with the air sampling methods, lab analysis, and interpretation. EPA toxicologist Dawn Ioven provided the risk calculations. Vance Evans is the Community Involvement Coordinator (CIC) for the site. Megan Mackey was the State Liaison for the site. She kept all the elected officials informed of site activities. James Wright was the EPA's assigned field accountant for the site.

Agency for Toxic Substances and Disease Registry (ATSDR)

Senior Regional Representative Lora Werner and toxicologist Karl Markiewicz assisted the OSCs with asbestos sampling methods, lab analysis, and interpretation.

U.S. Army Corps of Engineers (USACE)

USACE, in coordination with EPA's ERRS contractor and START contractor (WRS and WESTON, respectively), worked on the design and implementation of the open and closed sections of TRC. Richard DePasquale was the engineer assigned to the site.

3.2 STATE AND LOCAL AGENCIES

Montgomery County Health Department (MCHD)

The OSC kept his counterparts at PADOH and MCHD apprised of the activities at the site. The PADOH and MCHD representatives assigned to BoRit were Barbara Allerton and Harriet Morton, respectively.

Pennsylvania Department of Environmental Protection (PADEP)

Although EPA was the lead agency, the OSC had to comply with all of the State's Applicable or Relevant and Appropriate Requirements (ARAR); therefore, the OSC kept his counterparts at PADEP apprised of the activities at the site. PADEP representatives Abdel Nassani and Tim Cherry were associated with the site during the Pile Area and Phase V activities.

Wissahickon Valley Waterfowl Preserve (WVWP)

Some activities during Phase V took place on WVWP property. The OSC kept in constant communication with David Froehlich, WVWP representative.

3.3 EPA CONTRACTORS

WRScompass

WRS was the main Emergency and Rapid Response Services (ERRS) contractor for the site and performed the actual implementation of the design. During the Pile Area and Phase V portions of the Removal Action, the following subcontractors to WRS conducted the tasks listed below:

- County Line Fence: Repairs to Rose Valley gate after storm event.
- Strobert Land Clearing Services, Inc.: Performed clearing and grubbing activities at the southwest side of the Pile.
- Godwin Pumps: Provided and maintained the pumps required to re-route TRC stream flow and pumps for general dust suppression activities.
- Security Fence, LLC: Repairs to Rose Valley gate after second storm event, and the new fence along Sons of Italy parking lot after Phase V work was completed.

Weston Solutions, Inc.

WESTON, under the START contract, provided contractor oversight and engineering support to EPA. During the Pile Area and Phase V portions of the Removal Action, WESTON oversaw subcontractor Ludgate Engineering's stake out survey of TRC, topographic survey of the Pile Area, and pre- and post-construction survey of the Pile Area, and Phase V. WESTON conducted air monitoring during phases which disturbed ACM waste and evaluated all data obtained.

Table 3-1 Names and Contact Information

AGENCIES	CONTACTS	PHONE NUMBERS	DUTIES
EPA	Eduardo Rovira, Jr.	(215) 654-5190	OSC
	Trish Taylor	(215) 814-5526	CIC
	Vance Evans	(215) 814-5528	CIC
	Dawn Ioven	(215) 814-3320	Toxicologist
	James Wright	(215) 814-3250	Finance
	Jennie Saxe	(215) 814-5806	State Liaison
ATSDR	Lora Werner	(215) 814-3141	ATSDR Representative
	Karl Markiewicz	(215) 814-3149	ATSDR Toxicologist
PADOH	Barbara Allerton	(717) 346-3283	PADOH Representative
MCHD	Harriet Morton	610-278-5117	MCHD Representative
USACE	Richard DePasquale, PE	(215) 656-6675	Engineer
PADEP	Abdel Nassani	(484) 250-5170	Dam Safety and Waterway Management Program
	Tim Cherry	(484) 250-5728	Environmental Cleanup Program
	Linda Rebarchak	(484) 250-5820	Community Relations Coordinator
Weston Solutions, Inc.	(b) (4) [redacted]	(610) 701-3116	START – Site Lead & Health & Safety Officer
	[redacted] (b) (4)	(610) 701-3084	START – Site Co-Lead
Ludgate Engineering	[redacted] (b) (4)	(610) 404-7330	START/Site Surveys
WRScompass	[redacted] (b) (4)	(215) 654-5191	Response Manager
	P[redacted] (b) (4)	(215) 654-5191	Project Superintendent
	[redacted] (b) (4)	(215) 654-5191	Project Accountant

Figure 3-1 Lines of Communication

4. RESOURCES COMMITTED

This section describes the initial and additional funding requests and total costs for the Phase V and Pile Area activities at the site.

4.1 INITIAL FUNDING

On August 8, 2006, the EPA OSC conducted a removal site evaluation pursuant to Section 300.140 of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). On August 14, 2006, after reviewing the air sampling results obtained by EPA's Site Assessment Program, and evaluating factors specified in Section 300.415 of the NCP, the OSC initially determined that site conditions posed a potentially significant threat to public health, welfare, or the environment, and initiated immediate response activities pursuant to Section 104 of Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) to mitigate the threat. Pursuant to Re-Delegation of Authority 14-2, the OSC authorized the expenditure of CERCLA funding in an amount not to exceed $250,000 to initiate an emergency Removal Action intended to cover exposed areas of ACM on the site surface and conduct sampling to determine the threat posed by airborne asbestos levels.

4.2 ADDITIONAL FUNDING SUMMARY

After completing the removal assessment and reviewing analytical air sampling results the OSC requested additional funds and an exemption from the $2 million/12-month statutory limit for a Removal Action. The Hazardous Site Cleanup Division Director approved this request of $4,499,560 on April 14, 2008. In October 2009 the OSC requested additional CERCLA funds in the amount of $4,862,820 pursuant to Delegation of Authority 14-2, and on October 15, 2009 the Division Director approved this 2nd request. In April 2011 the OSC requested additional CERCLA funds in the amount of $3,454,608 pursuant to Delegation of Authority 14-2. On April 8, 2011 the Division Director approved the 3rd request for additional funds, placing the new Project Ceiling for BoRit to $12,817,238.

5. PILE FINAL DESIGN AND ACTIVITIES

5.1 PILE AREA DESIGN AND OVERVIEW

The Pile area encompasses approximately six acres located between Maple Street, TRC, the Reservoir, and WC. Between June 11, 2010 and November 19, 2010, all sides of the Pile were excavated to allow room for access roads around the pile. These access roads were necessary to permit the movement of equipment and personnel around the Pile Area during Phase IV (Tannery Run) activities. Additional details regarding these activities are included in the May 2012 After Action Report for the Pile Area and Phase IV.

Between August 23, 2011 and May 22, 2012, the Pile was further excavated and regraded to achieve a more uniform shape and to create 3H:1V slopes from the crest to the toe of the slope. A 3H:1V slope was selected in order to minimize erosion, promote vegetative growth, and to facilitate future maintenance activities (i.e., mowing). To achieve this design, the following steps were taken:

- Trees and other vegetation were cleared, chipped, and spread across the Pile.
- ACM soils at the Pile were graded to meet design specifications for subgrade elevation. Where necessary, clean fill was added to low areas.
- The entire pile was covered with Geotextile fabric.
- Two existing piezometers were extended in height to accommodate the elevation change.
- The pile was capped and compacted in lifts with a minimum two feet of clean fill.
- Top soil was then spread across the entire Pile.
- The Pile was then hydro-seeded and covered in straw matting to promote growth of vegetation.
- An access ramp was installed on the Reservoir-side of the Pile to facilitate future operations and maintenance activities (e.g., mowing of vegetation).
- Drainage swales were cut around the toe of the Pile to ensure storm water runoff was directed away from Maple Street and into TRC and the Reservoir.

One all of these tasks were completed, smaller miscellaneous tasks were completed in the Pile area to complete project design requirements. For example, these activities included capping a

small area between the Pile and Reservoir, installing a handrail at TRC, and placing R8 boulders along the shoulders of the access roads.

5.2 VEGETATION CLEARING

In order to grade the Pile to meet design specifications, all remaining trees, brush, and other vegetation were removed. Previous site activities had cleared vegetation from the northeastern and western portions of the pile. On August 23, 2011, Strobert Land Clearing Services, Inc. arrived on-site to begin clearing the remaining vegetation from the eastern portion of the pile. Chipping and grinding operations were conducted on top of the pile. All wood chips from the chipping and grinding operations were spread atop the pile. By August 26, 2012, all vegetation had been removed, chipped and spread across the pile. Clean fill was also spread atop the pile to cover any ACM exposed by the vegetation clearing activities.

5.3 EXCAVATION AND GRADING

All stumps from the tree cutting activities were placed in roll off containers for disposal in early September 2011. Once all stumps were removed, grading and excavation of the slopes began in order to achieve a 3H:1V slope. At the end of each workday, the slopes were covered with straw mats. Once the desired subgrade was achieved on a particular section of slope, it was covered with geotextile fabric and the fabric was then pinned in place.

Excavation and grading began on the eastern side of the pile (the side parallel to Maple Street) in mid-September 2011, and then generally progressed in a clockwise fashion around the Pile. The southern Pile slopes (along Tannery Run Creek) were completed by October 2011. The western portion of the Pile (nearest to the Wissahickon Creek) and the top of the Pile were completed November and December 2011. The excavation and grading of the northern side of the pile (adjacent to the reservoir) began in December 2011 and was completed in January 2012.

The majority of all grading, excavation, and covering of the pile with geotextile was finished on by January 30, 2012. However, the last waste cell (located at the northeast corner of the Pile) was not completed until early March 2012.

Soils excavated from the slopes were relocated to designated waste cells on the Pile. Once a designated waste cell was filled, it was demarcated with geotextile fabric, covered with clean fill,

and compacted. Waste cells were initially located on the western side of the pile. However, as excavations progressed, the low quality of the excavated waste required that it be mixed with clean fill. ACM soils mixed with clean fill were placed atop the pile in order to meet the design elevation for the top of the pile. Once the elevation was achieved, the top of the pile was covered with geotextile fabric, and pinned into place.

5.4 CAPPING ACTIVITIES

Once sections of the pile had been excavated, graded, and covered with geotextile fabric, two feet of clean fill was put into place as a cap. Placement of clean fill began on the eastern side of the pile in early November 2011. Clean fill was delivered by dump truck directly to the Pile slopes from the access roads, and also stockpiled atop the pile. Once offloaded, the clean fill was spread using a bull dozer. By mid-November 2011, the eastern and southern Pile slopes had been covered with two feet of clean fill and compacted. By mid-December, the western slope and the top of the Pile had been capped with two feet of clean fill. By the end of February 2012, the northern slope of the Pile had also been capped. The last active waste cell (located at the northeast corner of the pile) was capped with clean fill in early March 2012.

Approximately six inches of topsoil was placed over the clean fill cap in February and March 2012. This topsoil was then hydroseeded, covered with straw mats, and then re-hydroseeded. Hydroseeding of the Pile was completed by the end of March 2012.

5.5 ACCESS RAMP

An access ramp was constructed to facilitate the movement of earth moving equipment, to the top of the pile, and to allow for the delivery of clean fill and topsoil during capping activities. The access ramp will also facilitate future operations and maintenance activities (e.g., mowing of vegetation).

The access ramp to the top of the Pile was constructed near the northeast corner of the Pile in mid- November 2011. The access ramp was brought to subgrade with clean fill and then lined with geocells. Once the geocells were anchored with J-hooks, they were in filled with 2RC stone and compacted. Concrete barriers were installed along the edges of ramp to mark its location and to ensure its safe use.

5.6 DRAINAGE SWALES

Drainage swales were cut around the toe of the Pile to ensure storm water runoff was directed away from Maple Street and into TRC to the south and the Reservoir to the north. In early-March 2012 excavation of the drainage began. The drainage swales were excavated to the design subgrade, lined with top soil, covered with erosion control mats. The erosion control mats were then covered with topsoil and hydroseeded. Construction of the drainage swales was completed by May 22, 2012.

5.7 MISCELLANEOUS ACTIVITIES

In addition to the Pile itself, the triangular area between the Pile access ramp, Maple Street, and the Reservoir was cleared of vegetation and debris and excavated to one foot below existing grade. All vegetation was removed in mid-February 2012. By late February 2012, the area had been partially excavated, lined with geotextile fabric, covered with clean fill and then regraded to promote drainage to the Reservoir. By the end of February 2012, Reservoir shoreline had also been covered with geotextile fabric lined with rock and concrete debris (sizes ranging from R5 to R8). Topsoil was spread and the area was hydroseeded in mid April 2012.

In October 2011, an aluminum hand railing was installed atop the headwall in TRC. In March 2012, R8 boulders were spaced along TRC to prevent pedestrians or vehicles from inadvertently entering TRC from the access road.

The TRC headwall is notched to permit an overflow to a spillway during severe flooding conditions. This spillway is designed to flow to the Wissahickon Creek. In August 2011, CCMs were installed where the spillway discharges to the Wissahickon Creek. Excavation of the spillway nearest to the TRC headwall began in September 2011, but was not completed until April 2012. Once excavated, the spillway was covered with erosion control mats and hydroseeded.

A crossing was constructed to permit a vehicle to drive through the spillway so as to conduct maintenance on vegetation or the fence along the Sons of Italy parking lot. This crossing area

was created by laying back the slope of the spillway at the crossing point and installing CCMs. This crossing was completed by late April 2012.

From mid-April through May 22, 2012, the access roads around the Pile were brought to final grade using 2RC stone and compacted.

In addition, the area between the Pile access ramp, Maple Street, and the Reservoir was cleared of vegetation and debris and excavated to one foot below existing grade. Geotextile fabric was placed in the bottom of the excavated area. The Reservoir shoreline was then lined with rock and concrete debris (sizes ranging from R5 to R8). The excavation was then backfilled with top soil and sloped to drain into the Reservoir. Once grading had been completed, the area was hydroseeded.

5.8 CHRONOLOGY OF PILE ACTIVITIES

July 2011 to September 2011

- Pile Area field work:
  - Surveyed the Pile for grading
  - Transported clean fill from the Park area to the Pile for waste cell management.
  - Removed all trees on top of the Pile.
  - Chipped removed trees and spread on the Pile.
  - Spread clean fill on pile to cover exposed ACM.
  - Constructed water retention basin on back portion of the Pile by the Tannery Run emergency spillway, at the top of Phase V slope.
  - Excavation activities in the Pile area.
  - Installed foundations for fall protection rails at the headwall of Tannery Run.
  - Constructed decontamination pad atop the pile.

- Air monitoring:
  - Conducted perimeter and personnel air sampling during tree removal. Results were negative for asbestos.

October 2011 to December 2011

- Pile Area field work:
  - Excavated eastern slope of pile (parallel to Maple Street) to subgrade elevation before covered with geotextile and pinned into place.
  - Excavated southeast corner and southern sides of the Pile. All excavated ACM was relocated to the northwest side of the Pile.

- Raised the piezometer (monitoring well) on the southern slope (Tannery Run side) of the Pile to meet proposed grade and concreted in place.
- Covered completed portions of the slope with geotextile fabric and secured in place with pins.
- Placed clean fill on the eastern slope (nearest to Maple Street) and southern slope (nearest to Tannery Run) of the Pile to achieve planned final grades.
- Built an access road (which will remain in place) with clean fill on the northeastern portion of the Pile. The road will provide access to the top of the Pile for clean fill deliveries and future maintenance once stabilization is complete.
- Completed excavation on south face of the Pile (Tannery Run side). Covered area with geotextile fabric and secured in place with pins.
- Placed concrete barriers along the edges of the access ramp to ensure safe use.
- Excavated north face of the pile (Reservoir side) to achieve subgrade.
- Moved clean fill from Park to Pile and placed on top of geotextile fabric.
- Spread clean fill in lifts to a minimum depth of two feet to cap the Pile.

January 2012 through March 2012

- Pile Area field work:
  - Graded pile slopes with clean fill that was stockpiled in the Park area.
  - Excavated ACM from the Wissahickon Creek side of the Pile and moved to a new waste cell at the front of the Pile (along Maple Street).
  - Spread and compacted at least two foot of clean fill over the entire Pile.
  - Cut the remaining trees in the Pile Area.
  - Stockpiled remaining brush and debris from tree cutting for off-site disposal in roll-off containers.
  - Created a swale parallel to Maple Street to allow drainage from the Pile area into the Reservoir.
  - Completed a rock retention wall bordering the northeast corner of the Reservoir next to the Pile.
  - Cut drainage swales around the perimeter of the Pile to divert storm water away from Maple Street and into the Reservoir and Tannery Run.
  - Graded the pile with a 2% grade to allow drainage to the Wissahickon Creek.
  - Covered entire Pile area with topsoil.
  - Installed erosion control mats (ArmorMax) over topsoil in drainage swales then hydroseeded.
  - Hydroseeded Pile area and covered with straw mats to promote vegetation.
  - Surveyed Pile area for final grading plan.
- Air monitoring:
  - Conducted personal air sampling during chipping activities.

April 2012 through May 2012

- Pile Area field work:

  - Continued placement of erosion control mats (ArmorMax) in drainage swales over topsoil and hydroseeded.
  - Built up access road around the Pile to final grade.
  - Graded and rolled access roads around the Pile.
  - Placed R8 boulders along Tannery Run Road (from the headwall to the spillway crossing), as barriers for future traffic (maintenance crews).
  - Dressed up roads with stone.
  - Completed Pile area.
- General field work:
  - Moved equipment back to the Park area.

6. PHASE V DESIGN AND ACTIVITIES

6.1 Phase V Overview

The Phase V area consists of approximately 300 linear feet on the left bank of the Wissahickon Creek. It extends from the "old dam" in the Wissahickon Creek to the Tannery Run confluence with the Wissahickon Creek. Between June 21, 2011 and September 8. 2011, the slope along Phase V was excavated and regraded to achieve a more uniform shape and to permit the installation of erosion control measures. To achieve this design, the following steps were taken:

- All trees and other vegetation were cleared from the slope.
- Tree stumps and bulk ACM were placed in roll-off containers for disposal
- The toe of the slope was lined with and R8 stone and then backfilled approximately 12 feet up the slope with R5.
- From the "old dam" to about 65 feet downstream, the slope was graded to 1.5H:1V and covered with ArmorMax© erosion control mats.
- From approximately 65 feet downstream to 110 feet downstream, the slope was gradually laid back until it reached 3H:1V and covered with geocells to stabilize the slop.
- From 110 feet to the Tannery Run discharge (approximately 300 feet downstream of the "old dam"), the slope was graded to be 3H:1V and covered with geocells to stabilize the slop.
- Geocells were in-filled with clean fill.
- The entire Phase V slope was covered with top soil and hydroseeded.

6.2 PHASE V SLOPE PREPARATION

In order to grade the slope to meet design specifications, all trees, brush, and other vegetation were cut and removed from the Phase V slope. All stumps and bulk pieces of ACM were placed into roll-off dumpsters for offsite disposal. By early July 2011, the Phase V Slope had been brought to a rough subgrade and covered with geotextile fabric. In addition, a small anchor trench had been created in the Wissahickon Creek at the toe of the Phase V slope which had been lined with R8 boulders. The area behind the boulders was in-filled with R5 stone and chocked in

place with smaller stone. Once fully backfilled, the bottom 12-15 feet of the slope consisted of R5 and R8 stone.

6.3 1.5H:1V SLOPE

The first 65 feet of the slope (starting at the "old dam") were built up with 2RC stone to a 1.5H:1V slope. Once the desired subgrade was achieved, topsoil was added and the area was hydroseeded. Then, a heavy duty erosion control mat (ArmorMax©) was installed using an anchor trench and duckbill-type anchors. Once in place, the mats were covered with a light dusting of topsoil and re-hydroseeded. The 1.5H:1V section of the Phase V slope was completed by late July 2012.

6.4 3H:1V SLOPE

The remainder of the Phase V slope was cut back to a 3H:1V slope during July and August 2012. Once this gradient was achieved, geotextile fabric was laid down and pinned into place. Geocells (8 inches in height) were then installed over the geotextile fabric. The geocells were installed from the top down by first placing the 3 feet of the geocell panels into an anchor trench at the top of the slope. The geocells were anchored in place with 24 inch, J-shaped reinforcement bars. These bars were installed approximately every fifth cell down and across the slope.

Beginning in late August 2012, the geocells were filled with topsoil, followed by an additional 4 inches of topsoil above the geocell structure to provide a good medium for vegetation to grow and further stabilize the slope. Once the entire 3H:1V slope had been backfilled with topsoil, it was hydroseeded, covered with straw mats, and re-hydroseeded. The entire 3H:1V had been covered with straw mats and hydroseeded by early September 2012.

6.5 CHRONOLOGY OF FIELD ACTIVITIES

June 2011 through July 2011

- <u>Phase V field work:</u>
  - Placed R5 and R8 stone around flare end section of pipe in Tannery Run (confluence with the Wissahickon Creek)

- Placed and graded topsoil on top of the pipe area (Tannery Run), then hydroseeded
- Surveyed Phase V control points and property line for Sons of Italy
- Demobilized pump used for Tannery Run bypass line
- Moved two rock bars within the Wissahickon Creek to the west bank to prevent future erosion to the work along the Phase V area
- Collected groundwater samples at monitoring well 5 (MW-05) before decommissioning and removal of MW-05 and two piezometer wells due to their locations within the work zone
- Completed lining the foot of rip rap slope with R8 boulders
- Filled the remaining slope and bench with R5 rock and chocked with #57 size stone
- Excavated Phase 5 slope from the Wissahickon Dam downstream to the confluence with Tannery Run
- Conducted air monitoring at two perimeter locations and two ERRs contractors. All results were negative for asbestos.
- Hydroseeded the western bank of the Wissahickon Creek (just across from Phase V)

August 2011 through October 2011

- Phase V field work:
  - Installed erosion and sedimentation controls (silt fence and rock check dam) above the flared end of Tannery Run.
  - Installed additional cable clamps and placed R8 boulders and R5 stones at the flared end section of Tannery Run to secure the cable concrete mats (CCMs) in place
  - Completed excavation and fill activities to achieve the planned subgrade of the Phase V slope.
  - Placed geocells on the Phase V slope.
  - Excavated the anchor trench along the top of the Phase V slope.
  - Installed CCMs at the end of the emergency spillway for Tannery Run and secured the CCMs with cable clamps and extension cables
  - Increased the silt fencing and rock check dams around the spillway to prevent run-off in the Wissahickon Creek during spillway construction
  - Infilled the geocells with topsoil along the Phase V slope.
  - Hydroseeded the Phase V slope prior to replacing the ArmorMax
  - Infilled CCMs in the Tannery Run spillway on the Phase V slope between the dam and Control Point 6
  - Pinned and anchored the ArmorMax erosion control system and placed erosion straw mats
  - Hydroseeded areas by Rose Valley Creek that were impacted by installation of handrail.

March 2012 through April 2012

- Phase V field work:
  - Cut emergency spillway from Tannery Run headwall to the Wissahickon Creek.
  - Placed additional topsoil along the emergency spillway for Tannery Run.
  - Installed erosion control mat along the swale at Tannery Run
  - Raised the Phase V top-of-slope along the Wissahickon Creek to direct storm water runoff to the emergency spillway.
  - Filled the center of CCMs with concrete at the end of the spillway where the water is more likely to flow.

7. AIR MONITORING ACTIVITIES

During the course of the excavation and grading activities for Phase V and the Pile, air sampling was conducted for laborers, equipment operators, and along the perimeter of the Site. From June 21, 2011 through May 22, 2012, a total of 31 air samples were collected for analysis. Twelve of these samples were area samples obtained from the site perimeter and 21 were obtained from laborers or equipment operators working in close proximity to the ACM.

Only one detection of asbestos fibers was identified in the 31 air samples collected between June 21, 2011 through May 22, 2012. A single asbestos fiber (chrysotile) was identified in an 8-hour time weighted average sample for a laborer working in close proximity to ACM on October 4, 2011. Given the amount of air collected for the sample, this equates to a concentration of 0.004 fibers per cubic centimeter, which is two orders of magnitude below the Permissible Exposure Limit (PEL) of 0.1 fibers per cubic centimeter.

8. WASTE DISPOSAL METHODS AND QUANTITIES

Numerous pieces of ACM (e.g., pipes, shingles, and tiles) were present along the Phase V area. During the preparation stages of the slope, bulk pieces of ACM debris and stumps were removed and placed into roll-off containers for disposal. Soils excavated from Phase V that were suspected to contain ACM were transported to the Pile and placed into designated waste cells.

ACM containing soils encountered during excavation and/or grading activities at the Pile were also relocated into designated waste cells on the Pile. Completed waste cells were covered with geotextile fabric and at least two feet of clean fill.

The entire Pile area was hydroseeded to promote a natural vegetative cover. The grading and vegetative cover have been designed to minimize the likelihood of erosion that could expose ACM containing soils located beneath the clean fill cap of the Pile.

During the Pile and Phase V activities, a total of 27 roll-off containers were sent to the landfill. The combined weight of the 27 containers was 184.63 tons. It should be noted that the combined weight of the roll-off containers is not a direct indication of the quantity of asbestos waste sent to the landfill. Included in the waste materials were soil and organic material (e.g., tree stumps), which was treated as suspected waste, even though sampling had not been conducted to confirm the presence of ACM. In addition, due to dust suppression activities during the collection and handling of the suspected waste materials, the wastes were saturated with water and were therefore heavier than they would have been otherwise.

9. CHALLENGES ENCOUNTERED

This section describes the challenges encountered during Pile Area and Phase V activities.

- Saturated conditions created by the dust suppression activities.
- Variability in the ACM waste encountered. The consistency of some waste types encountered at the pile posed challenges in its grading and excavation by heavy equipment. Some of this waste was mixed with clean fill in order to make it easier to handle by heavy equipment.
- Heavy rainfall associated with the slow moving Tropical Storm Lee in early September 2011 caused extensive damage to portions of the site, particularly in the Rose Valley Creek. However, the design of the Phase V slope withstood the storm well, registering minimal damage even though it had just been completed and was not fully vegetated.
- The damage to the Rose Valley Creek due to Tropical Storm Lee were exacerbated by upstream conditions (offsite). Following the storm, actions were taken at the offsite location to prevent a recurrence of this damage.

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APPENDIX A

SITE LOCATION MAP AND SITE LAYOUT

APPENDIX B

PHOTOGRAPHIC DOCUMENTATION (PILE AREA & PHASE V)

APPENDIX C

POST CONSTRUCTION SURVEY DATA (PILE AREA & PHASE V)