FIVE-YEAR REVIEW REPORT

Butler Mine Tunnel Superfund Site

Luzerne County, PA

EPA ID#: PAD980508451

Prepared by:

U.S. Environmental Protection Agency

Region III

Philadelphia, Pennsylvania

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Date

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Acronyms

CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CD	Consent Decree
EPA	Environmental Protection Agency
FS	Feasibility Study
MCL	Maximum Contaminant Level
NCP	National Contingency Plan
NPL	National Priorities List
O&M	Operations and Maintenance
OU	Operable Unit
PADEP	Pennsylvania Department of Environmental Protection
PADER	Pennsylvania Department of Environmental Resources
PPB	Part per billion
PPM	Part per million
PRP	Potentially Responsible Party
RA	Remedial Action
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
RI	Remedial Investigation
ROD	Record of Decision
RPM	Remedial Project Manager
SDWA	Safe Drinking Water Act

EXECUTIVE SUMMARY

The Butler Mine Tunnel (BMT) Site ("Site") is located in Luzerne County, in northeastern Pennsylvania. The tunnel discharge point (BMT outfall) is located on the east bank of the Susquehanna River, approximately 350 feet north of the Fort Jenkins Bridge in the City of Pittston, Pennsylvania. Between 1977 and 1979 liquid industrial waste was disposed of into abandoned underground mine workings via a borehole located at the Highway Auto Service Station (HWAS) in Pittston Township. Such disposal was responsible for discharges of oily waste from the Butler Mine Tunnel in 1979 and 1985. The 1985 discharge following the high precipitation event of Hurricane Gloria.

The Site was placed on the National Priorities List in 1987, and a Record of Decision for the Site was issued by EPA in 1996.

The remedy implemented for the Butler Mine Tunnel Superfund Site in the Luzerne County, Pennsylvania included:

- Establishing an Administrative Center.
- Improving and using a warehouse in Pittston to store response equipment.
- Constructing a boat launch ramp and access roads.
- Installing the Tunnel flow monitoring equipment and monitoring system.
- Constructing five in-river permanent moorings.
- Constructing 11 anchor points (eight pad-eyes and three fair-leads) and four winch pads.
- Preparing the response preparedness plan.
- Implementing the Community Information Program.
- Closing seven boreholes used during the RI at the Site, including the HWAS borehole.

The Site achieved construction completion with the signing of the Preliminary Close-Out Report on September 8, 2005. The trigger for this five-year review was the signature date for the first Five Year Review report, July 30, 2009. This 2014 five-year review found that the remedy was constructed in accordance with the requirements of the Record of Decision (ROD).

Based on a review of decision documents, O&M documents, monitoring results, interviews with O&M staff, and residents who live in the Site vicinity, and the Site inspection, the remedy is functioning as intended by the ROD, and the remedy is protective of human health.

Five Year Review Summary Form

SITE IDENTIFICATION		
Site Name: Butler Mine Tunnel		
EPA ID: PAD980508451		
Region: 3	**State:** PA	**City/County:** Pittston/Luzerne

SITE STATUS	
NPL Status: Final	
Multiple OUs? No	**Has the site achieved construction completion?** Yes

REVIEW STATUS
Lead agency: EPA
Author name (Federal or State Project Manager): Mitch Cron
Author affiliation: EPA Region 3
Review period: 2013-2014
Date of site inspection: December 11, 2013
Type of review: Statutory
Review number: 2
Triggering action date: July 30, 2009 – previous Five Year Review issue date
Due date *(five years after triggering action date)*: July 30, 2014

Five-Year Review Summary Form (continued)

Issues/Recommendations

Issues and Recommendations were not identified in the Five Year Review report

Protectiveness Statement(s)

Protectiveness Statement.
The remedy at the Site is protective of human health and the environment because the Selected Remedy has been constructed and is operational, weather conditions and BMT flow are monitored in real time to determine when an oil flush out may occur, in the event of an oil flush out a response plan will be implemented using facilities and equipment which have been constructed on-Site or are staged near the Site

Government Performance and Results Act (GPRA) Measure Review

Human Health: HHPA (Long-Term Human Health Protection Achieved)
Groundwater Migration GMNA (Not a Groundwater Site)

Site wide RAU: Site wide Ready for Anticipated Use (SWRAU) was achieved on May 21, 2010

U.S. Environmental Protection Agency
Region III
Hazardous Site Cleanup Division
2nd Five-Year Review Report
Butler Mine Tunnel Superfund Site
City of Pittston, Luzerne County, Pennsylvania

I. Introduction

The purpose of the Five-Year Review is to determine whether the remedy at a site is protective of human health and the environment. The methods, findings, and conclusions of these Five-Year Reviews are documented in Five-Year Review reports. In addition, Five-Year Review reports identify issues found during the review, if any, and identify recommendations to address them.

The Environmental Protection Agency (EPA or "the Agency") is preparing this Five-Year Review report pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) §121 and the National Contingency Plan (NCP). CERCLA §121 states:

> *If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.*

The Agency interpreted this requirement further in the NCP; 40 CFR §300.430(f) (4) (ii) states:

> *If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.*

EPA Region III conducted this Five-Year Review of the remedy implemented at the Butler Mine Tunnel Superfund Site (Site) in the City of Pittston, Luzerne County, Pennsylvania. This review was conducted by the Remedial Project Manager (RPM) for the Site during 2013 and 2014. This report documents the results of the Five-Year Review. This is the second Five-Year Review for the Site. The triggering action for this statutory review is the signature date of the first Five Year Review for the Site: July 30, 2009. The Five-Year Review is required because hazardous substances, pollutants, or contaminants remain at the Site above levels that allow for unlimited

use and unrestricted exposure.

II. Site Chronology

Table 1 lists the chronology of events for the Site.

Table 1: Chronology of Site Events

Date	Event
1977-1979	Disposal of waste liquids, including oil waste, occurs at the Highway Auto Service Station (HWAS) borehole.
July 1979	First discharge of oil from the Butler Mine Tunnel (BMT) outfall.
September 1985	Second discharge of oil from the BMT outfall.
March 30, 1987	Seventeen potentially responsible parties (PRPs) entered into a Consent Agreement and Order to perform the RI/FS
July 1, 1987	Site was placed on the National Priorities List (NPL) by EPA.
July 15, 1996	EPA issued the Record of Decision (ROD) for the Site.
February 15, 2001	EPA and the Commonwealth of Pennsylvania entered into a Consent Decree (CD) with a group of PRPs to perform the Remedial Design/Remedial Action and Operations and Maintenance at the Site. February 15, 2001 is the date the CD was entered in court.
December 30, 2003	EPA approved the Remedial Design.
August 4, 2004	Construction of the Remedy outlined in the ROD began.
September 8, 2005	Preliminary Close-Out Report signed.
October 2, 2008	Remedial Action Completion Report approved by EPA
July 30, 2009	First Five Year Review completed at the Site.
2009-2013	Training and operations and maintenance of Selected Remedy features (see Appendix 5)

III. Background

Physical Characteristics

The Butler Mine Tunnel (BMT) Site ("Site") is located in Luzerne County, in northeastern Pennsylvania. The tunnel discharge point (BMT outfall) is located on the east bank of the Susquehanna River, approximately 350 feet north of the Fort Jenkins Bridge in the City of

Pittston, Pennsylvania. The City of Pittston, and nearby areas are densely populated urban areas.

A Site location map is provided in Appendix 1.

The BMT was constructed prior to the 1930s as a drainage tunnel for underground coal mines via a series of interconnecting drainage ditches. The BMT drains an approximate five-square mile area of underground mine caverns and waterways. The BMT still continues to drain the mine workings. It routinely discharges water containing contaminants of acid mine drainage composed of sulfate, iron, and magnesium into the Susquehanna River.

During mining operations, boreholes were drilled into the mines to serve as air vents for the mines. Many individuals and companies used the bore holes to dispose of various wastes, including, residential and commercial wastes containing hazardous substances and waste oil. One such borehole was in Pittston, PA at a gas station and auto repair shop called the Hi-Way Auto Service Station ("HWAS"), located over two miles from the Tunnel discharge point. This borehole is known as the HWAS borehole. Water in the mine workings is not used as a drinking water source for the area.

Broadly, the Site consists of three distinct but related areas. First, the Site includes a contaminated source area in the mine workings beneath HWAS. Second, the Site also includes the subsurface migration pathway where the contamination in the source area has the potential to migrate to the BMT outfall. As noted above, the BMT outfall discharges into the Susquehanna River in the City of Pittston. Finally, the Site includes the areas along the Susquehanna River bank, in the City of Pittston, which are necessary to implement responses during future oil flushouts from the BMT.

Land and Resource Use

Ground water in the mine workings is not used as a drinking water source for the area; rather the drinking water supply is surface water reservoirs. The Susquehanna River itself is used a drinking water source in the City of Danville, which is located 60 miles downstream of the BMT outfall.

HWAS continues to operate as a truck fueling and repair business. The coal mines and related underground features which act as a migration pathway between the HWAS contamination source area and the BMT outfall are no longer active mines. Several areas in the vicinity of the BMT outfall are used in conjunction with the Site remedy to monitor rainfall in the vicinity of the BMT outfall, measure tunnel flow from the BMT outfall, and facilitate training and future response actions to address potential future discharges of oil from the BMT. Certain portions of the Site remedy (concrete pads for hydraulic winches, "pad eyes" for trot-line/boom management, etc.) lie in City Park, on the banks of the Susquehanna River in the City of Pittston.

History of Contamination and Initial Response

In late 1977, an oil recycling and reclamation company contracted with the owner of the HWAS for the disposal of oil waste into the HWAS borehole on the service station property. It is estimated that several million gallons of liquid industrial waste were disposed of into this borehole. In July 1979, this disposal was discontinued because of a Pennsylvania State Police investigation.

At the end of July 1979, Pennsylvania authorities were notified of a strong odor emanating from the BMT outfall on the banks of the Susquehanna. Upon arriving at the scene, authorities discovered a 35-mile long oil slick on the Susquehanna River originating at the Butler Tunnel outfall. Both the EPA and the Pennsylvania Department of Environmental Resources (now known as the Pennsylvania Department of Environmental Protection or "PADEP"), responded and performed an emergency removal under the authority of §311 of the Clean Water Act ("CWA"). Section 311 of the CWA authorizes the cleanup of any oil discharge into navigable water.

After further investigation by EPA, PADEP and other authorities, the source of the hazardous substances was traced to the HWAS borehole. Testing of the wastes found in the borehole matched the waste in the outfall. To provide conclusive proof, a dye was placed in the HWAS borehole. The same dye was subsequently observed in the outfall discharge.

After this spill was cleaned up, EPA installed an emergency monitoring device at the outfall of the Butler Tunnel. The Butler Emergency Response Program ("BERP") was designed to monitor the continuing discharge of water from the BMT outfall and trigger an alarm if hazardous substances were discharged. PADEP was charged with the operation and maintenance of the BERP system. After several years without a toxic discharge, the system was abandoned.

Following the 1979 spill, EPA evaluated the Butler Mine Tunnel Site and proposed for inclusion on the NPL. However, EPA made the determination that no remedial activities were needed and the Site was removed from the proposed list.

In September 1985, another sudden oil discharge from the BMT occurred following heavy rains and flooding associated with Hurricane Gloria. Upon arriving at the scene, PADEP found a 50-mile oil slick in the Susquehanna River emanating from the BMT outfall. EPA was notified and, with the assistance of PADEP, began cleanup activities under §311 of the Clean Water Act.

This response became an emergency removal under §104 of CERCLA when chemical analysis confirmed the presence of bis(2-ethylhexyl) phthalate and dichlorobenzene, which are federally regulated hazardous substances. EPA removed and disposed of 161,000 pounds of oil/chemical-soaked debris and soil from the Site. After further testing and investigation, EPA determined that the 1985 discharge was linked to the illegal dumping that caused the 1979 discharge. EPA spent over $735,000 on the 1985 removal action.

On May 20, 1986, the BMT site was once again proposed for inclusion on the NPL and was listed on the NPL on July 1, 1987.

After both the 1979 and 1985 discharges, hydrogeologic studies were performed by EPA. These studies concluded that a low probability of a future discharge exists under normal day to day conditions but another discharge may occur anytime a large storm impacts the area.

Basis for Taking Action

The Remedial Investigation ("RI") attempted to re-construct the operations of the oil recycling contractor and the dispatching tanker trailers carrying waste materials to the HWAS borehole. Based on reports from different refinery facilities and records, it is estimated that between 1,500,000 to 2,700,000 gallons of liquid wastes were disposed into the mine workings. The RI report further estimates the oil content of the liquid to be between 330,000 to 490,000 gallons. In reviewing the two oil discharge events from 1979 and 1985, PADEP and EPA have estimated that between 276,000 and 400,000 gallons were discharged during these events. Therefore, the RI concluded that there still could be 50,000 to 90,000 gallons of oil contained in the mine workings.

Hazardous Substances

In 1985 the analysis of the oily hydrocarbon discharge from the BMT revealed hazardous substances which triggered CERCLA jurisdiction and funding to address the discharge.

The oily waste containing these hazardous substances moved through the mine workings into the BMT and discharged into the Susquehanna River at the BMT outfall. The RI also shows that some hazardous substances and oily waste still remain in the mine workings and present a potential risk if another flushout should occur. Therefore, EPA evaluated two discharge conditions, a flushout condition and a day to day condition, to describe the nature and extent of releases that could occur at the outfall of the Tunnel.

The following table from the 1996 ROD shows the two conditions and the concentrations of the contaminants of concern that were reported during: 1) the 1985 flushout of the oily liquid wastes, and 2) the day to day concentrations as reported in the RI:

Contaminant Concentration in Flushout Events		
Compound	1985 Flushout – Maximum Concentration (parts per billion)	Day to Day – Maximum concentration (parts per billion)
Benzene	26.8	Non detect (ND)
Carbon Tetrachloride	13.6	ND

Chloroform	7	ND
Ethylbenzene	ND	9
Methylene Chloride	795	ND
Toluene	11	4
Trichloroethene	ND	ND
Total Xylenes	ND	59
bis (2ethylhexyl) phthalate	36	8
4-Bromophenyl phenyl ether	166	ND
1,2-Dichlorobenzene	ND	ND
1,3-Dichlorobenzene	26.5	ND
1,4-Dichlorobenzene	ND	ND
Diethyl phthalate	5	ND
Dimethyl phthalate	5	ND
Di-n-octyl phthalate	5	ND
Naphthalene	ND	ND
Phenol	ND	ND
Cyanide	1	ND
Oil	NA	100
ND – Non detect NA – Not analyzed		

Hydrogeologic Investigation

EPA hydrogeologic studies conducted in 1981 and 1987 demonstrated that contaminants injected into the HWAS borehole migrated downward through the Red Ash mine workings and into the Bottom Red Ash workings. The contaminants followed the structure contours of the Bottom Red Ash mine workings, entered an underground east-west drainage ditch and then reached the tunnel discharge location on the eastern side of the Susquehanna River. During the investigation additional boreholes were drilled, some existing boreholes were reopened, and the monitoring, sampling and analytic program was conducted. One of the goals was to determine if any accumulation of contaminants was present underground. Using 14 different boreholes, the RI detected some of the hazardous substances detected in the 1985 release in 10 of the boreholes. The highest concentrations were found in the HWAS borehole. The frequency of detection and the concentrations decreased as the borehole locations followed the main contaminant migration pathway along the Bottom Red Ash workings toward the east-west drainage ditch. The second part of the hydrogeologic investigation attempted to correlate rainfall events with an increase in water flow into the east-west drainage ditch and ultimately to the tunnel discharge location. In general each storm produced a different rainfall amount and occurred over a different time duration. The size of storms is assessed by comparing return periods. A storm's return period is the average number of years within which the storm's rainfall amount will be equaled or exceeded. As an example, the September 1985 storm caused by Hurricane Gloria had a return period of 55 years and can be described as a "55 year storm". It is estimated that flow from the BMT exceeded

42 million gallons per day during that rainfall event. During the RI three storms did exceed the 1 year storm level, and these storms did increase the volume of water exiting the tunnel. Therefore, the RI concluded that measurement of storm rainfall can be used to predict the actual flow from the BMT.

Surface Water and Sediment Investigation

Surface water samples were collected during the RI at three different locations on the eastern side of the Susquehanna River. The first location was north of the tunnel discharge location. The second was located at the Bridge just south of the discharge location (Fort Jenkins Bridge) and the third was located at the next bridge further south (Water Street Bridge). The surface water analytical results did not show detectable concentrations of the hazardous substances at any of the three locations. Sediment samples were also collected and analyzed from the same three locations. Three of the hazardous substances were detected, but they did not exceed sediment quality criteria based on PADEP Water Quality Criteria for the protection of fresh water aquatic life. Generally volatile, semi-volatile and petroleum compounds were detected in sediments at higher levels at the bridge just south of the tunnel discharge. These detections could be attributed to the previous discharge incidents.

Biota Investigation

A macro invertebrate investigation was conducted as part of the RI and samples were collected near the three locations where surface water and sediment samples were taken. Generally, the macro invertebrate community improves as the distance from the Lackawanna River and the Susquehanna River confluence increases; this confluence is a short distance upriver from the BMT discharge. The total number of specimens was smallest at a location north of the BMT and greatest at the second bridge south of the tunnel. There were no changes directly attributable to the Butler Tunnel discharges on a day to day basis. The Lackawanna River quality is the factor that probably explains the results of the river biota study.

Risk Conclusions

The discharge of oil and hazardous substances from the BMT outfall did not reveal significant risks to human health or ecological receptors under non-flushout conditions. However, the ROD indicated that if another flushout should occur, "there would be damaging effect on both river bank vegetation and aquatic life in the river." In addition, potential risks to human health were concluded to exist during a potential future flushout condition from human exposure to oil and hazardous substances, as well as a potential risk for public water intakes located along the Susquehanna River. Broadly, with regard to risk from the Site, the ROD concluded that, "actual or threatened releases of hazardous substances from this Site, if not addressed by implementing the response actions selected in the ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment."

IV. Remedial Actions

Remedy Selection

Based primarily on the information collected during the RI/FS, EPA issued a ROD for the Site on July 15, 1996. The ROD selected remedy consisted of the following components:

- The establishment of an Administrative Center. The Administrative Center is to be maintained for 10 years following its establishment. The Administrative Center is established and maintained to perform the following functions: (1) monitor rainfall in the Site area; (2) monitor flow from the BMT; (3) measure water levels in boreholes; (4) collect water samples for chemical analysis; and (5) monitor precipitation forecasts for the Site area. These functions are performed to predict when a future flushout from the BMT may occur.
- The following activities are to be performed to prepare for future flushouts: construction of an access road to the Susquehanna River and a boat ramp; construction of anchor points along the river to allow for the deployment of oil control/recovery booms; purchasing and staging oil control/recovery booms and associated response equipment (including a boat) near the Site, to allow for accelerated flushout response and cleanup.
- Preparation of a response plan detailing appropriate response procedures should a flushout occur. The response plan also includes guidelines for the storage and upkeep of response equipment (booms, boat, etc.), deployment exercises, etc.
- Development of a community information program for local municipal officials and residents. The program is designed to discourage the use of mine ventilation boreholes for waste disposal activities.
- Closure of six boreholes used during the RI.
- Establishment of deed restrictions to prohibit excavation or disturbance of the Site.
- Funding to conduct two cleanup efforts comparable to the 1985 flushout event.
- An Operations and Maintenance (O&M) plan for the selected remedy is required. The performance of the Administrative Center's functions shall be carefully monitored and the system may be modified, as warranted by the performance data collected during operation.

Remedy Implementation

Under a remedial design and remedial action consent decree entered by the United States District Court for the Middle District of Pennsylvania on February 15, 2001, the settling defendants established the BMT Site Trust Fund (the "Trust Fund") to carry out obligations under the consent decree. The Trustees are authorized to administer the Trust Fund to carry out the settling defendants' consent decree obligations and to obtain from them the funds necessary to do so. The consent decree also requires the Trustees to develop a remedial design (RD) and implement the

remedial action (RA) at the Site. The performance standards and other requirements of the ROD are incorporated into various provisions of the consent decree. The RD for the Site was completed on December 30, 2003, when the final RD report was approved by EPA.

Remedial Action construction activities, as prescribed in the RD included:

- Improving and using a warehouse in Pittston to store response equipment, including: trot line deployment equipment and a recovery barge; two 26' work boats; two oil skimmers; shore-based trot line tension system, motor and trailer; booms; debris barrier; barricade fencing; absorbent pads; portable pressure washer; crew shelter tents; equipment trailers; decontamination pools; and diesel-powered light stands.
- Constructing a boat launch ramp and access roads.
- Installing the Tunnel flow monitoring equipment and monitoring system.
- Constructing five in-river permanent moorings, to allow for deployment and control of oil control/recovery booms.
- Constructing 11 anchor points (eight pad-eyes and three fair-leads) and four winch pads. Fair-leads/pad-eyes are concrete pilings installed on the banks of the Susquehanna River, and topped with steel rings, to allow for deployment and control of oil control/recovery booms. The fair-leads/pad-eyes were installed along the river to accommodate boom control at different river heights. The winch pads are fitted with hydraulic motors that drive multi-reduction planetary gear to achieve needed line pull to fit current river conditions.
- Preparing the response preparedness plan, which covers storage and upkeep of the booms and equipment; response and deployment procedures; access to utilities; practiced deployment exercises; and handling, transportation and disposal of hydrocarbon material from within the boom system and from along the shoreline.
- Implementing the Community Information Program, designed to discourage continued use of boreholes for waste disposal.
- Closing seven boreholes used during the RI at the Site, including the HWAS borehole. The ROD specified that six RI-related boreholes were to be closed as part of the RA. However, EPA and PADEP later determined that a seventh borehole, the HWAS borehole, should also be properly abandoned during the RA. The seven specific boreholes that were closed in accordance with the Remedial Design were: HWAS, BH-2A1, BH-2A2, BH-2A3, BH-2C, BH-8A1, and BH-S1.

The Trustees perform operations and maintenance of the Selected Remedy components and provide financial assurance for a limited number of oil flush out events. The time-frame for the operations and maintenance activities and financial assurance is 10 years after EPA provided certification to the Trustees that the remedial action construction activities are complete.

On August 29, 2005, EPA and PADEP performed a pre-final inspection at the Site. The pre-final inspection was attended by representatives of EPA and its oversight contractors, PADEP, and the

Trustees and their contractors. During the pre-final inspection, a representative number of boats and containment and absorbent booms were found to be ready for use. Additionally, newly installed access roads, anchors, and boat launch areas were found to be ready for use. Based on the pre-final inspection, the remedy prescribed in the 1996 ROD for the BMT was constructed at the Site as outlined in the final RD report.

EPA documents indicate that the Site achieved construction completion status when the Preliminary Close-Out Report was signed on September 8, 2005.

The remedial action completion report was approved by EPA on October 2, 2008.

System Operation/Operation and Maintenance

Site-related Operations and Maintenance (O&M) activities are overseen by de maximis, inc. (PRP Project Coordinator), on behalf of the Trustees, and performed by a team of contractors and subcontractors. O&M activities for the Site are described in the Site Operations and Maintenance Manual.

O&M activities performed at the Site include:

1. Sampling of the borehole 11 (BH-11) located near the HWAS station, and the BMT outfall.
2. Maintaining the response equipment which is stored in a warehouse in the City of Pittston, PA.
3. Performing monitoring of Site weather, rainfall, flow from the BMT, and Susquehanna River conditions, to continuously evaluate flushout potential, and factors related to implementing a potential oil recovery response on the river.
4. Inspection and maintenance of the permanent features of the remedy which exist on the banks of the Susquehanna River, including pad-eyes, winch pads, access roads, staging areas, a boat ramp, etc.
5. Updating the Flushout Preparedness/Response Plan.
6. Performing off-river and on-river exercises to prepare for a flushout of oil from the BMT.

Training and Response activities

Training with the on-river oil recovery response system has occurred annually by the PRP group with oversight by EPA and PADEP. Training activities included on-river deployment of oil recovery booms, and on-river deployment of oil skimming equipment. A summary of training activities is included as Appendix 5 to this Five Year Review report.

Weather Monitoring

Since September 2005 (construction completion PCOR) the Administrative Center has monitored 12 storms of considered significance (capable of producing greater than 2 inches of rain in a 24 hour period with additional precipitation forecast). Four of the twelve storms produced in excess of 4 inches of rain and were monitored following approved procedures. In addition, Hurricane Ivan passed through the area during remedial action activities in September 2004 producing over 5 inches of rain in less than 24 hours. This storm was monitored by the remedial action contractor.

During each of the referenced storms, response personnel visited the Site to observe tunnel discharge. An oil discharge from the Butler Mine Tunnel did not occur.

In 2011, storms Irene and Lee passed through the project area over a very short period of time. On August 27, 2011 Hurricane Irene passed through area dropping 3.7 inches of rain at the Site in less than 24 hours. A week later, Tropical Storm Lee impacted the project area dropping 6+ inches of rain over several days. The combination of the two storms created widespread flooding and due to the storm's severity EPA requested that water quality samples be collected from the tunnel discharge for laboratory analysis and visual inspection. The laboratory results did not indicate the presence of COCs in the tunnel discharge.

Borehole and Tunnel Outfall Monitoring

The Remedial Action Sampling and Analysis Plan (SAP) describes borehole and BMT outfall sampling activities to be performed as part of the remedial action. Sampling of boreholes and the BMT outfall is performed to evaluate the environmental condition of the HWAS source area, and the water quality at the BMT outfall. The SAP indicates that the following locations are to be sampled semi-annually for the first four years of the remedial action, with an evaluation of the need for continued sampling to be performed during Five-Year Reviews of the Site:

- Borehole-7 (BH-7)
- BH-11
- BH-12
- BMT outfall to Susquehanna River

The following are borehole analytes:

- Benzene
- Carbon Tetra Chloride
- Chloroform
- Ethylbenzene
- Methylene Chloride
- Toluene

- Trichloroethene
- Total Xylenes
- Bis(2-ethylhexyl)phthalate
- 4-Bromophenyl phenyl ether
- 1,2-dichlorobenzene
- 1,3-dichlorobenzene
- 1,4-dichlorobenzene
- Diethyl phthalate
- Dimethyl phthalate
- Di-n-octyl phthalate
- Napthalene
- Phenol
- Cyanide
- Oil

EPA allowed the closure of BH-7 on July 14, 2005, and allowed the closure of BH-12 on October 29, 2007. BH-7 and BH-12 were closed in response to land development issues where the boreholes were located. EPA allowed the closure of BH-7 and BH-12 because another borehole (BH-11, discussed below), located proximate to the HWAS source area, was considered to represent an adequate sampling point for long-term monitoring of the environmental condition of the HWAS source area.

BH-11, located along Route 315, is considered to be down gradient along the main subsurface contaminant pathway between the HWAS station borehole and the BMT outfall. Of the three boreholes contemplated for sampling and analysis in the SAP, BH-11 is the borehole nearest to the HWAS source area.

Operation and Maintenance Period

The Trustees perform operations and maintenance of the Selected Remedy components and provide financial assurance for a limited number of oil flush out events, in accordance with the consent decree. The time-frame for the operations and maintenance activities and financial assurance is 10 years after EPA provided certification to the Trustees that the remedial action construction activities are complete. Therefore, during the next Five Year Review period the PRPs will no longer be obligated to continue with operation and maintenance activities.

V. Progress Since the Last Five-Year Review

Two recommendations were included in the 2009 Five Year Review report, as follows:

- Long-term access and assurance of integrity of BH-11 must be obtained

- RI boreholes should be properly abandoned or confirmed to have been properly abandoned

On August 29, 2011 EPA determined that access to BH-11 was satisfactory. From 2009-2011, the PRP group documented closure of the RI boreholes indentified in the 2009 Five Year Review report. EPA concluded on August 29, 2011 that the identified boreholes are closed and do not represent a threat to human health or the environment.

VI. Five-Year Review Process

Administrative Components

Members of the local government in the City of Pittston, de maximis, inc. (the Project Coordinator for the Site), and PADEP were notified of the initiation of the Five-Year Review in approximately January 2014.

The Five-Year Review team was led by Mr. Mitch Cron, EPA-Remedial Project Manager (RPM) for the Site.

The review team established the review schedule which included: community involvement; document review; data compilation and review; site inspection; local interviews; and Five-Year Review report development and review.

Community Involvement

The general public in the vicinity of the Site was notified of the performance of the Five-Year Review by publishing an advertisement in the Times Leader newspaper on February 14, 2014. The Times Leader is based out of Wilkes-Barre, Pennsylvania and serves the community in the vicinity of the Site.

Activities to involve the community in the Five-Year Review included interviewing the following individuals:

1. Local government officials
2. Project Coordinator
3. PADEP officials

During the interview, representatives of EPA summarized the findings of the Five-Year Inspection at the Site and asked for any input or concerns about the protectiveness of the remedy.

Document Review

This Five-Year Review consisted of a review of relevant documents including:

- ROD – Signed July 15, 1996
- PCOR – Signed September 8, 2005
- Hydrogeology of the Butler Water Tunnel Hazardous and Toxic Materials Discharge, Pittston, Pa., prepared by R.E. Wright Associates, Inc, dated December 1979.
- Hydrogeology of the Butler Water Tunnel Hazardous and Toxic Materials Discharge, Pittston, Pa. – Phase II Exploration and Monitoring Program, prepared by R.E. Wright Associates, Inc, dated January 1981.
- Phase II Remedial Investigation Report – Butler Mine Tunnel Site, prepared by Gannett Fleming, Inc., dated May 29, 1992.

Data Review

The following reports were reviewed during the performance of this Five-Year Review:

- Borehole monitoring data for the following sampling events: December 2008, July 2009, December 2009, June 2010, December 2010, June 2011, December 2011 June 2012, December 2012, June 2013.

SUMMARY OF BOREHOLE AND TUNNEL OUTFALL SAMPLING

Several boreholes (BH-7, 11, 12) were identified in the remedial design for semi-annual sampling during the remedial action. The boreholes were located along what is expected to be the main contaminant pathway between the HWAS borehole (where contamination was disposed) and the BMT outfall at the Susquehanna River (where contamination discharged to the river in 1979 and 1985). The main contaminant pathway is described in the RI, as follows: "Migration from the HWAS borehole to the Bottom Red Ash vein and thence via the No. 29 Tunnel to the east-west drainage ditch and (Butler Mine) Tunnel in the Red Ash mine workings (main contaminant pathway)." The manner by which BH-7, BH-11, and BH-12 lie along the main contaminant pathway is depicted on Figure 4-14 of the Phase II RI, which is included as Appendix 3 to this Five-Year Review report.

A summary of the sampling and analysis that has been performed at Borehole 11 and BMT outfall during the time period addressed by this Five Year Review is included as Appendix 7. Review of the BH-11 and BMT Outfall sample results indicates that Site related contamination is still present near the HWAS borehole. Oil and grease can still be identified at the BH-11 sampling location; and the contaminant bis(2-ethylhexyl)phthalate is identified at BH-11 at concentrations above federal drinking water standards. However, water from the mine pool is not used for drinking water. In addition, Bis(2-ethylhexyl)phthalate is not a vapor forming

compound. Volatile compounds identified at BH-11 (e.g. benzene, trichloroethylene) are present at levels below federal drinking water standards. With regard to water coming through the Butler Mine Tunnel and discharging to the Susquehanna River, compounds were not identified above drinking water standards between 2008 and 2013, although oil and grease are sometimes detected.

Site Inspection

A Site inspection was performed on December 11, 2013. The Site inspection was attended by Mitch Cron of EPA, Mark Leipert of EPA, Craig Coslett of de maximis, inc. (PRP Project Coordinator), and members of a PRP subcontractor. The Site Inspection was performed during a borehole and Butler Mine Tunnel outfall sampling event. The purpose of the inspection was to assess the protectiveness of the remedy.

During the inspection, EPA visited certain land-side features associated with the Butler Mine Tunnel response system (winch pads, pad-eyes), as well as the warehouse where response equipment is stored and maintained. EPA did not observe concerns with the remedy during the Site inspection. Photographs taken during the inspection are included in Appendix 2. A Site inspection checklist is included in Appendix 4.

Interviews

The following individuals were interviewed during the performance of the Five-Year Review:

1. Local community officials

Interviews were performed by the EPA Community Involvement Coordinator (CIC) with local community officials. The interviews were performed with elected officials, emergency service providers, and local government officials.

The following paragraph is the "Summary Narrative" from the CIC's notes for interviews conducted as part of this Five Year Review report:

"In general, interviewees are satisfied with the project and think EPA has done everything technologically possible to protect human health and the environment with regards to the mine tunnel response system "

See Appendix 6 for the EPA CIC notes regarding interviews with local government officials.

2. Project Coordinator (de maximis, inc.)

The Project Coordinator did not raise concerns with regard to the protectiveness of the remedy at the Site. However, the Project Coordinator did suggest that EPA, PADEP, and PRP group meet

in near future to discuss disposition of the remedy components (boats, monitoring equipment etc) after PRP involvement in the Site ends.

3. PADEP officials

EPA communicated with three PADEP officials during the preparation of this Five Year Review report. The PADEP officials did not identify concerns with regard to the protectiveness of the Superfund remedy at the Site. The PADEP officials did suggest that a final closure report be prepared as part of completion of PRP involvement at the Site. This recommendation is under consideration by EPA, and will be among the issues discussed with the PRPs in preparation for completion of PRP activities at the Site.

VII. Technical Assessment

Question A: Is the remedy functioning as intended by the decision documents?

The remedy has been constructed and is functioning as intended by the ROD. The following work has been completed as described in the Selected Remedy:

- The establishment of an Administrative Center.
- Landside and in-river improvements have been constructed to facilitate response to future oil flush outs, including access roads, boat ramps, anchor points. Materials to be used during future oil flush outs have been purchased and staged near the BMT oufall, including oil booms, oil skimmers, and boats.
- A response plan has been prepared and is being implemented with regard to response training and preparation activities.
- A community information program regarding the problems associated with disposal of waste into boreholes was prepared and delivered to the public.
- Boreholes associated with the Site have been closed.
- Institutional controls have been established at the Site (see below)
- An operations and maintenance plan for the Site monitoring and response equipment has been prepared and is being implemented.

Institutional Controls

The ROD required the establishment of institutional controls at the Site, as follows: establishment of deed restrictions to prohibit excavation or disturbance of the Site.

Institutional controls, focused on securing long-term access to Site areas along the Susquehanna River which are owned primarily by the City of Pittston and the Redevelopment Authority of the City of Pittston, are necessary to ensure that monitoring and response activities can occur.

Monitoring activities at the Site include real-time monitoring of weather and BMT flow. Access to rainfall and tunnel flow monitoring equipment has been secured as part of the remedial action. Rainfall and tunnel flow monitoring equipment is located proximate to the BMT outfall and its disposition and secured access is described in the Remedial Action Completion Report. Monitoring of the HWAS source area is performed at Borehole-11 (BH-11). Long-term access to BH-11 for purposes of monitoring the HWAS source area is described further below. Access to numerous improvements along the Susquehanna River in the City of Pittston, including pad-eyes, fair-leads, winch-pads, access roads, crane pads, and staging areas, which were constructed as part of the remedial action, is necessary to implement an effective response to a potential future oil flushout from the BMT.

The institutional controls, including easement agreements, which were established as part of the remedial action and establish long-term access to the constructed improvements are described in the Remedial Action Completion Report. The institutional controls include provisions disallowing the disturbance of certain constructed improvements, and limiting access to areas where Site-related improvements are located.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid?

Yes.

Environment health concerns raised by the community in 2011

It should be noted that during the period of time since the last Five Year Review in 2009, community members in the City of Pittston expressed concern that environmental contamination present in the underground abandoned mine features beneath Pittston and possibly related to the Butler Mine Tunnel Superfund Site was resulting in a higher than normal incidence of sickness in their community. EPA requested that the Agency for Toxic Substances and Disease Registry (ATSDR) and the Pennsylvania Department of Health (PADOH) evaluate the citizen concerns regarding higher than normal incidence of disease in their community. As part of this Five Year Review, EPA contacted ATSDR/PADOH for a summary of their conclusions regarding the citizen's concerns. The following summary of environmental health evaluation activities conducted at the Site was received from PADOH:

On May 24, 2011, the PADOH attended a meeting hosted by the EPA in Pittston. PADOH presented a review of the state's cancer registry data and self-reported health surveys.

In February 2012, PADOH published a health consultation on the cancer incidence data review for the City of Pittston. Based on the review, PADOH concluded the Pittston ZIP code had an 11 percent higher cancer incidence rate when compared to the overall state rate, and this difference is statistically significant. Among the specific cancer types, statistically significant elevated rates

were found for colon and rectum, lung, and thyroid. However, these cancer types are not closely linked to environmental chemical hazards. The excess of cancers (colon and rectum and thyroid) is not unique to Pittston and was also observed at the county level. In addition, no statistically significant differences in the distribution of cancer were found in the area of concern around Mill and Carroll streets when compared to the remainder of the Pittston ZIP code.

In October 2013 PADOH updated the previous cancer registry data review with 2009 and 2010 cancer registry data in response to a request from a community member who lives near the Butler Mine Tunnel site. The resident requested an updated cancer review. The findings of the updated review are consistent with the 2012 cancer data review for the Pittston Zip code area.

On January 9, 2014, PADOH conducted a conference call with the concerned resident. In the course of the conference call, the resident requested an analysis of the occurrence of polycythemia vera which was not included in the October 2013 update of the cancer registry data. PADOH agreed to conduct such a review. The results of this review were summarized to EPA on May 20, 2014 as follows:

At the request of a resident, PADOH Bureau of Epidemiology (BOE) reviewed the incidence of polycythemia vera and chronic myeloproliferative diseases in the Pittston (18640) Zip code that were reported to the Pennsylvania Cancer Registry for the years 2001 – 2011.

- For polycythemia vera: The number of expected cases for the 18640 Zip code for the period is 3.85 when compared to the Commonwealth as a whole. The number of observed cases for the zip code for the same time frame was 5. The Standard Incidence Ratio (SIR) = 1.30. Due to the small number of cases PADOH does not believe there is an unusual rate of polycythemia occurring in the 18640 Zip code area. In other words, the difference between the observed number of cases of polycythemia in the 18640 zip code does not appear to be the result of a particular factor and most likely can be attributed to random variation.

- The PADOH BOE also compared the rate of chronic myeloproliferative disease in the 18640 Zip code area with the Commonwealth as a whole for the 2001 – 2011 period. The number of expected cases = 1.17. The number of cases observed = 0. The Standard Incidence Ratio for chronic myeloproliferative disease in the 18640 Zip code area for the years 2001 – 2011 is 0. Therefore, there is not an unusual rate or occurrence of chronic myeloproliferative disease in the 18640 Zip code area.

Based on a review of PADOH's activities and conclusions EPA is not aware of environmental health issues associated with the Site.

Vapor Intrusion evaluation

During the Five Year Review EPA evaluated the mine water data to determine the potential for vapor intrusion at the Site. Vapor intrusion can occur when volatile organic compounds present in the subsurface can migrate into building structures above a contaminated area. To complete this evaluation EPA reviewed the mine water data collected at BH-11 (immediately down gradient from the HWAS borehole where the alleged disposal occurred), and mine water data collected from the Butler Mine Tunnel, where the Butler Mine Tunnel discharges into the Susquehanna River.

As discussed above, review of mine water data indicates that Site related contamination is still present near the HWAS borehole. The only Site related contaminant that was identified above federal drinking water standards was bis(2-ethylhexyl)phthalate at BH-11. Bis(2-ethylhexyl)phthalate is not a vapor forming compound. Site-related volatile (vapor forming) compounds identified at BH-11 (e.g. benzene, trichloroethylene) were either not detected or were present at levels below federal drinking water standards. With regard to water coming through the Butler Mine Tunnel and discharging to the Susquehanna River, Site-related compounds were not identified above drinking water standards between 2008 and 2013.

Oil and grease are still detected at BH-11 near the contamination source area, and are sometimes detected at the Butler Mine Tunnel discharge location.

The area in the vicinity of the HWAS source area where oil was identified consists of commercial development (gas stations, hotels, retail development), and major roadways (Route 314, Interstate 81, and Interstate 476).

Vapor forming compounds were not identified in mine water data collected at the Site and therefore vapor intrusion is not expected to be a pathway of concern for the Site.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

No. Additional information has not been revealed during the performance of this Five-Year Review that calls into question the protectiveness of the remedy as specified in the ROD.

Technical Assessment Summary

Based on a review of decision documents, O&M documents, monitoring results, interviews with O&M staff, and residents who live in the Site vicinity, and the Site inspection, the remedy appears to be functioning as intended by the ROD. There are no evident changes in the physical conditions of the Site that would affect the protectiveness of the remedy.

VIII. Issues

Table 2- Issues

Issue	Currently Affects Protectiveness (Y/N)	Affects Future Protectiveness (Y/N)
N/A		

IX. Recommendations and Follow Up Actions

Table 3- Recommendations

Issue	Recommendations and Follow-Up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness
N/A					

X. Statement on Protectiveness

The remedy at the Site is protective of human health and the environment because the Selected Remedy has been constructed and is operational; weather conditions and BMT flow are monitored in real time to determine when an oil flush out may occur; in the event of an oil flush out a response plan will be implemented using facilities and equipment which have been constructed on-Site or are staged near the Site.

XI. Next Five-Year Review

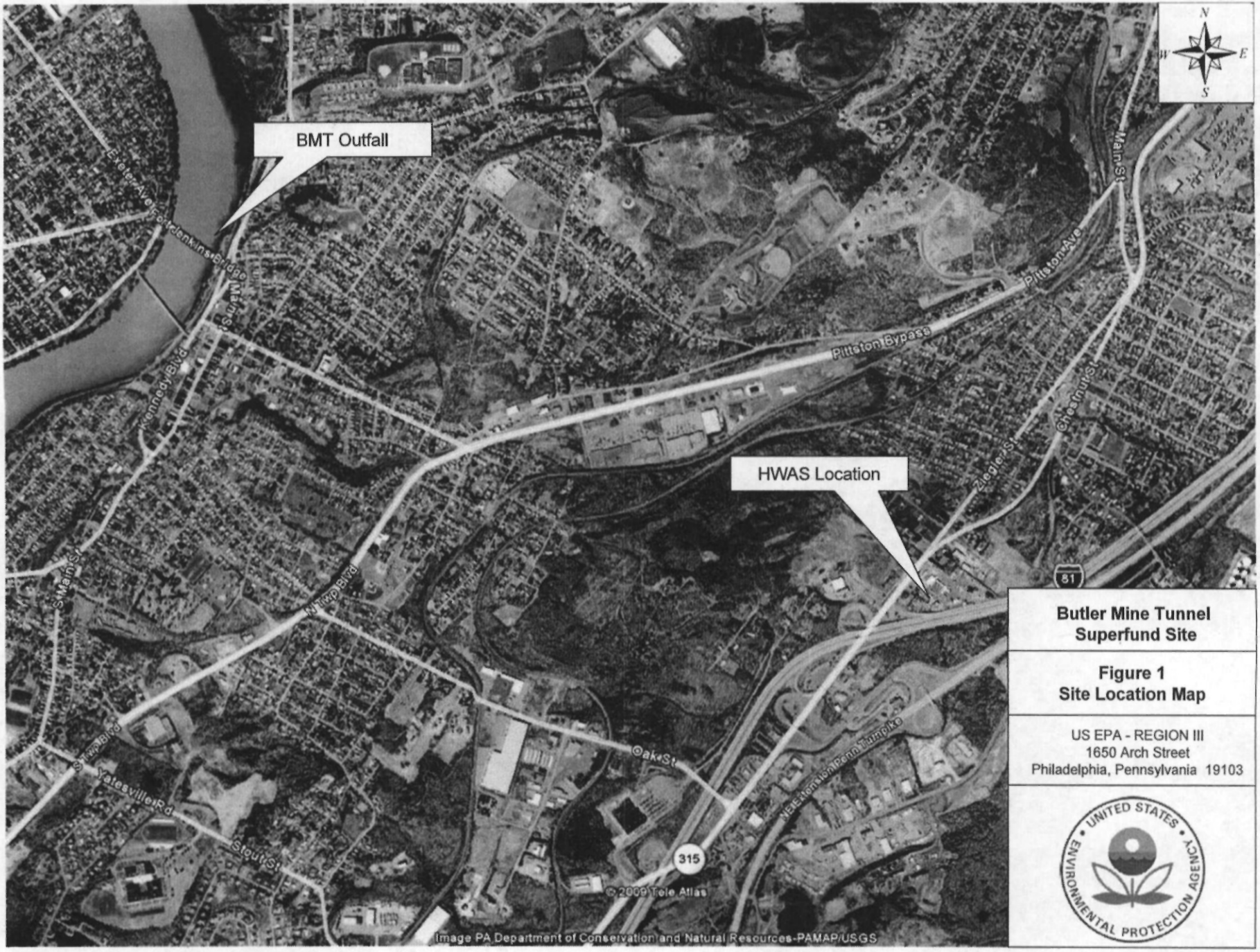
The next Five Year Review will be prepared five years after the issue date of this Five Year Review, in approximately July 2019.

Butler Mine Tunnel Superfund Site

Five Year Review Report

Appendix 1

Site Location Map



Butler Mine Tunnel Superfund Site

Figure 1
Site Location Map

US EPA - REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Butler Mine Tunnel Superfund Site

Five Year Review Report

Appendix 2

Photographs during Site Inspection (12/11/13)

Borehole 11, near HWAS Service Station. Located along Route 315.

Sampling activities at Borehole 11.

View of oil response boat associated with Site equipment.

View of Butler Mine Tunnel outfall to Susquehanna River. Photograph taken in Pittston, PA.

View of Susquehanna River where Butler Mine Tunnel outfall discharges to river.

View of boat ramp to Susquehanna River; one of a number of features constructed on the river bank to facilitate potential future oil responses.

View of monitoring building, located approximately above the Butler Mine Tunnel near where the Tunnel discharges into the Susquehanna River. In foreground is a concrete pad mounted winch pad, used to control lines during training activities and potential on-river oil responses.

Butler Mine Tunnel Superfund Site

Five Year Review Report

Appendix 3

Phase II RI – Figure 4-14

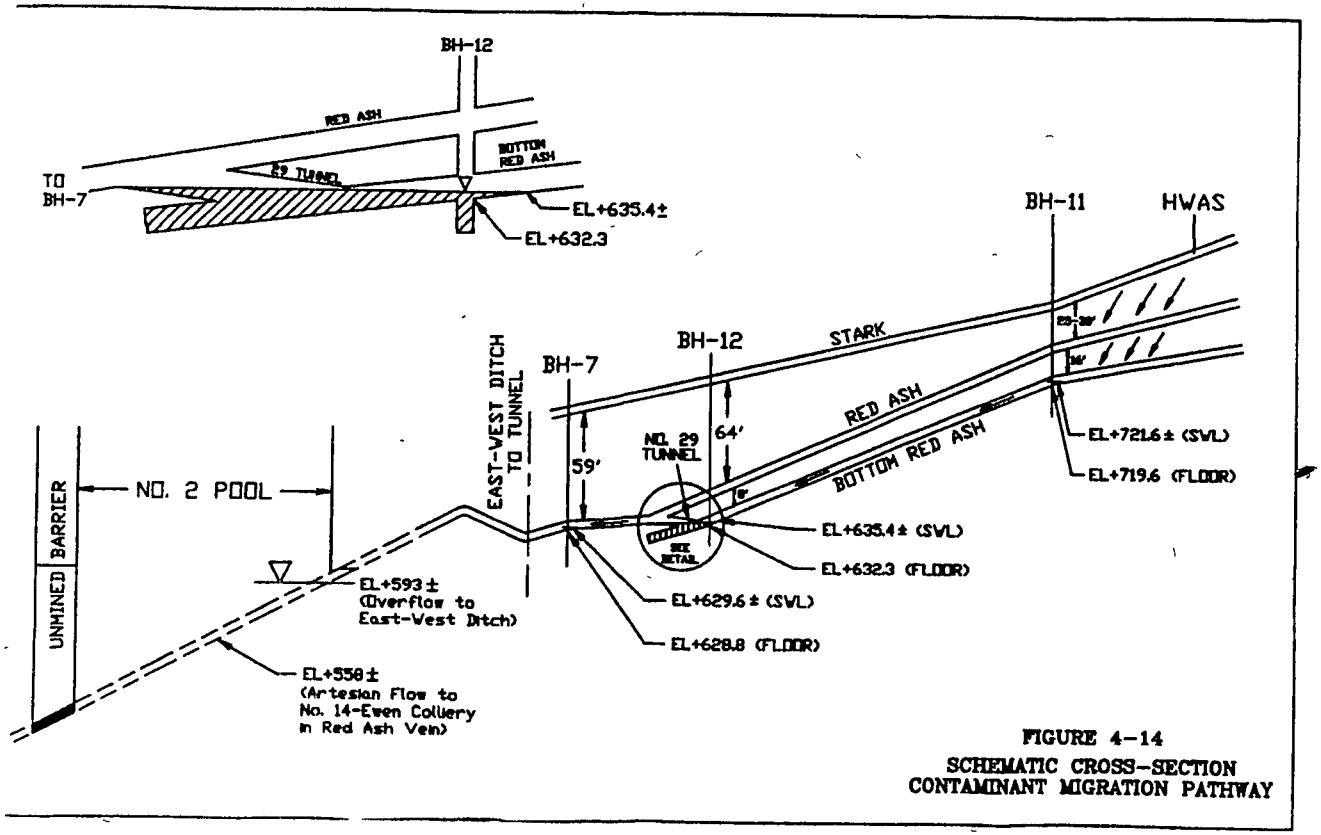


FIGURE 4-14
SCHEMATIC CROSS-SECTION
CONTAMINANT MIGRATION PATHWAY

ORIGINAL (Red)

Butler Mine Tunnel Superfund Site

Five Year Review Report

Appendix 4

Five-Year Review Inspection Checklist

Site Inspection Checklist

5/14/14

I. SITE INFORMATION	
Site name: BUTLER MINE TUNNEL SUPERFUND SITE	**Date of inspection: DECEMBER 11, 2013**
Location and Region: PITTSTON, LUZERNE COUNTY, PA. EPA REGION III	**EPA ID:**
Agency, office, or company leading the five-year review: EPA REGION III, HSCD	**Weather/temperature: COLD, WINDY, OVERCAST**

Remedy Includes (Check all that apply)

- ■ Landfill cover/containment
- ■ Access controlsX
- ■ Institutional controlsX
- ■ Groundwater pump and treatment
- ■ Surface water collection and treatment
- ■ OtherX
- ■ Monitored natural attenuation
- ■ Groundwater containment
- ■ Vertical barrier walls

REMEDY CONSISTS OF WEATHER/RAINFALL MONITORING EQUIPMENT, AS WELL AS STAGED EQUIPMENT AND CONSTRUCTED FEATURES TO FACILITATE ON-RIVER OIL RECOVERY IN THE EVENT OF AN OIL FLUSHOUT FROM THE BUTLER MINE TUNNEL FOR CONTEXT, THE LAST OIL FLUSHOUT WAS 1985

Attachments: ■ Inspection team roster attached - LISTED IN FYR ■ Site map attached – FYR APPENDIX 1

II. INTERVIEWS (Check all that apply)

1 **O&M site manager** N/A _____ _____ _____
Name Title Date
Interviewed ■ at site ■ at office ■ by phone Phone no _____
Problems, suggestions; ■ Report attached (NOTE THERE IS NO ON-SITE MANAGER)

2. **O&M staff** CRAIG COSLETT, PRP PROJECT COORDINATOR, DECEMBER 11, 2013
Name Title Date
Interviewed ■ at siteX ■ at office ■ by phone Phone no (610) 435-1151
Problems, suggestions, ■ Report attached OVERALL CRAIG INDICATED THAT THE SUPERFUND REMEDY WAS FUNCTIONING AS DESIGNED CRAIG SUGGESTED THAT THE PRPS, EPA, AND PADEP MEET SOON TO DISCUSS COMPLETION OF PRP INVOLVEMENT IN REMEDY

3 **Local regulatory authorities and response agencies** (i.e , State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc) Fill in all that apply

LARRY JOHNSON, EPA CIC, INTERVIEWED LOCAL OFFICIALS HIS RECORDS OF SUCH INTERVIEWS WILL BE INCLUDED IN FYR REPORT AS AN APPENDIX

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no
Problems; suggestions, ■ Report attached _____

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems, suggestions, ■ Report attached _____

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no
Problems, suggestions; ■ Report attached _____

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no
Problems, suggestions, ■ Report attached _____

4 **Other interviews** (optional) ■ Report attached

EPA COMMUNICATED WITH THREE PADEP OFFICIALS ON JANUARY 29, 2014 (JOE IANUZZO, PAUL PANEK, BOB LEWIS) DURING THE PREPARATION OF THE FIVE YEAR REVIEW REPORT. THE PADEP OFFICIALS DID NOT IDENTIFY CONCERNS WITH REGARD TO THE PROTECTIVENESS OF THE SUPERFUND REMEDY AT THE SITE. THE PADEP OFFICIALS DID SUGGEST THAT A FINAL CLOSURE REPORT BE PREPARED AS PART OF COMPLETION OF PRP INVOLVEMENT AT THE SITE.

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)	
1.	**O&M Documents** ■ O&M manual ■ Readily availableX ■ Up to date ■ N/A ■ As-built drawings ■ Readily availableX ■ Up to date ■ N/A ■ Maintenance logs ■ Readily availableX ■ Up to date ■ N/A Remarks_____
2	**Site-Specific Health and Safety Plan** ■ Readily availableX ■ Up to date ■ N/A ■ Contingency plan/emergency response plan ■ Readily availableX ■ Up to date ■ N/A Remarks_____
3	**O&M and OSHA Training Records** ■ Readily availableX ■ Up to date ■ N/A Remarks OVERALL TRAINING RECORDS FOR SITE RELATED TRAINING ARE AVAILABLE
4.	**Permits and Service Agreements ---- THIS IS NOT APPLICABLE** ■ Air discharge permit ■ Readily available ■ Up to date ■ N/A ■ Effluent discharge ■ Readily available ■ Up to date ■ N/A ■ Waste disposal, POTW ■ Readily available ■ Up to date ■ N/A ■ Other permits_____ ■ Readily available ■ Up to date ■ N/A Remarks_____
5	**Gas Generation Records** ■ Readily available ■ Up to date ■ N/AX Remarks_____
6	**Settlement Monument Records** ■ Readily available ■ Up to date ■ N/AX Remarks_____
7	**Groundwater Monitoring Records** ■ Readily available ■ Up to date ■ N/AX Remarks_____
8	**Leachate Extraction Records** ■ Readily available ■ Up to date ■ N/AX Remarks_____
9	**Discharge Compliance Records** ■ Air ■ Readily available ■ Up to date ■ N/AX ■ Water (effluent) ■ Readily available ■ Up to date ■ N/AX Remarks THE BUTLER MINE TUNNEL DOES NOT HAVE A DISCHARGE PERMIT; HOWEVER, BI-ANNUAL SAMPLES OF THE WATER FROM THE BUTLER MINE TUNNEL ARE COLLECTED BY PRPS A DISCUSSION OF SAMPLING RESULTS IS INCLUDED IN FYR REPORT
10	**Daily Access/Security Logs** ■ Readily available ■ Up to date ■ N/AX Remarks THERE ARE NOT DAILY ACTIVITIES AT THE SITE

IV. O&M COSTS

1 **O&M Organization**

■ State in-house ■ Contractor for State
■ PRP in-houseX ■ Contractor for PRPX
■ Federal Facility in-house ■ Contractor for Federal Facility
■ Other_____

2 **O&M Cost Records**

■ Readily available ■ Up to date
■ Funding mechanism/agreement in placeX – CONSENT DECREE IN PLACE FOR O&M
Original O&M cost estimate_____ ■ Breakdown attached

Total annual cost by year for review period if available

From_____ To_____ _____ ■ Breakdown attached
Date Date Total cost

From_____ To_____ _____ ■ Breakdown attached
Date Date Total cost

From_____ To_____ _____ ■ Breakdown attached
Date Date Total cost

From_____ To_____ _____ ■ Breakdown attached
Date Date Total cost

From_____ To_____ _____ ■ Breakdown attached
Date Date Total cost

3 **Unanticipated or Unusually High O&M Costs During Review Period**

Describe costs and reasons _____

V. ACCESS AND INSTITUTIONAL CONTROLS ■ ApplicableX ■ N/A

A. Fencing

1 **Fencing damaged** ■ Location shown on site map ■ Gates securedX ■ N/A

Remarks OVERALL SECURITY AT SITE LOOKED OK

B. Other Access Restrictions

1 **Signs and other security measures** ■ Location shown on site map ■ N/AX

Remarks_____

C. Institutional Controls (ICs)

1 **Implementation and enforcement**

Site conditions imply ICs not properly implemented ■Yes ■NoX ■N/A
Site conditions imply ICs not being fully enforced ■Yes ■NoX ■N/A

Type of monitoring (*e g* , self-reporting, drive by) _____
Frequency _____
Responsible party/agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.

Reporting is up-to-date ■Yes ■No ■N/A
Reports are verified by the lead agency ■Yes ■No ■N/A

Specific requirements in deed or decision documents have been met ■YesX ■No ■N/A
Violations have been reported ■Yes ■No ■N/A
Other problems or suggestions ■Report attached
IMPLEMENATION OF ICS IS SATISFACTORY – THIS ISSUE WAS EVALUATED DURING PERIOD BETWEEN 2009 AND 2014 FIVE YEAR REVIEWS

2 **Adequacy** ■ICs are adequateX ■ICs are inadequate ■N/A
Remarks ICs SEEM ADEQUATE, AT PRESENT ICs MAINTAIN ACCESS TO RESPONSE AREAS ALONG SUSQUEHANNA RIVER

D. General

1. **Vandalism/trespassing** ■Location shown on site map ■No vandalism evidentX
Remarks PRP CONTRACTOR INDICATED THAT SOME GRAFITTI HAS BEEN REMOVED FROM MONITORING BUILDING OVER BUTLER MINE TUNNEL OUTFALL DURING FYR PERIOD (2009-2014)

2. **Land use changes on site** ■N/A
Remarks NO

3 **Land use changes off site** ■N/A
Remarks RETAIL DEVELOPMENT HAS OCCURRED ALONG ROUTE 315 WEST OF THE HI WAY AUTO SERVICE STATION

VI. GENERAL SITE CONDITIONS

A. Roads ■ApplicableX ■N/A

1 **Roads damaged** ■Location shown on site map ■Roads adequateX ■N/A
Remarks ACCESS ROADS TO RESPONSE AREAS ALONG SUSQUEHANNA RIVER SHOWED SOME SIGNS OF RUTTING/WEAR DURING THE SITE INSPECTION, HOWEVER THEY APPEARED TO BE OK FOR USE DURING TRAINING/RESPONSE ACTIVITIES

B. Other Site Conditions

Remarks OVERALL THE ELEMENTS OF THE SITE APPEAR TO BE IN GOOD CONDITION, THE BH-11 HAS BEEN IMPROVED, THE RESPONSE WAREHOUSE APPEARED TO BE IN GOOD ORDER/CONDITION, AND RIVER SIDE SITE IMPROVEMENTS APPEARED TO BE IN SATISFACTORY CONDITION

VII. LANDFILL COVERS ■ Applicable ■ N/AX

NO LANDFILL COVER IS-PRESENT AT THE BUTLER MINE TUNNEL SUPERFUND SITE

A. Landfill Surface

1. **Settlement** (Low spots) ■ Location shown on site map ■ Settlement not evident
   Areal extent_____ Depth_____
   Remarks_____

2. **Cracks** ■ Location shown on site map ■ Cracking not evident
   Lengths_____ Widths_____ Depths_____
   Remarks_____

3. **Erosion** ■ Location shown on site map ■ Erosion not evident
   Areal extent_____ Depth_____
   Remarks_____

4 **Holes** ■ Location shown on site map ■ Holes not evident
   Areal extent_____ Depth_____
   Remarks_____

5. **Vegetative Cover** ■ Grass ■ Cover properly established ■ No signs of stress
   ■ Trees/Shrubs (indicate size and locations on a diagram)
   Remarks_____

6. **Alternative Cover (armored rock, concrete, etc.)** ■ N/A
   Remarks_____

7. **Bulges** ■ Location shown on site map ■ Bulges not evident
   Areal extent_____ Height_____
   Remarks_____

8 **Wet Areas/Water Damage** ■ Wet areas/water damage not evident
   ■ Wet areas ■ Location shown on site map Areal extent_____
   ■ Ponding ■ Location shown on site map Areal extent_____
   ■ Seeps ■ Location shown on site map Areal extent_____
   ■ Soft subgrade ■ Location shown on site map Areal extent_____
   Remarks_____

9	**Slope Instability** ■ Slides ■ Location shown on site map ■ No evidence of slope instability Areal extent_____ Remarks_____	
B. Benches ■ Applicable ■ N/A (Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel)		
1.	**Flows Bypass Bench** ■ Location shown on site map ■ N/A or okay Remarks_____	
2.	**Bench Breached** ■ Location shown on site map ■ N/A or okay Remarks_____	
3	**Bench Overtopped** ■ Location shown on site map ■ N/A or okay Remarks_____	
C. Letdown Channels ■ Applicable ■ N/A (Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)		
1	**Settlement** ■ Location shown on site map ■ No evidence of settlement Areal extent_____ Depth_____ Remarks_____	
2	**Material Degradation** ■ Location shown on site map ■ No evidence of degradation Material type_____ Areal extent_____ Remarks_____	
3	**Erosion** ■ Location shown on site map ■ No evidence of erosion Areal extent_____ Depth_____ Remarks_____	

4 **Undercutting** ■ Location shown on site map ■ No evidence of undercutting
Areal extent_____ Depth_____
Remarks_____

5 **Obstructions** Type_____ ■ No obstructions
■ Location shown on site map Areal extent_____
Size_____
Remarks_____

6 **Excessive Vegetative Growth** Type_____
■ No evidence of excessive growth
■ Vegetation in channels does not obstruct flow
■ Location shown on site map Areal extent_____
Remarks_____

D. Cover Penetrations ■ Applicable ■ N/A

1 **Gas Vents** ■ Active ■ Passive
■ Properly secured/locked ■ Functioning ■ Routinely sampled ■ Good condition
■ Evidence of leakage at penetration ■ Needs Maintenance
■ N/A
Remarks_____

2. **Gas Monitoring Probes**
■ Properly secured/locked ■ Functioning ■ Routinely sampled ■ Good condition
■ Evidence of leakage at penetration ■ Needs Maintenance ■ N/A
Remarks_____

3 **Monitoring Wells** (within surface area of landfill)
■ Properly secured/locked ■ Functioning ■ Routinely sampled ■ Good condition
■ Evidence of leakage at penetration ■ Needs Maintenance ■ N/A
Remarks_____

4. **Leachate Extraction Wells**
■ Properly secured/locked ■ Functioning ■ Routinely sampled ■ Good condition
■ Evidence of leakage at penetration ■ Needs Maintenance ■ N/A
Remarks_____

5 **Settlement Monuments** ■ Located ■ Routinely surveyed ■ N/A
Remarks_____

E. Gas Collection and Treatment ■ Applicable ■ N/A

1 **Gas Treatment Facilities**
■ Flaring ■ Thermal destruction ■ Collection for reuse
■ Good condition ■ Needs Maintenance
Remarks_____

2 **Gas Collection Wells, Manifolds and Piping**
■ Good condition ■ Needs Maintenance
Remarks_____

3 **Gas Monitoring Facilities** (*e g* , gas monitoring of adjacent homes or buildings)
■ Good condition ■ Needs Maintenance ■ N/A
Remarks_____

F. Cover Drainage Layer ■ Applicable ■ N/A

1. **Outlet Pipes Inspected** ■ Functioning ■ N/A
Remarks_____

2 **Outlet Rock Inspected** ■ Functioning ■ N/A
Remarks_____

G. Detention/Sedimentation Ponds ■ Applicable ■ N/A

1 **Siltation** Areal extent_____ Depth_____ ■ N/A
■ Siltation not evident
Remarks_____

2 **Erosion** Areal extent_____ Depth_____
■ Erosion not evident
Remarks_____

3 **Outlet Works** ■ Functioning ■ N/A
Remarks_____

4. **Dam** ■ Functioning ■ N/A
Remarks_____

H. Retaining Walls ■ Applicable ■ N/A

1 **Deformations** ■ Location shown on site map ■ Deformation not evident
Horizontal displacement_____ Vertical displacement_____
Rotational displacement_____
Remarks_____

2 **Degradation** ■ Location shown on site map ■ Degradation not evident
Remarks_____

I. Perimeter Ditches/Off-Site Discharge ■ Applicable ■ N/A

1 **Siltation** ■ Location shown on site map ■ Siltation not evident
Areal extent_____ Depth_____
Remarks_____

2 **Vegetative Growth** ■ Location shown on site map ■ N/A
■ Vegetation does not impede flow
Areal extent_____ Type_____
Remarks_____

3 **Erosion** ■ Location shown on site map ■ Erosion not evident
Areal extent_____ Depth_____
Remarks_____

4 **Discharge Structure** ■ Functioning ■ N/A
Remarks_____

VIII. VERTICAL BARRIER WALLS ■ Applicable ■ N/AX

THERE ARE NO VERTICAL BARRIER WALLS AT THE BUTLER MINE TUNNEL SUPERFUND SITE

1 **Settlement** ■ Location shown on site map ■ Settlement not evident
Areal extent_____ Depth_____
Remarks_____

2 **Performance Monitoring** Type of monitoring_____
■ Performance not monitored
Frequency_____ ■ Evidence of breaching
Head differential_____
Remarks_____

IX. GROUNDWATER/SURFACE WATER REMEDIES ■ Applicable ■ N/AX

THERE IS NO GROUND WATER OR SURFACE WATER REMEDY ASSOCIATED WITH THE SITE – THE SITE IS WEATHER AND TUNNEL MONITORING TO PREDICT OIL FLUSHOUT FROM BUTLER MINE TUNNEL + PREPARATION/EXECUTION OF NECESSARY RESPONSES

A. Groundwater Extraction Wells, Pumps, and Pipelines ■ Applicable ■ N/A

1 **Pumps, Wellhead Plumbing, and Electrical**
■ Good condition ■ All required wells properly operating ■ Needs Maintenance ■ N/A
Remarks_____

2 **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
■ Good condition ■ Needs Maintenance
Remarks_____

3 **Spare Parts and Equipment**
■ Readily available ■ Good condition ■ Requires upgrade ■ Needs to be provided
Remarks_____

B. Surface Water Collection Structures, Pumps, and Pipelines ■ Applicable ■ N/A

1. **Collection Structures, Pumps, and Electrical**
■ Good condition ■ Needs Maintenance
Remarks_____

2 **Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
■ Good condition ■ Needs Maintenance
Remarks_____

3 **Spare Parts and Equipment**
■ Readily available ■ Good condition ■ Requires upgrade ■ Needs to be provided
Remarks_____

C. Treatment System	■ Applicable ■ N/A
1	**Treatment Train** (Check components that apply) ■ Metals removal ■ Oil/water separation ■ Bioremediation ■ Air stripping ■ Carbon adsorbers ■ Filters_____ ■ Additive (*e g* , chelation agent, flocculent)_____ ■ Others_____ ■ Good condition ■ Needs Maintenance ■ Sampling ports properly marked and functional ■ Sampling/maintenance log displayed and up to date ■ Equipment properly identified ■ Quantity of groundwater treated annually_____ ■ Quantity of surface water treated annually_____ Remarks_____
2	**Electrical Enclosures and Panels** (properly rated and functional) ■ N/A ■ Good condition ■ Needs Maintenance Remarks_____
3.	**Tanks, Vaults, Storage Vessels** ■ N/A ■ Good condition ■ Proper secondary containment ■ Needs Maintenance Remarks_____
4	**Discharge Structure and Appurtenances** ■ N/A ■ Good condition ■ Needs Maintenance Remarks_____
5.	**Treatment Building(s)** ■ N/A ■ Good condition (esp roof and doorways) ■ Needs repair ■ Chemicals and equipment properly stored Remarks_____
6.	**Monitoring Wells** (pump and treatment remedy) ■ Properly secured/locked ■ Functioning ■ Routinely sampled ■ Good condition ■ All required wells located ■ Needs Maintenance ■ N/A Remarks_____
D. Monitoring Data – MONITORING DATA DOES EXIST FOR BOREHOLE 11 – NEAR SOURCE AREA AND FROM BUTLER MINE TUNNEL OUTFALL TO SUSQUEHANNA RIVER	
1	Monitoring Data ■ Is routinely submitted on timeX ■ Is of acceptable qualityX

2.	Monitoring data suggests ■ Groundwater plume is effectively contained ■ Contaminant concentrations are declining MONITORING DATA SUGGESTS SOME SITE RELATED CONTAMINANTS ARE STILL PRESENT IN MINE WATER NEAR HI WAY AUTO SERVICE STATION SITE RELATED CONTAMINANTS ARE VERY RARELY DETECTED IN WATER DISCHARGING THROUGH THE BUTLER MINE TUNNEL TO THE SUSQUEHANNA RIVER

D. Monitored Natural Attenuation – NOT PART OF REMEDY

1 **Monitoring Wells** (natural attenuation remedy)

■ Properly secured/locked ■ Functioning ■ Routinely sampled ■ Good condition
■ All required wells located ■ Needs Maintenance ■ N/AX

Remarks_____

_____

X. OTHER REMEDIES

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy An example would be soil vapor extraction

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed Begin with a brief statement of what the remedy is to accomplish (i e , to contain contaminant plume, minimize infiltration and gas emission, etc.)

OVERALL THE PURPOSE OF THE REMEDY IS TO 1) MONITOR WEATHER AND RAINFALL NEAR THE BUTLER MINE TUNNEL, 2) PREDICT FLOW THAT WILL COME FROM BUTLER MINE TUNNEL IN RESPONSE TO RAINFALL AND MEASURE ACTUAL TUNNEL FLOW, 3) IF MODELED OR ACTUAL TUNNEL FLOWS EXCEED LEVELS NOT KNOWN TO BE ASSOCIATED WITH A FLUSHOUT, PREPARE FOR A FLUSHOUT RESPONSE, 4) RESPOND TO OIL FLUSHOUTS WITH A LAND-BASED AND IN-RIVER OIL RECOVERY SYSTEM

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures In particular, discuss their relationship to the current and long-term protectiveness of the remedy

O&M OF SITE FEATURES APPEARED TO BE ADEQUATE.

C.	Early Indicators of Potential Remedy Problems
	Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future. NO
D.	**Opportunities for Optimization**
	Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy. PRP PROJECT COORDINATOR REQUESTED A MEETING WITH PADEP AND EPA TO DISCUSS FUTURE END OF PRP INVOLVEMENT IN SITE ACTIVITIES.

Butler Mine Tunnel Superfund Site

Five Year Review Report

Appendix 5

Butler Mine Tunnel Site – Drill and Training Summary (prepared by PRPs)

Butler Mine Tunnel Site - Drill and Training Summary
Updated - 2/6/2014
Major Equipment

Year	Date	Work Boats	Jon Boat	Barge Training	Barge Deployment	Trotline Training	Trotline Deployment	Winch Deployment	"A" boom deployment	"B" Boom Deployment	"C" Boom Deployment	"D" Boom Deployment	Skimmer Operation	Auxillary Equipment	Notes
2007	April	X	X		X	X	X	X	X	X	X	X	X	X	System prove out / in water testing Full system deployment with full extents of boom installed on the river The prove out was conducted with the river stage above 16 feet The PCOR was submitted to agency in August 2007
2008	10-Nov-08			X		X		X						X	The Barge was taken for a dry run to the deployment area where a trotline deployment was mimicked on dry land including the connections of boom buoys A single winch was also taken to the blockhouse winch pad and used for training
	11-Nov-08		X						X					X	"A" Boom configuration was installed using Jon Boat Auxillary equipment included the use of the pressure washer trailer and misc hand tools
2009	2nd Quarter Maintence	X													Work Boats were tested at Lake Wallenpaupak
2010	26-Apr-10	X	X		X		X	X		X	X	X	X	X	Full Sytem Deployment and training The debris trotline and boom was installed multiple times at various angles for training purposes The training exercise was conducted over a one week period
2011	2nd Quarter Maintenance	X													Work Boats were tested at Harvey's Lake
	15-Nov-11			X		X		X						X	Winches were tested at shoreside locations, Barge and trotline training was conducted in the warehouse Auxillary equipment was utilized during winch installation and during warehouse barge training
2012	2nd Quarter Maintenance	X													Work Boats were tested at Harvey's Lake
	4-Dec-12		X			X		X	X						Barge and trotline training was conducted at the warehouse including boom buoy attachments "A" boom was deployed in the river using the Jon boat and winches were installed and tested at the southern winch pad location
2013	6-May-13	X	X		X		X	X		X	X		X	X	Full system deployment "B" boom configuration was installed serval times as practice "D" trotline and booms were not installed due to low water conditions and rock outcrops along the "D" trotline orientation Night operations were conducted by installing a light plant on the barge This was done to observe river hazards during potential night operations

Butler Mine Tunnel Superfund Site

Five Year Review Report

Appendix 6

Summary of Community Involvement Coordinator's interview with local officials (3/13/14)

Butler Mine Tunnel 5 year review Interview (Synopsis) (March 13, 2014)

Interviewees were selected for Site knowledge and connection to Community
Total number of interviewees: 3.

Mix of elected officials (Mayor), appointed Officials (City Manager) and emergency services managers (Fire and Police Chiefs)

Question 1: Aside from the Butler Mine Tunnel site, In general what issues receive the most attention locally?

Stormwater Control
Sinkholes
Antiquated sewage system

Question 2: What are the main environmental issues that continue to be resurface?

Flooding
Stormwater Management

Question 3: What is your impression of the remedy EPA has decided upon for the Butler Mine Tunnel?

Interviewees have personally observed the deployment of the response system for the Butler Mine Tunnel in at least 2 instances. They expressed admiration for the scope of the response and the attention to detail that has been evident in each of the training exercises to date. Of particular note was the coordination of response activities with local law enforcement and fire department personnel.

1. Numerous sinkholes and mine subsidence issues continue to plague the town with no effective resolution in sight. Structural failures in the sewer system and personal property continue to plague the city in recent years.
2. The City Manager is particularly concerned about the end of the active response system being maintained after 2017. The City of Pittston would like to be considered as recipients of the equipment associated with the response.
3. Citizens concerns related to the BMT have successfully transitioned from focus on EPA activities to a better working relationship with the Pennsylvania Department of Health. No inquiries from the Menichini Family in several months
4. Serious concerns about mine subsidence and stormwater management

Question 4: Do you think there is community interest or concern about the operation or administration of the Butler Mine Tunnel Site?

Interviewees had some concerns during Hurricane Irene and Hurricane Lee. Having observed EPA/ Trustee drills and exercises has given them confidence that the existing remedy will be successful in containing any outflow from the Mine Tunnel. However, without observing an actual release and containment they reserve comment on this issue. Generally, the project has the publics approval but with reservations as well.

Question 5: Do you feel well informed about the site's activities and progress?

The Mayor of Pittston expressed considerable praise for our outreach and information activities with regards to the flurry of concern from the Menichini family. He was particularly pleased with the extent and quality of our presentations at the Public meeting which was held

Question 6: What is your overall impression of the site?

In speaking with interviewees there has been a significant shift in the understanding of both City leadership and the general population that BMT is an unusual type of EPA response which will not lead to a general cleanup but a coordinated containment.

Summary narrative:

In general, interviewees are satisfied with the project and thinks EPA has done everything technologically possible to protect human health and the environment with regards to the mine tunnel response system. They have come to understand that EPA's role is not as a 'public health' agency per se but as a bulwark of engineering and technology that works for the situation at hand.

Larry C. Johnson
Community Involvement Coordinator
EPA Region 3 HSCD
Brownfields and Community Outreach Branch
Philadelphia, PA

Butler Mine Tunnel Superfund Site
Five Year Review Report
Appendix 7
Summary of Sampling Data

Borehole 11

Borehole-11 analytical results	Sampling Dates Results in parts per billion(ppb)				
Compound	12/2008	7/2009	12/2009	6/2010	12/2010
Benzene	<0.5	0.12 (estimated)	<0.5	<0.5	<0.5
Carbon Tetra Chloride	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroform	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	<0.5	<0.5	<0.5	<0.5	<0.5
Methylene Chloride	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	<0.5	<0.5	<0.5	<0.5	<0.5
Trichloroethene	1.1	1.1	1.2	0.71	0.72
Total Xylenes	1.0	<0.5	<0.5	<0.5	<1.5
Bis(2-ethylhexyl)phthalate	41	<20	240	130 (sample was noted as diluted prior to analysis)	340 (sample was noted as diluted prior to analysis)
4-Bromophenyl phenyl ether	Not provided	<5.1	<5	<5.1	<50
1,2-dichlorobenzene		2.5	3.1	3.9	3.6
1,3-dichlorobenzene		<0.5	<0.5	<0.5	<0.5
1,4-dichlorobenzene		<0.5	<0.5	<0.5	<0.5
Diethyl phthalate	1.5	<5.1	<5	<5.1	<50
Dimethyl phthalate	1.5	<5.1	<0.5	<5.1	<50
Di-n-octyl phthalate		<5.1	<0.5	<5.1	<50
Napthalene		0.16 (estimated)	<0.5	0.2 (estimated)	0.98
Phenol		<5.1	18	<5.1	<50
Cyanide	69	33	9.6 (estimated)	26	160
Oil	75,500	2,900 (estimated)	26,400	72,600	105,000

Borehole-11 analytical results	Sampling Dates Results in parts per billion(ppb)				
Compound	6/2011	12/2011	6/2012	12/2012	6/2013
Benzene	<0.5	<0.5	<0.5	<0.5	<0.5
Carbon Tetra Chloride	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroform	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	<0.5	<0.5	<0.5	<0.5	<0.5
Methylene Chloride	<0.5	<0.5	<0.5	<0.5	<0.5

Toluene	<0.5	<0.5	<0.5	<0.5	<0.5
Trichloroethene	0.56	0.8	0.69	0.51	0.69
Total Xylenes	<1.5	<1.5	<1.5	<1.5	<0.5
Bis(2-ethylhexyl)phthalate	110	33,000	5.6	670 (sample was noted as diluted prior to analysis)	68
4-Bromophenyl phenyl ether	<10	<5,000	<5.1	<10	<5
1,2-dichlorobenzene	2.5	4.2	3.5	3.1	5.7
1,3-dichlorobenzene	<0.5	<0.5	<0.5	<0.5	<0.5
1,4-dichlorobenzene	<0.5	<0.5	<0.5	<0.5	<0.5
Diethyl phthalate	<10	<5,000	<5.1	<10	<5
Dimethyl phthalate	<10	<5,000	<5.1	<10	<5
Di-n-octyl phthalate	<10	<5,000	<5.1	<10	<5
Napthalene	<0.5	0.78	1.2	1.2 (estimated)	<0.5
Phenol	<10	<5,000	<5.1	<10	<5
Cyanide	44	33	79	77	86
Oil	3,900 (estimated)	2,300 (estimated)	2,500 (estimated)	9,100	3,600 (estimated)

Borehole-11 analytical results	Sampling Dates Results in parts per billion(ppb)
Compound	12/2013
Benzene	<0.5
Carbon Tetra Chloride	<0.5
Chloroform	<0.5
Ethylbenzene	<0.5
Methylene Chloride	<0.5
Toluene	<0.5
Trichloroethene	0.56
Total Xylenes	<0.5
Bis(2-ethylhexyl)phthalate	37
4-Bromophenyl phenyl ether	<5.1
1,2-dichlorobenzene	3.2
1,3-dichlorobenzene	<0.5
1,4-dichlorobenzene	<0.5
Diethyl phthalate	<5.1
Dimethyl phthalate	<5.1
Di-n-octyl phthalate	<5.1
Napthalene	<0.5

Phenol	<5.1	
Cyanide	74	
Oil	6,900 (estimated)	

BMT Outfall

BMT Outfall analytical results	Sampling Dates Results in micrograms per liter				
Compound	12/2008	07/2009	12/2009	6/2010	12/2010
Benzene	<0.5	<0.5	<0.5	<0.5	<0.5
Carbon Tetra Chloride	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroform	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	<0.5	<0.5	<0.5	<0.5	<0.5
Methylene Chloride	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	<0.5	<0.5	<0.5	<0.5	<0.5
Trichloroethene	<0.5	<0.5	<0.5	<0.5	<0.5
Total Xylenes	<0.5	<0.5	<0.5	<1.5	<1.5
Bis(2-ethylhexyl)phthalate	<1.9	<5.1	<5	<5	<5
4-Bromophenyl phenyl ether	Not provided	<5.1	<5.2	<5.1	<5
1,2-dichlorobenzene		<0.5	<0.5	<0.5	<0.5
1,3-dichlorobenzene		<0.5	<0.5	<0.5	<0.5
1,4-dichlorobenzene		<0.5	<0.5	<0.5	<0.5
Diethyl phthalate	1.5	<5.1	<5.2	<5.1	<5
Dimethyl phthalate	1.5	<5.1	<5.2	<5.1	<5
Di-n-octyl phthalate		<5.1	<5.2	<5.1	<5
Napthalene		<0.5	<0.5	<0.5	<0.5
Phenol		<5.1	<5.2	<5.1	<50
Cyanide	<10	10	<10	10	<100
Oil	<5000	2600 (estimated)	3,600 (estimated)	3500 (estimated)	2200 (estimated)

BMT Outfall analytical results	Sampling Dates Results in micrograms per liter				
Compound	6/2011	12/2011	6/2012	12/2012	6/2013
Benzene	<0.5	<0.5	<0.5	<0.5	<0.5
Carbon Tetra Chloride	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroform	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	<0.5	<0.5	<0.5	<0.5	<0.5

Methylene Chloride	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	<0.5	<0.5	<0.5	<0.5	<0.5
Trichloroethene	<0.5	<0.5	<0.5	<0.5	<0.5
Total Xylenes	<1.5	<1.5	<1.5	<1.5	<0.5
Bis(2-ethylhexyl)phthalate	<5	<5,000	5.1	<5.1	<5
4-Bromophenyl phenyl ether	<5	<5,000	<5.1	<5.1	<5
1,2-dichlorobenzene	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-dichlorobenzene	<0.5	<0.5	<0.5	<0.5	<0.5
1,4-dichlorobenzene	<0.5	<0.5	<0.5	<0.5	<0.5
Diethyl phthalate	<5	<5,000	<5.1	<5.1	<5
Dimethyl phthalate	<5	<5,000	<5.1	<5.1	<5
Di-n-octyl phthalate	<5	<5,000	<5.1	<5.1	<5
Napthalene	<0.5	<0.5	<0.5	<0.5	<0.5
Phenol	<5	<5,000	<5.1	<5.1	<5
Cyanide	<100	<10	<10	4.7 (estimated)	<10
Oil	1,600 (estimated)	<5,000	1,400	<710	3,100 (estimated)

BMT Outfall analytical results	Sampling Dates Results in micrograms per liter
Compound	12/2013
Benzene	<0.5
Carbon Tetra Chloride	<0.5
Chloroform	<0.5
Ethylbenzene	<0.5
Methylene Chloride	<0.5
Toluene	<0.5
Trichloroethene	<0.5
Total Xylenes	<0.5
Bis(2-ethylhexyl)phthalate	<5.1
4-Bromophenyl phenyl ether	<5.1
1,2-dichlorobenzene	<0.5
1,3-dichlorobenzene	<0.5
1,4-dichlorobenzene	<0.5
Diethyl phthalate	<5.1
Dimethyl phthalate	<5.1
Di-n-octyl phthalate	<5.1
Napthalene	<0.5

Phenol	<5.1	
Cyanide	<10	
Oil	3,800 (estimated)	