SECOND FIVE-YEAR REVIEW REPORT

For

BERKLEY PRODUCTS COMPANY DUMP SUPERFUND SITE

WEST COCALICO TOWNSHIP

LANCASTER COUNTY, PENNSYLVANIA

SEPTEMBER 2010

PREPARED BY:

United States Environmental Protection Agency
Region III
Philadelphia, Pennsylvania

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U.S. EPA Region III

Date: 9/27/10

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Five-Year Review Report

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List of Acronyms

CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COPC	Compound of Potential Concern
DCA	Dichloroethane
EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Differences
MCL	Maximum Contaminant Level
NCP	National Contingency Plan
NPL	National Priorities List
O&M	Operation and Maintenance
PA	Preliminary Assessment
PADEP	Pennsylvania Department of Environmental Protection
PADER	Pennsylvania Department of Environmental Resources
PAH	Polynuclear Aromatic Hydrocarbons
PCB	Polychlorinated Biphenyl
PCE	Perchloroethene
PCOR	Preliminary Close Out Report
PRP	Potentially Responsible Party
RA	Remedial Action
RAC	Remedial Action Contractor
RD	Remedial Design

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RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RSLs	Regional Screening Levels
SI	Site Inspection
SSC	State Superfund Contract
SVOC	Semi-volatile Organic Compounds
TCA	Trichloroethane
TCE	Trichloroethene
URS	URS Corporation (PADEP's O&M contractor)
VOC	Volatile Organic Compounds

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Executive Summary

The Berkley Products Company Dump Site (Site) is located one and a half miles northeast of Denver, Pennsylvania, in West Cocalico Township, Lancaster County. Also known as Schoeneck Landfill, the Site is east of Wollups Hill Road and north of Swamp Bridge Road. The Site is a former "town dump" which covers about eight acres on the crest of a hill, within a larger tract of 21 acres. The Site included the landfill, areas where dumping occurred on the southern slope and the groundwater affected by contamination leaching from the landfill. The area surrounding the Site is primarily forested residential.

On June 28, 1996, EPA issued a ROD for the Site which required the following components:

- Pre-design investigations and activities
- Site preparation
- Consolidation of landfill wastes
- Site grading
- Cover system placement, with the following components as determined necessary for compliance with the relevant sections of Pennsylvania's Hazardous Waste Regulations:
    - Subgrade
    - Gas vent system
    - Barrier layers
    - Drainage layer
    - Top layer (vegetated)
- Security fencing
- Removal actions as determined to be necessary during consolidation activities, and to be conducted in compliance with all state and local laws, to the extent not inconsistent with federal laws
- Erosion control measures
- Long-term monitoring to include groundwater, surface runoff, leachate spring and seep monitoring (annual), residential well monitoring (semi-annual) and monitoring wells (quarterly)
- Institutional controls to restrict new well installation in the contaminated zone
- Long-term operation and maintenance of the remedy
- Five-Year Reviews

On August 20, 1999 an Explanation of Significant Differences (ESD) was issued which revised the remedy. The ROD anticipated that the bulk of the consolidated wastes at the Site would be incorporated into the on-site landfill and capped in place. During the design of the cap, the volume of the waste to be consolidated was determined to exceed the capacity of the cap being designed for the landfill area. Therefore the ESD required excavation, characterization, and offsite disposal of the excess waste materials. Then the on-site landfill could be capped as described in the ROD.

On-site construction for the remedial action began in May of 2000 and was completed by September 2002. EPA conducted the first round of groundwater monitoring in October 2002 and then turned over the Operation and Maintenance (O&M) activities to the Pennsylvania Department of Environmental Protection (PADEP), since there was no viable responsible party for the Site. The State initiated O&M in the fall of 2003.

The institutional controls to restrict new well installation in the landfill property were established on June 8, 2001 by an Access Order issued during the construction phase of the remedial action and are still in effect. The property owner initially signed an Environmental Protection Easement and Declaration of Restrictive Covenants which specified the institutional control, but the easement was never recorded in the chain of title. The easement was replaced by the Access Order which required that the property owner shall not interfere with the operation, alter or disturb the integrity, of any structures or devices now or hereinafter built, installed or otherwise placed by EPA and/or its Representatives on the Site or Property. This effectively prevents any well installation through the cap. Maintenance of the institutional control is part of the O&M activities conducted by PADEP pursuant to the State Superfund Contract (SSC). If the property is sold to any new owner, PADEP is obligated to put new institutional controls in place.

GPRA Measure Review

As part of this Five-Year Review the GPRA (Government Performance Results Act) Measures have also been reviewed. The GPRA Measures and their current status are provided as follows:

Environmental Indicators

Human Health: HEUC = Current Human Exposure Under Control
Groundwater Migration: GMUC = Groundwater Migration Under Control

Sitewide RAU: The Site has achieved SWRAU because the Institutional Controls have been implemented.

Protectiveness Statement

The Site remedy is protective of human health and the environment in the short-term because the remedial action as outlined in the ROD and ESD was implemented and all immediate threats at the site have been addressed.

Long-term protectiveness of the remedial action will continue to be verified by obtaining additional groundwater samples to fully evaluate the groundwater conditions at the Site and any potential impact to the downgradient areas.

Current data indicates that two downgradient monitoring wells display low levels of VOC contamination below MCLs which are expected to continue to diminish.

Several other monitoring wells have low levels of metals. Two compounds are currently above MCLs. Barium is a site related compound and the concentrations in monitoring

wells are decreasing over time. Mercury is not a Site related compound based on the 1996 Record of Decision.

Residential wells show occasional metals concentrations exceeding regional screening levels (RSLs). However, these results are unfiltered analyses and it is expected these concentrations will be reduced when filtered analysis is required in the next sampling event. Since the remedy was constructed, residential wells have been sampled multiple times for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and polynuclear aromatic hydrocarbons (PAHs). The 2004 and 2005 groundwater data show no concentrations above MCLs or at risk levels of concern (cancer or hazard index) in residential wells. In 2006, residential groundwater data showed no organic contamination. Sampling for residential wells will be repeated in the fall of 2010.

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Five-Year Review Summary Form

SITE IDENTIFICATION

Site name Berkley Products Company Dump Site

EPA ID PAD980538649

Region: III	**State:** PA	**City/County:** West Calico Township, Lancaster County

SITE STATUS

NPL status: □ Final √ Deleted □ Other (specify) _____

Remediation status (choose all that apply) □ Under Construction □ Operating √ Complete

Multiple OUs? □ Yes √ No	**Construction Completion date:** 09/19/01

Has site been put into reuse? □Yes √ No

REVIEW STATUS

Lead agency: √ EPA □ State □ Tribe □ Other Federal Agency _____

Author name: Roy Schrock

Author title: Remedial Project Manager	**Author Affiliation:** U.S. EPA Region 3

Review period:** 5/10/09 to 9/23/10

Date(s) of site inspection: 6/2/10

Type of review:
√ Post-SARA □ Pre-SARA □ NPL-Removal only □ Non-NPL Remedial Action-site
□ NPL State/Tribe-lead □ Regional Discretion

Review number: □ first √ second □ third □ other _____

Triggering action:
□ Actual RA On-site Construction at OU #1 □ Actual RA Start at OU#____
□ Construction Completion √ Previous Five-Year Review Report
□ Other (specify) _____

Triggering action date (from WasteLAN): 8/17/05

Due Date (five years after triggering action date): 8/17/10

* "OU" refers to operable unit.
** Review period should correspond to the actual start and end dates of the Five-Year Review in WasteLAN

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Five-Year Review Summary Form, cont'd

Issues:

1. PADEP analyzed for metals, but did not monitor residential wells for organics, svocs, pesticides or PCBs from 2006-2009 as required by the ROD.

2. A number of metals in groundwater residential wells and monitoring wells are above the EPA Region 3 2010 Regional Screening Levels (RSLs). The metals analyses were based on unfiltered groundwater samples.

3. No groundwater flow figures were available.

Recommendations:

1. PADEP should perform the analysis required by the 1996 ROD on residential wells.

2. A comprehensive comparison to background should be performed to determine if observed metals are related to the Site. Future inorganic analyses should be performed on filtered samples.

3. Develop a current groundwater flow figure to assist with evaluation of groundwater conditions.

Protectiveness Statement:

The Site remedy is protective of human health and the environment in the short-term because the remedial action as outlined in the ROD and ESD was implemented and all immediate threats at the site have been addressed.

Long-term protectiveness of the remedial action will continue to be verified by obtaining additional groundwater samples to fully evaluate the groundwater conditions at the Site and any potential impact to the downgradient areas.

Current data indicates that two downgradient monitoring wells display low levels of VOC contamination below MCLs which are expected to continue to diminish.

Several other monitoring wells have low levels of metals. Two compounds are currently above MCLs. Barium is a site related compound and the concentrations in monitoring wells are decreasing over time. Mercury is not a Site related compound based on the 1996 Record of Decision.

Residential wells show occasional metals concentrations exceeding RSLs. However, these results are unfiltered analyses and it is expected these concentrations will be reduced when filtered. In 2006, residential groundwater data showed no organic contamination.

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Five-Year Review Report
For
Berkley Products Company Dump Superfund Site
West Calico Township, Lancaster 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 reviews are documented in Five-Year Review reports. In addition, Five-Year Review reports identify issues found during the reviews, if any, and recommendations to address them.

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

> *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 often 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 judgement 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 Code of Federal Regulations §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.*

The United States Environmental Protection Agency, Region 3, conducted the Five-Year Review of the remedy implemented at the Berkley Products Dump Site in West Cocalico Township, Pennsylvania. This review was conducted by the Regional Project Manager (RPM) for the entire Site from May 2009 through September 2010. This report documents the results of the review.

This is the second Five-Year Review for the Site. The triggering action for this statutory review is the completion of the previous Five-Year Review which is required due to the fact that hazardous substances, pollutants, or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure.

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II. Site Chronology

Table 1: Chronology of Site Events

Event	Date
Initial discovery of problem or contamination	6/01/1981
Pre-NPL responses	3/01/1984 prelim assessment 3/05/1986 site inspection
NPL listing	3/31/1989
Removal actions	5/09/1992
ROD and Remedial investigation/Feasibility Study complete	6/28/1996
ESD	8/20/1999
Unilateral, Administrative Order	6/08/2001
Remedial design start	9/11/1996
Remedial design complete	1/07/2000
Superfund State Contract	2/09/2000
Actual remedial action start	9/30/1999
Construction start date	5/24/2000
Preliminary Close-out Report	9/19/2001
Remedial Action Completion Date	9/27/2002
First Five-Year Review	8/17/2005
Deletion from the NPL	3/19/2007

III. Background

Physical Characteristics and Land Use

The Berkley Products Company Dump Site (Site) is located one and a half miles northeast of Denver, Pennsylvania, in West Cocalico Township, Lancaster County (Figure 1). Also known as Schoeneck Landfill, the Site is east of Wollups Hill Road, north of Swamp Bridge Road

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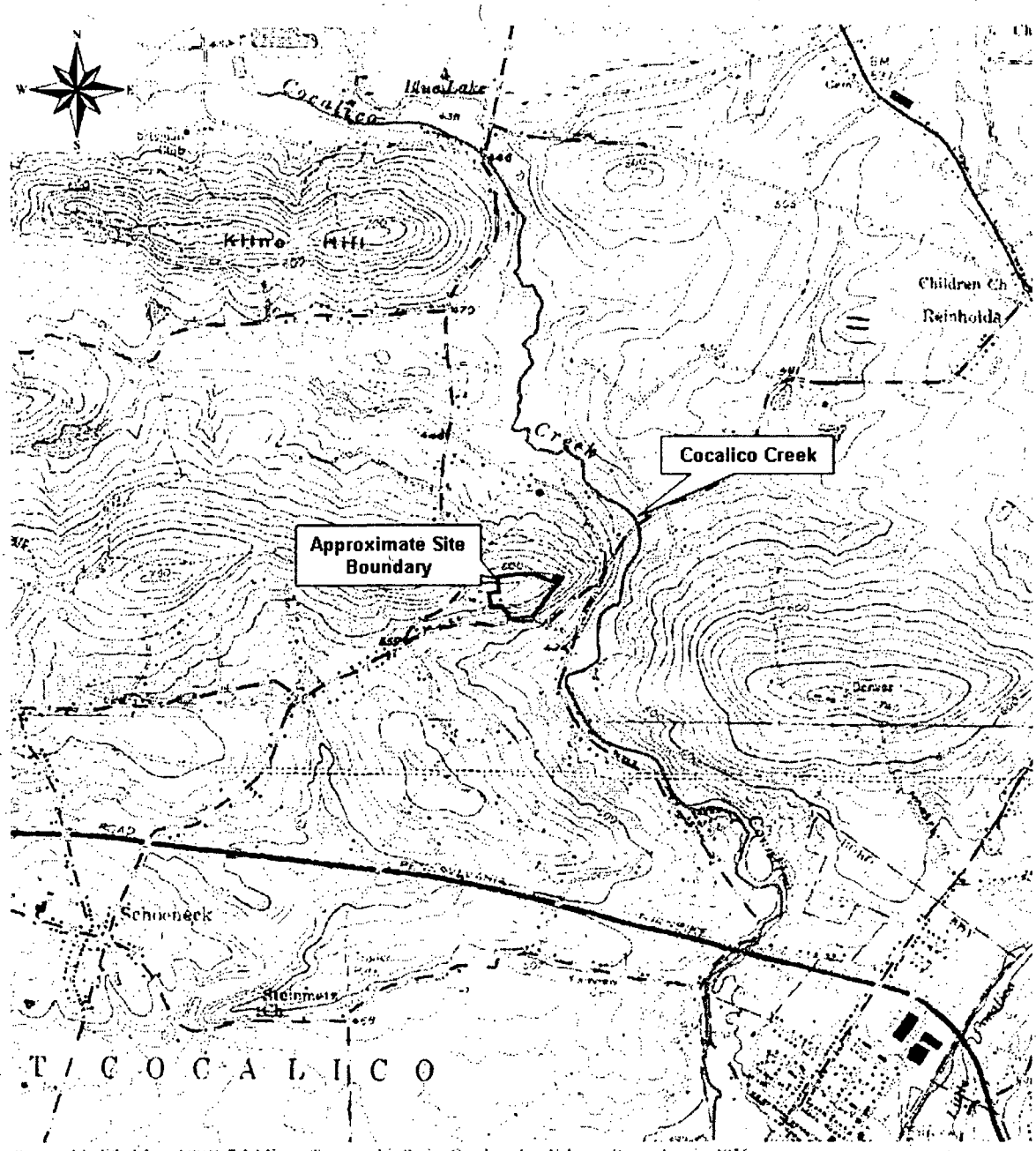
Figure 1 – Site Location Map



Source: Modified from USGS 7.5-Minute Topographic Series Quadrangles: Ephrata, Pennsylvania, 1956, Photorevised 1969, 1974, Photoinspected 1982; Womelsdorf, Pennsylvania, 1955, Photorevised 1969, 1977, Photoinspected 1984

The Site is approximately 1,000 feet west of Cocalico Creek. The groundwater flow is generally to the east and northeast direction towards Cocalico Creek. The headwaters of Cocalico Creek are in the valley south of South Mountain near Blue Lake. This valley is located a few miles north of the Site. Conestoga Creek, along with its tributaries, Muddy Creek, Little Conestoga Creek, and Cocalico Creek, drains the northeastern and north-central portion of Lancaster County and eventually enters the Susquehanna River. Seasonally, wet springs located immediately north of the Site discharge into Cocalico Creek to the north. On the southern side of the Site, a seep was located on the slope of the landfill material. The seep was related to rain events.

The land use in the immediate vicinity of the Site is residential in nature. The Site is near dense woods and several single family homes. A few open areas have been converted into farm land by the local residents

History of Contamination and Response Actions

The Site was used as a municipal waste dump from approximately 1930 until 1965. In 1965, the Lipton Paint Company (Lipton), a subsidiary of Berkley Products Company, purchased the property. The operation continued to receive household trash from neighboring communities as well as paint wastes from Berkley Products Company. The property was closed by Lipton due to a lack of available fill area, and was covered with soil. Then, in September 1970, the property was sold to private owners and is still used as a private residence.

Prior to 1965, the dump received paper, wood, cardboard and other domestic trash from the northeastern corner of Lancaster County. The only commercial wastes identified during that period were from local shoe companies. Those wastes included leather scraps and empty glue and dye pails.

During the period from 1965 to 1970, different sources estimate that the dump received from 650 to 40,000 gallons of paint wastes from Berkley Products Company. These wastes included primarily pigment sludges and wash solvents. EPA has learned that the solvents were sometimes used to burn the household trash and that the sludges were disposed of in five gallon pails. Information gathered about the final years of operation of the Site indicates that the municipal trash was dumped to the south of the access road, toward the hillside, while the paint wastes were deposited in the northern part of the dump.

The Berkley Products Company produced paints and varnishes with solvents, ethyl cellulose resin and pigments with lead oxide and lead chromate. The solvents included toluene, xylene, aliphatic naphthas, mineral spirits, methyl ethyl ketones, methyl isobutyl ketones, ethyl acetate, butyl acetate, glycol ether, butyl celasol, methyl alcohol and isopropyl alcohol.

This Site was originally investigated by the Pennsylvania Department of Environmental Resources (PADER) in 1984. In March of that year, PADER completed a Potential

Hazardous Waste Site Identification form and the Site was included on EPA's CERCLIS, a list of potentially hazardous waste sites. A Preliminary Assessment (PA) was also completed in 1984, by EPA, and the Site was scheduled for further investigation pursuant to the Comprehensive Environmental Response, Compensation and Liability Act, as amended, (CERCLA), 42 U.S.C. §§9601 - 9675.

In July 1984, EPA collected field samples and the results were presented in a Site Investigation (SI) report dated March 5, 1986. The information from the SI was used to score the Site using the Hazard Ranking System. The Site was nominated for the National Priorities List (NPL) of Superfund sites in 1986 with a score of 30.00 and was finalized as an NPL site in March 1989. The regulations enacted pursuant to CERCLA generally require that a Remedial Investigation and Feasibility Study (RI/FS) be conducted at each NPL site and subsequently, a remedial response action selected to address the problems identified.

During the search for potentially responsible parties (PRP) for the Site EPA conducted interviews with former owners, operators and employees of the Site. Company records were also obtained and deed information was researched. That information has been compiled and reviewed to determine liability and also to estimate types and quantities of wastes disposed at the Site and to determine disposal practices during operations. Based on the findings of the PRP search, EPA sent Notice Letters to two parties, Berkley Products Company and the landowner that had purchased the closed landfill. These Notice Letters identified the parties as PRPs, but waived the sixty day moratorium, established at CERCLA Sections 122(a) and 122(e), to negotiate a Consent Order to perform the RI/FS. These waivers were issued pursuant to CERCLA Section 122(a) because the Berkley Products Company did not have the financial assets to pay for the remedy, and the current landowners had purchased the property after landfill operations had ceased.

Initial Response

EPA initiated the RI/FS in 1990 to identify the types, quantities and locations of contaminants, to evaluate the potential risks, and to develop and evaluate remedial action alternatives to address the contamination problems at this Site. A CERCLA removal action was completed at the Site in May 1992 to address some preliminary findings of the RI. During the field investigation of the RI, buried drums containing paint wastes were uncovered in the northeastern portion of the Site. This area was excavated, and 59 drums were overpacked and removed. An additional seven drums were overpacked and removed from the southern slope of the landfill. A 35-foot-long by 15-foot-deep exploration trench uncovered no additional drums. The wastes were classified as Polychlorinated Biphenyl (PCB) flammable liquids, solids, and paint solvents.

The field investigations, data analysis and evaluation of alternatives that comprise the RI/FS were completed in June 1996 for the Site.

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Basis for Taking Action

The following contaminants, hazardous substances and inorganics were the Compounds of Potential Concern (COPC) detected at the Site.

Surface Soils COPC

Organics	Inorganics
Dieldrin	Aluminum
Aroclor 1254	Arsenic
	Beryllium
	Chromium
	Magnesium

Subsurface Soil

Organics	Inorganics
Acetone	Aluminum
Benzene	Arsenic
Ethylbenzene	Beryllium
2-Butanone	Cadmium
1,1,1-TCA	Chromium
1,1,2-TCA	Manganese
4-Methyl-2-Pentanone	Mercury
PCE	Nickel
Toluene	Vanadium
TCE	
Xylene	

Springs CPOC

Organics	Inorganics
No CPOC	Aluminum
	Arsenic
	Beryllium
	Manganese

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Leachate COPC

Organics

No CPOC

Inorganics

Arsenic
Beryllium
Chromium

Groundwater CPOC

Organics

Methylene chloride
Chloroform
2-Butanone
TCE
PCE
Toluene
Ethylbenzene
1,2 Dichlorobenzene
Xylenes
Bis(2-ethylhexyl) phthalate
1,4-Dichlorobenzene
Vinyl chloride
Carbon Disulfide
1,2-Dichloroethene

Inorganics

Arsenic
Beryllium
Chromium
Manganese
Nickel

IV. Remedial Actions

Remedy Selection

Remedial Action Objectives

The major objectives of the remedy was to consolidate the landfill materials, contain the Site by capping the landfill to prevent direct contact and to significantly limit contamination leaching into groundwater, thereby reducing contaminant migration. The remedy included monitoring wells between the landfill and downgradient residents to act as early warning system to ensure that the residential wells remain uncontaminated. Institutional controls to restrict any new wells on the landfill property were required.

On June 28, 1996, EPA issued a ROD for the Site which required the following components:

- Pre-design investigations and activities
- Site preparation
- Consolidation of landfill wastes
- Site grading
- Cover system placement, with the following components as determined necessary for compliance with the relevant sections of Pennsylvania's Hazardous Waste Regulations:
  - Subgrade
  - Gas vent system
  - Barrier layers
  - Drainage layer
  - Top layer (vegetated)
- Security fencing
- Removal actions as determined to be necessary during consolidation activities, and to be conducted in compliance with all state and local laws, to the extent not inconsistent with federal laws
- Erosion control measures
- Long-term monitoring to include groundwater, surface runoff, leachate spring and seep monitoring (annual), residential well monitoring (semi-annual) and monitoring wells (quarterly)
- Institutional controls to restrict new well installation in the contaminated zone
- Long-term operation and maintenance of the remedy
- Five-Year Reviews

On August 20, 1999 an Explanation of Significant Differences was issued which revised the remedy. The ROD anticipated that the bulk of the consolidated wastes at the Site would be incorporated into the on-site landfill and capped in place. During the design of the cap, the volume of the waste to be consolidated was determined to exceed the capacity of the cap being designed for the designated landfill area. Therefore the ESD required excavation, characterization, and offsite disposal of the excess waste materials. Then the on-site landfill could be capped as described in the ROD.

Remedy Implementation

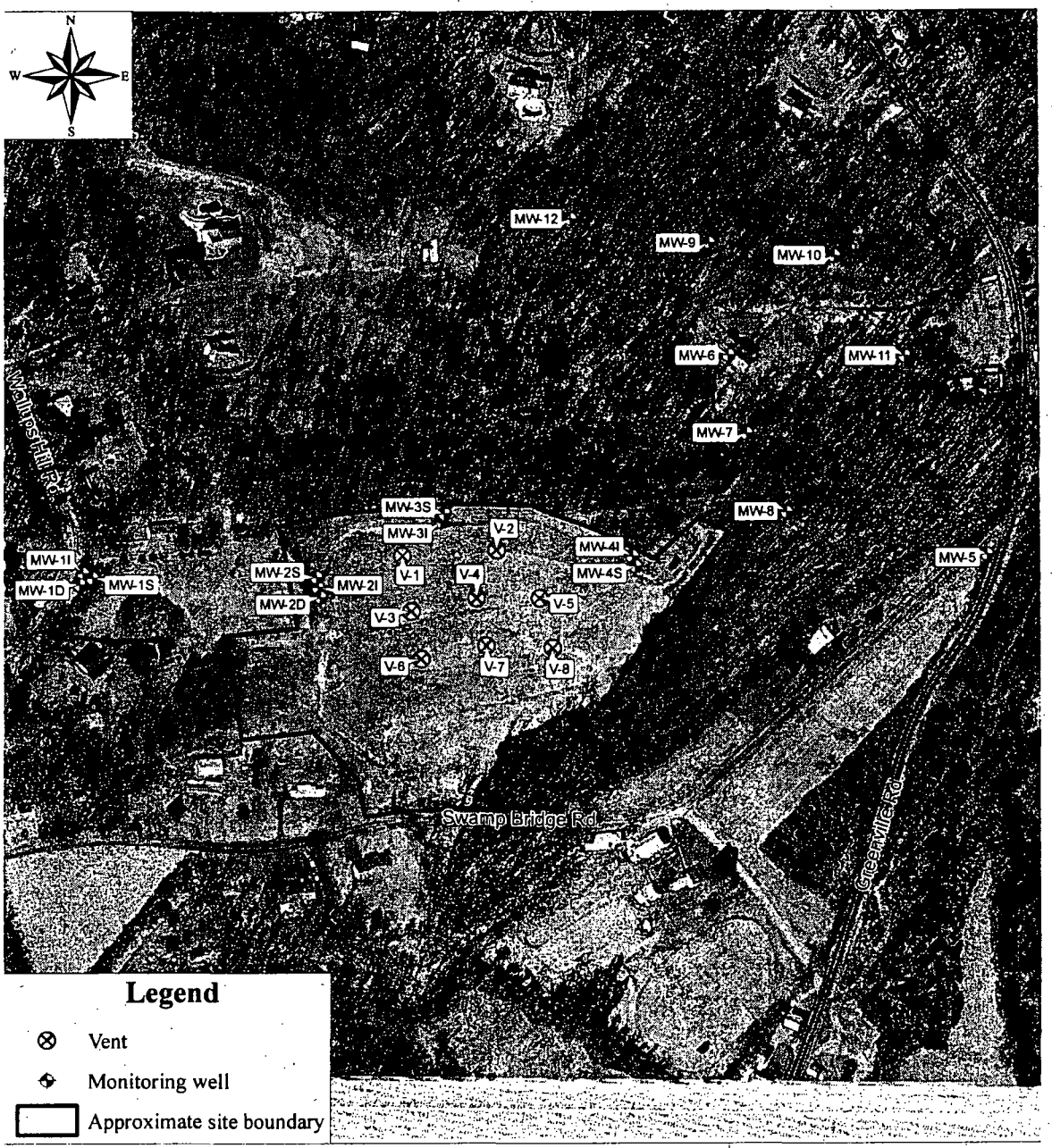
The Remedial Design (RD) commenced September 11, 1996 with EPA Region III processing a work assignment to its Remedial Action Contractor (RAC), TetraTech NUS Inc. The RD included installation and sampling of nine (9) new multi-port monitoring Westbay wells for the development of the long term monitoring program. The well locations are designated as MW-6 through MW-14. The well locations are shown in Figure 2. Soil borings and test pits were also conducted during the RD to determine the exact extent and volume of the Site wastes to be consolidated into the landfill portion of the Site. The design of the cover system (cap) incorporated information on the extent of contamination and the topography to determine the final configuration of the cap.

During the design of the cap it was determined that the volume of the waste to be consolidated would exceed the total available volume of the final landfill when capped in accordance with appropriate regulatory standards. The surface area for the existing landfill could not be expanded to accept all of the excess waste because it is unlined. Additionally, the naturally steep inclines of the surrounding terrain limited the ability to increase the elevation or extend the area of the cap without exceeding final slope requirements. The excess waste therefore required excavation, characterization, and transportation and disposal offsite. The estimated volume of the excess waste was 30,000 cubic yards, primarily from the steep southern slopes of the Site (the estimate for the volume of waste to remain exceeded 103,000 cubic yards). The cost of offsite disposal for the excess wastes as non-hazardous, residual waste was estimated to be a total of $1.1 million. The potential for removing materials found on the Site had been contemplated in the ROD, but because of the magnitude of the volume and associated costs, the offsite disposal of the materials was considered a significant difference from the remedy and an Explanation of Significant Differences (ESD) was issued August 20, 1999. The design package was approved January 7, 2000, signifying the completion of the Remedial Design.

Based on the pre-final design documents, funding was obligated to EPA's RAC contractor, TetraTech NUS, Inc., and the Remedial Action (RA) commenced on September 30, 1999. Following work plan development and approval, a request for bids was issued, the responses were evaluated and the construction sub-contract was awarded April 7, 2000 to Grace Industries Inc. On-Site construction presence started May 24, 2000, with mobilization, surveying, and clearing and grubbing activities. During construction of the cap for the landfill, EPA and PADEP decided not to extend the casing for wells MW-2S, MW-2I, MW-2D, MW-3S, MW-3I, MW-4S and MW-4I through the cover. These wells were decommissioned and remain under the landfill cover.

Unanticipated developments were encountered during construction causing additional work and impacting the original schedule and budget. The presence of extensive deposits of large stone in the excavation areas caused work to be delayed until special equipment was procured to handle and break the stone into usable size. The wastes shipped off-site were heavier than initially estimated, causing a significant increase in disposal costs. As the landscape was changed from a rough, forested hillside to a smooth, denuded slope, the peculiar local rainfall patterns (short thunderstorms that drop several inches per hour) caused the standard erosion controls to be overwhelmed, flooding the surrounding properties. The design of the Site's southern slope was revised to minimize the impacts of the storms and additional erosion control matting was planned and installed across most areas of the Site. Additionally, a new storm water management system was designed and installed in the township road directly south of the Site to capture and direct the excess storm flow, and repairs were made to address those neighboring properties that were damaged. These additional tasks were incorporated into the RA schedule and completed during the work period. Construction activity was virtually continuous during the construction period until the final vegetative layer was placed and seeded; seeding was completed August 10, 2001.

Figure 2 – Site Layout Map



Source: Modified from PAMAP Program Cycle 2 - 1 ft Orthorectified Digital Imagery of Pennsylvania, PAMAP Program, PA Department of Conservation and Natural Resources, Bureau of Topographic and Geologic Survey, 2007.

System Operation/Operation and Maintenance

EPA completed the first round of groundwater monitoring in October 2002. During this sampling event, EPA and PADEP discontinued sampling the surface water and springs because no contaminants were detected in the seeps and creek north of the landfill and upgradient from the Site. Sampling the leachate seep from the landfill was also discontinued because the cover eliminated the seep.

Operation and Maintenance (O&M) activities were transferred to PADEP after this sampling event since there was no viable responsible party for the Site. URS Corporation (URS) was contracted by the PADEP to complete the post-closure operations and maintenance. Quarterly site inspections of Site conditions and gas monitoring have been conducted up through 2009. Groundwater monitoring and sampling was also conducted on an annual basis since the last Five-Year Review. The next annual sampling event is scheduled for October 2010.

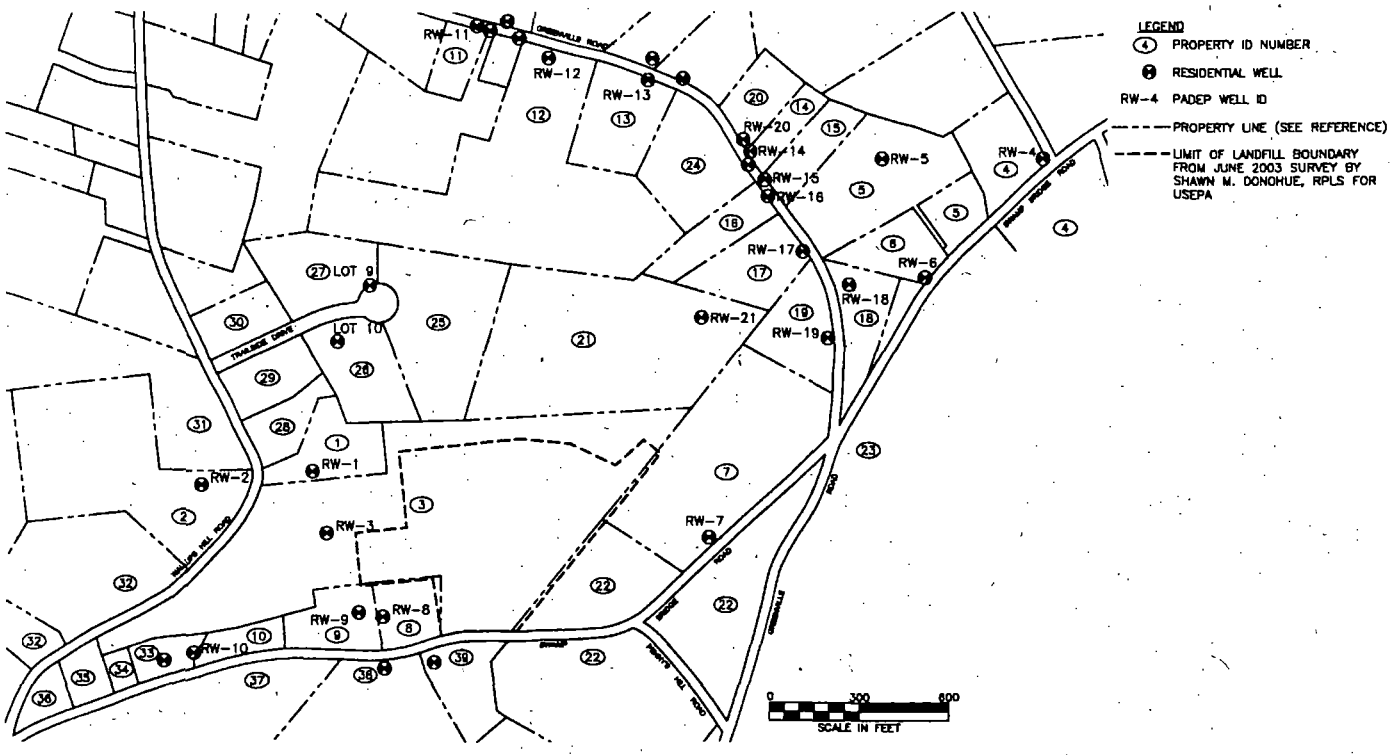
Mowing the vegetation on the cap is conducted under a separate contract issued by PADEP on a yearly basis.

Conventionally constructed monitoring wells specified in the annual reports include: MW-1S, MW-1I, MW-1D, MW-5S, MW-5I, and MW-5D. With the exception of MW-1S that is constructed of 4-inch diameter PVC riser and screen, the wells are bedrock open borehole construction. Well MW5 is shown on Figure 2, but the three wells in the cluster are not marked separately.

Westbay wells are specially constructed monitoring wells that use multiple packers to isolate individual fractures in the aquifer (indicated by S numbers). Westbay wells and sample port elevations specified in the annual reports include: MW-7-9S, MW-8-4S, MW-8-6S, MW-8-12S, MW-9-3S, MW-9-4S, MW-10-5S, MW-11-2S, MW-11-4S, and MW-12-4S.

Residential wells specified in the sampling plan included: Lot 9, Lot 10, RW-01, RW-03, RW-07, RW-08, RW-09, RW-12, RW-16, RW-17, RW-19, RW 20 and RW-21. Residential wells are shown on Figure 3. For a discussion of the results, see the Data Review section on page 18.

Figure 3 – Residential Well Location Map



V. Progress Since Last Five-Year Review

This is the second Five-Year Review for the Site

The First Five Year Review prepared in 2005 stated that, "The Site remedy is protective of human health and the environment in the short-term because the remedial action as outlined in the ROD and ESD was implemented and all immediate threats at the site have been addressed.

Long-term protectiveness of the remedial action will continue to be verified by obtaining additional groundwater samples to fully evaluate possible migration of the contaminant plume from the site towards the creek and residential areas.

Current data indicates that contamination is primarily contained on-site. Downgradient monitoring wells display low levels of contamination which are expected to continue to diminish, and residential wells remain uncontaminated. Additional monitoring of the landfill gas vents for volatile organic compounds should be conducted to determine long-term protectiveness."

A Five-Year Review Addendum was signed on August 14, 2006 to address concerns about possible vapor intrusion of the volatile compounds into homes surrounding the landfill. The addendum concludes that "Upon further review, vapor intrusion of site

related groundwater contamination is not an issue at this Site. Volatile organic contaminates (VOCs) have only been detected at low concentrations at individual wells close to the landfill. Residential wells at the Site are uncontaminated. In addition, the monitoring includes sentinel wells which are purposely located to insure early warning of any groundwater contamination at or near residential properties. No pathway exists for vapor intrusion of Site related groundwater VOCs into local residences."

The activities at the Site since 2005 included yearly sampling and monitoring which are reported in the annual progress reports prepared by PADEP's contractor, URS. Operation and Maintenance activities also included mowing the vegetative cover over the landfill.

In preparation for this Five-Year Review, EPA initiated a work assignment with Tetra Tech EMI, under the START contract to collect the analytical data recommended in the last Five-Year Review.

The following three different types of air samples were taken at the landfill to characterize the landfill's impact to the ambient air and the potential for vapor intrusion for nearby residents.

1. Methane measurements were taken at the perimeter of the landfill to evaluate the potential for landfill gas migration and explosive hazards. ARARs for methane at the landfill perimeter state that no more than 100% of the lower explosive level (LEL) is permitted. (40 CFR 258.23 - Explosive Gases Control).

2. Ambient air samples were collected at the perimeter of the landfill using Summa evacuated canisters and analyzed with EPA Method TO-15. These samples provide a direct measurement of the impact the landfill gases are having on the air quality at the perimeter of the landfill.

3. Landfill gas samples were taken at each of the landfill gas vents using Summa evacuated canisters and analyzed with EPA Method TO-15. These samples provide a measure of the amount and types of VOCs that the landfill is producing.

The air sampling locations are shown on Figure 4.

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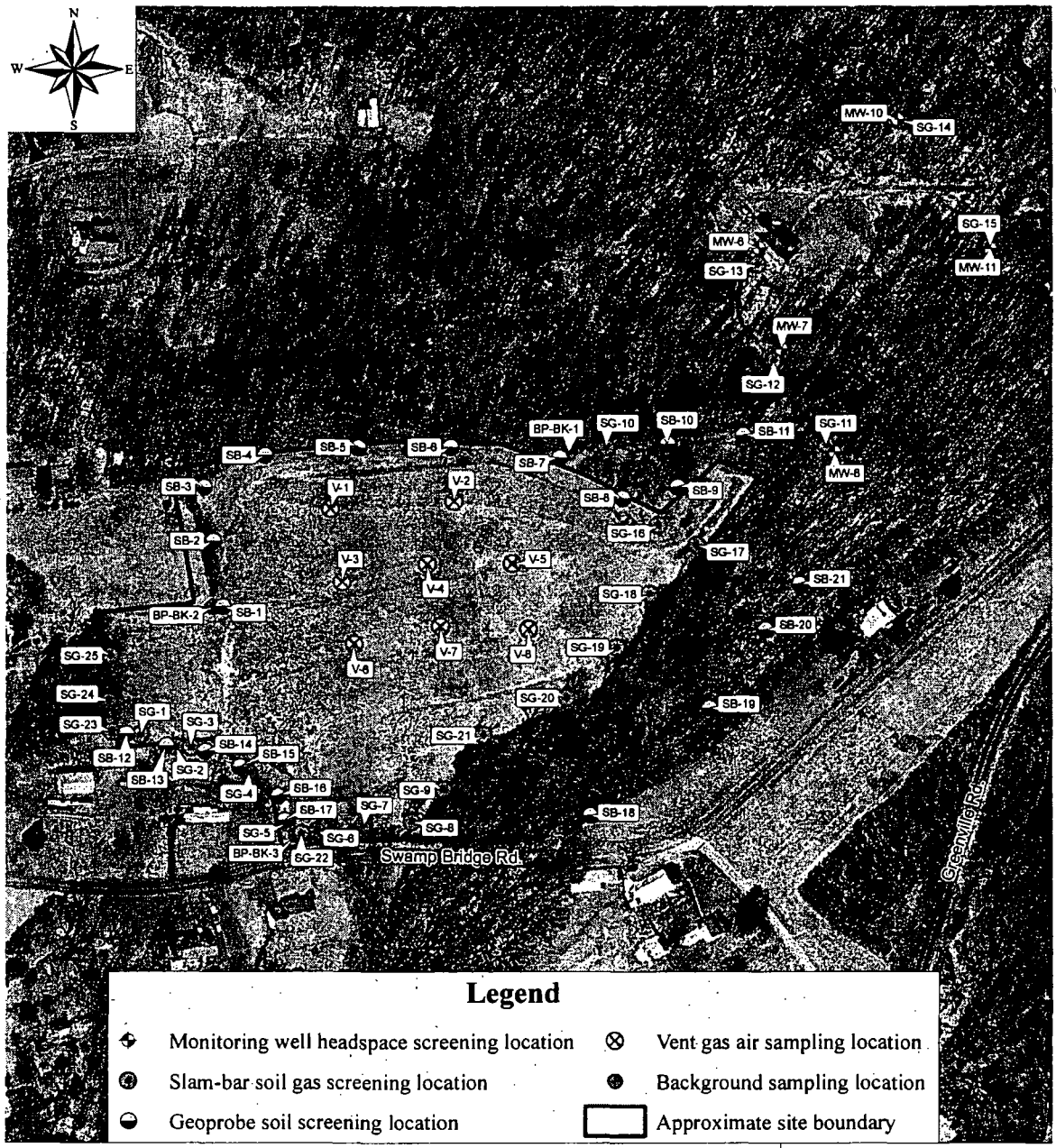
Figure 4 – Sampling Location Map



Source: Modified from PAMAP Program Cycle 2 - 1 ft Orthorectified Digital Imagery of Pennsylvania, PAMAP Program, PA Department of Conservation and Natural Resources, Bureau of Topographic and Geologic Survey, 2007.

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VI. Five-Year Review Process

Administrative Component

On June 2, 2010, the Five-Year Review inspection was conducted at the Site. The team was led by the EPA Remedial Project Manger and the PADEP Project Manager for the Site. More details are provided in the Site Inspection section below.

Components for completion of the Five-Year Review included the following:

- Notice to the public that the Five -Year Review was being conducted
- Document review
- Data review
- Site Inspection
- Five-Year Review development and review

Community Involvement

A notice was published in the Lancaster Intelligencer on June 22, 2010 that a Five-Year Review was to be conducted and that any comments and concerns that the community may have regarding the site should be submitted to EPA. No local residents or public officials submitted comments.

When the Five-Year Review is completed, a copy of the document will be available to the public at the West Cocalico Township Municipal Building, US EPA Region III and on the internet at: http://loggerhead.epa.gov/5yr/jsp/pubUser.jsp

Document Review

This Five-Year Review included the review of a number of relevant documents including the Record of Decision (6/28/96), the Explanation of Significant Differences (8/20/99), the Preliminary Close Out Report (9/19/01), the First Five-Year Review (8/17/05) and the Five-Year Review Addendum (8/14/06). The 2006 through 2009 Annual Reports prepared by URS of O&M activities were reviewed and the Final Trip Report prepared by Tetra Tech EMI dated June 2010 was also reviewed.

Data Review

Evaluation of Landfill Gas Migration for Explosive Hazards (ARARs) and Vapor Intrusion

Methane soil gas samples were taken all around the perimeter of the landfill area as well as near the groundwater monitoring wells at the northeast corner of the site using a Landtec GEM-2000 plus landfill gas meter. The depths of the samples ranged from 1 ft below ground surface to 14.5 feet deep. Methane was detected in only two locations, SG-

04 at the southwest corner of the site (0.1% methane or 1,000 ppmv), and SG-05 at the southern boundary of the site (0.8% methane or 8,000 ppmv). Both locations had less than the LEL of methane (50,000 ppmv), so the landfill is in compliance with the ARARs for explosive gases control.

Only two of the landfill gas soil samples contained VOCs. Both SG-22 at the southern border of the site and SG-25 at the western border of the site had 1.3 ppmv of VOCs. The VOC analysis was done with a hand held PID measuring device and the data is intended for use as a screening tool and the data is not validated. Based on the field measurements, quantitative results were determined not to be necessary. The nearest residences to either of these border points are over 100 feet away, making the possibility of vapor intrusion unlikely.

Evaluation of Ambient Air Data

Ambient air sampling was performed at three locations at the perimeter of the landfill to assess the impact the landfill gases to the ambient air. The samples were taken over a 24-hour period with Summa evacuated canisters and analyzed with EPA Method TO-15. These ambient samples are labeled BK-1, BK-2, and BK-3. No methane was detected in any of these samples. The sample results were analyzed directly for inhalation risks. Trimethylbenzenes, benzene, perchloroethene (PCE), and trichloroethene (TCE) exceeded residential Region 3 Regional Screening Levels (RSL)s, but the Hazard Index (HI) was less than 1 for these chemicals, and the cancer risk was below 1E-4 (in fact, below 1E-5).

The data are listed below on Table 2. All non-detects have been omitted from the list.

Evaluation of Landfill Gas Data from the Gas Vents

All eight passive gas vents, located in the middle of the landfill, were sampled for VOCs with Summa evacuated canisters and analyzed with EPA Method TO-15. The sampling results are presented in Table 3.

Evaluation of the analytical results indicate that neither the ambient air concentrations nor the landfill gas vent concentrations present a health risk for VOC emissions from the gas vents or for anyone living near the landfill.

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Table 2 Ambient Air Data for Berkley Products (6/1/10 – 6/2/10)

VOC	BP-BK-1 ug/m3	BP-BK-2 ug/m3	BP-BK-3 ug/m3
1,2,4-trimethylbenzene	2.1	2.6	2.4
1,3,5-trimethylbenzene	0.6 J	1.3	0.5 J
2-butanone	2.4	1.9	2.7
Acetone	33	44	36
Benzene	0.39 J	0.39 J	0.45 J
Chloromethane	0.88	1.0	0.99
Dichlorodifluoromethane	2.7	2.7	2.9
Ethylbenzene			0.71
m,p-xylene	0.84 J	0.93 J	1.9
o-xylene		0.66	0.75
Styrene			0.48
Tetrachloroethene	1.0		
Toluene	1.8	2.3	3.7
Trichloroethene	1.7	1.4	1.1
Trichlorofluoromethane	1.8	1.4	1.5

Table 3 – Vent Gas Sampling Data (6/2/10)

VOC	BP-LG-V1	BP-LG-V2	BP-LG-V3	BP-LG-V4	BP-LG-V5	BP-LG-V6	BP-LG-V7	BP-LG-V8	Dup of V-1	Max Conc.
	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3
1,1,2-trichlor-1,2,2-trifluoroethane		0.86	0.78		0.86					0.86
1,2,4-trichlorobenzene				7.4						7.4
1,2,4-trimethylbenzene		2.2	2		5.1	4.8	7	1.6		7
1,3,5-trimethylbenzene				2.1	1.2	2.2	2			2.2
1,2-dichloroethane	0.7			0.53		0.58			0.66	0.7
1,4-dichlorobenzene	9			10	6.4	12	13		9.5	13
2-butanone		2.3	2.4	6.6	4.4		7.8	2		7.8
4-ethyltoluene				1.4	1					1.4
4-methyl-2-pentanone				1.3			1.4			1.4
Acetone	48	30	30	44	28	41	49	33	19	49
Benzene	3.1	0.52	0.49	1.8	0.84	2.2	1.6	0.42	2.4	3.1
carbon tetrachloride			0.64		0.64					0.64
chlorobenzene							1.5			1.5
Chloroform	19			0.55		17	16		7.5	19
chloromethane		1.1	1.2		1.2			1.1		1.2
dichlorodifluoromethane		2.8			2.9		28	3		28
Ethylbenzene	4.4		0.44	3.7	1.8	3.8	3.2		3.8	4.4
m,p-xylene	17	0.97	1.3	13	7.5	16	11	0.79	15	17
o-xylene		0.49	0.62	2.3	1.7	2.7	2.4			2.7
Styrene				3.2	91		2.6			91
Toluene	21	5.9	2.1	6.9	7.2	14	13	2	120	120
trichloroethene	2.1	1.1	1	2.2	1.4	1.6	1.7	0.87	1.7	2.2
trichlorofluoromethane		1.5	1.5	1.4	1.5	2.6	1.9	1.5		2.6

Groundwater Quality Monitoring

The ROD required a monitoring program to ensure that the residential wells in the vicinity of the landfill remain protected. Two sets of conventional wells are located around the Site. The MW1 cluster is on the western side and the MW5 cluster is on the eastern side the Site. The Westbay monitoring wells are located to the north and east between the landfill and residences. All the monitoring wells are sampled routinely in the monitoring program. There is no current exposure to monitoring-well water.

The groundwater flow is generally to the east and northeast towards Cocalico Creek. The Site Location map on page 3 shows the creek, however, no recent groundwater flow figures were available for this report. Figure 2 on page 10 shows the monitoring wells and Figure 3 on page 12 shows the locations of the residential wells.

Since the remedy was constructed, residential wells have been sampled multiple times for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and polynuclear aromatic hydrocarbons (PAHs). The 2004 and 2005 groundwater data show no concentrations above MCLs or at risk levels of concern (cancer or hazard index) in residential wells. In 2006, residential groundwater data showed no organic contamination. Sampling VOCs, SVOCs, PAHs and PCBs for residential wells will be repeated in the fall of 2010.

VOC results are consistent with the previous Five-Year Review. However, over the 2006 -2009 time period residential wells show occasional metals concentrations exceeding Regional Screening Levels (RSL)s—usually for copper, iron, or manganese. These common metals are not believed to be site-related in these wells.

Conventional monitoring wells, MW-1S, MW-1I, MW-1D, MW-5S, MW-5I, and MW-5D were also sampled for VOCs and SVOCs. Over 2006 - 2008, concentrations of VOCs in monitoring wells have usually been below MCLs. Benzene was detected in 2006 up to 3X the MCL of 5 ug/L, and TCE that year slightly exceeded its MCL of 5 ug/L with a maximum of 6.3 ug/L, but in 2009 all monitoring-well VOCs were below MCLs.

Several inorganic chemicals in 2009 monitoring-well data exceeded RSLs: these were mercury (MW5S), arsenic (MW5S), barium (MW8 6S), iron (MW12 4S), manganese MW1I and MW 1D, MW8 6S), zinc (MW5 s and MW 8 4S) 1,1-dichloroethane (DCA) (MW 7 9S), 1,2-DCA (MW 7 9S), 1,2-dichloropropane (MW 7 9S), PCE (MW 7 9S), 1,1,2- trichloroethane (TCA) (MW 7 9S), and TCE (MW 7 9S).

Mercury is not considered a Site related compound based on the 1996 ROD and the 1998 RD analytical results. Barium is a Site related compound and concentrations are decreasing over time. The other metals are still present but remain below MCLs. The organic compounds appear to be mainly detected in well MW 7 9S and may be increasing

in the past five years, but this well will be monitored. Organic compounds that were detected above the MCL in the first Five-Year Review are now below the MCL.

Table 4 shows the 2009 inorganic results for the residential wells. The VOC results from the 2006 sampling event were not included here since all the results were below the detection limits. From 2007 until 2009 VOC, SVOC, pesticides and PCBs were not sampled as required by the 1996 ROD. The October 2010 event should include these parameters.

Table 5 shows the monitoring well sample results for VOCs. Table 6 shows monitoring well results for metals. Table 7 shows the Westbay well sample results for VOCs and Table 8 shows the Westbay well sample results for metals.

Table 4 – Residential Well Sampling Results

Compound	Method	Units	MSC Criteria	Lot 9		Lot 18		RW-01		RW-03		RW-07		RW-08		RW-09		RW-12		RW-16		RW-17		RW-19		RW-20		RW-21	
			Sample Date	4/28/09		4/28/09		4/28/09		4/28/09		4/29/09		4/28/09		4/28/09		4/28/09		4/28/09		4/28/09		4/28/09		4/28/09		4/28/09	
PADEP, Bureau of Labs (BOL)			Sequence ID #	620		619		618		617		627		615		616		621		613		614		622		612		611	
Total Metals																													
Mercury	7470	µg/L	2	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
Aluminum	6010B	µg/L	200*	200	U	200	U	200	U	200	U	200	U	200	U	200	U	200	U	200	U	200	U	200	U	200	U	200	U
Antimony	6010B	µg/L	6	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U
Arsenic	6010B	µg/L	10	3	U	3	U	3	U	3	U	3	U	3	U	3	U	3	U	3	U	3	U	3	U	3	U	3	U
Barium	6010B	µg/L	2,000	10	U	10	U	95		10	U	37		177		234		289		218		379		167		157		200	
Beryllium	6010B	µg/L	4	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
Cadmium	6010B	µg/L	5	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Calcium	6010B	µg/L	NR	30	U	102		26,900		28,500		24,400		52,400		36,600		43,700		24,400		39,600		20,500		36,200		30,600	
Chromium	6010B	µg/L	100	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U
Cobalt	6010B	µg/L	730	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U
Copper	6010B	µg/L	1,000	10	U	22		82		14		47		25		13		10	U	57		78		43		28		25	
Iron*	6010B	µg/L	300	20	U	23		20	U	104		1,420		116		707		20	U	3,500		79		20	U	881		20	U
Lead	6010B	µg/L	5	1	U	1	U	1	U	1	U	2.3		1	U	1	U	1	U	1.1		1	U	1.5		1.4		1	U
Magnesium	6010B	µg/L	NR	10	U	17		6,080		10,100		7,080		13,900		10,300		8,050		3,450		7,650		3,270		6,800		4,940	
Manganese	6010B	µg/L	300	10	U	10	U	10	U	10	U	983		10	U	10	U	10	U	31		10	U	10	U	10	U	10	U
Nickel	6010B	µg/L	100	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U
Potassium	6010B	µg/L	NR	1000	U	1000	U	1000	U	1000	U	2040		1000	U	1320		1000	U	1000	U	1310		1000	U	1000	U	1000	U
Selenium	6010B	µg/L	50	7	U	7	U	7	U	7	U	7	U	7	U	7	U	7	U	7	U	7	U	7	U	7	U	7	U
Silver	6010B	µg/L	100	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U	10	U
Sodium	6010B	µg/L	NR	63,700		71,200		6,750		7,480		61,600		7,820		7,780		10,100		4,330		4,350		2,840		7,840		2,610	
Vanadium	6010B	µg/L	260	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U	20	U
Zinc	6010B	µg/L	2,000	10	U	36		19		17		36		15		11		10	U	27	U	10	U	11		10	U	10	
Thallium	7841	µg/L	2	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U
General Chemistry																													
Chloride*	300.0	mg/L	250	5.9		19.9		3		3		33.3		6.9		6.8		2.7		3		3.5		3.1		24.4		2.3	

Notes:
Groundwater MSC for Residential Used Aquifer with TDS <2500
Detections above screening criteria are highlighted
* Listed value is a secondary maximum contaminant limit (SMCL)
NR = Not Regulated
mg/L = Milligrams per Liter
µg/L = Micrograms per Liter
na = Sample data not reported by Department BOL

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Table 5 – Monitoring Well Sampling Results (VOCs)

Compound	Method	Units	MSC Criteria	MW-1S		MW-1I		MW-1D		MW-5S		MW-5I		MW-5D	
			Sample Date	4/27/09		4/27/09		4/27/09		4/27/09		4/27/09		4/27/09	
PADEP Bureau of Labs (BOL)			Sequence ID #	602		601		600		605		604		603	
VOCs (Method 8260B)															
Acetone	8260B	µg/L	3,700	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
Benzene	8260B	µg/L	5	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Bromodichloromethane	8260B	µg/L	100	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Bromoform	8260B	µg/L	100	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Bromomethane	8260B	µg/L	10	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
2-Butanone	8260B	µg/L	4,000	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
Carbon Disulfide	8260B	µg/L	1,900	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Carbon Tetrachloride	8260B	µg/L	5	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Chlorobenzene	8260B	µg/L	100	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Chloroethane	8260B	µg/L	230	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Chloroform	8260B	µg/L	80	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Chloromethane	8260B	µg/L	30	1.5		1.2		0.5	U	1.2		0.5	U	0.5	U
Dibromochloromethane	8260B	µg/L	NR	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,1-Dichloroethane	8260B	µg/L	27	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dichloroethane	8260B	µg/L	5	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,1-Dichloroethene	8260B	µg/L	7	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
cis-1,2-Dichloroethene	8260B	µg/L	70	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
trans-1,2-Dichloroethene	8260B	µg/L	100	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dichloropropane	8260B	µg/L	5	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
cis-1,3-Dichloropropene	8260B	µg/L	NR	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
trans-1,3-Dichloropropene	8260B	µg/L	NR	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Ethylbenzene	8260B	µg/L	700	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
2-Hexanone	8260B	µg/L	NR	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
4-Methyl-2-pentanone	8260B	µg/L	190	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
Methylene chloride	8260B	µg/L	5	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Styrene	8260B	µg/L	100	5	U	5	U	5	U	5	U	5	U	5	U
1,1,2,2-Tetrachloroethane	8260B	µg/L	0.3	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Tetrachloroethene	8260B	µg/L	5	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Toluene	8260B	µg/L	1,000	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,1,1-Trichloroethane	8260B	µg/L	200	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,1,2-Trichloroethane	8260B	µg/L	5	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Trichloroethene	8260B	µg/L	5	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Vinyl chloride	8260B	µg/L	2	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
m,p-Xylene	8260B	µg/L	10,000	1	U	1	U	1	U	1	U	1	U	1	U
o-Xylene	8260B	µg/L		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U

Notes:

Groundwater MSC for Residential Used Aquifer with TDS <2500
Detections above screening criteria are highlighted
Total xylene MSC value shown for Xylene isomers
NR = Not Regulated
µg/L = Micrograms per Liter
na = Sample data not reported by Department BOL

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Table 6 – Monitoring Well Sampling Results (Metals and General Chemistry)

Compound	Method	Units	MSC Criteria	MW-1S		MW-1I		MW-1D		MW-6S		MW-6I		MW-6D	
			Sample Date	4/27/09		4/27/09		4/27/09		4/27/09		4/27/09		4/27/09	
PADEP Bureau of Labs (BOL)			Sequence ID #	602		601		600		605		604		603	
Total Metals															
Mercury	7470	µg/L	2	0.2	U	0.2	U	0.2	U	4.21		0.2	U	0.2	U
Aluminum	6010B	µg/L	200*	314		200	U	200	U	1,410		200	U	200	U
Antimony	6010B	µg/L	6	2	U	2	U	2	U	2	U	2	U	2	U
Arsenic	6010B	µg/L	10	3	U	3	U	3	U	3.1		3		3.6	
Barium	6010B	µg/L	2,000	125		573		277		1515		376		1148	
Beryllium	6010B	µg/L	4	1	U	1	U	1	U	1	U	1	U	1	U
Cadmium	6010B	µg/L	5	10	U	10	U	10	U	10	U	10	U	10	U
Calcium	6010B	µg/L	NR	17,900		63,600		30,800		157,000		94,800		240,000	
Chromium	6010B	µg/L	100	50	U	50	U	50	U	50	U	50	U	50	U
Cobalt	6010B	µg/L	730	50	U	50	U	50	U	50	U	50	U	50	U
Copper	6010B	µg/L	1,000	10	U	10	U	10	U	10	U	10		10	U
Iron*	6010B	µg/L	300	432		74,000		56,200		24,200		6,782		7,205	
Lead	6010B	µg/L	5	1.1		1	U	1	U	1.4		1	U	1.3	
Magnesium	6010B	µg/L	NR	3,587		13,000		4,805		45,300		21,300		49,150	
Manganese	6010B	µg/L	300	10		3,258		1,886		354		875		129	
Nickel	6010B	µg/L	100	50	U	50	U	50	U	50	U	55		50	U
Potassium	6010B	µg/L	NR	1,429		3,157		1,927		2,916		2,055		2,829	
Selenium	6010B	µg/L	50	7	U	7	U	7	U	7	U	7	U	7	U
Silver	6010B	µg/L	100	10	U	10	U	10	U	10	U	10	U	10	U
Sodium	6010B	µg/L	NR	4,491		14,600		14,500		52,800		97,000		58,500	
Vanadium	6010B	µg/L	260	20	U	20	U	20	U	20	U	20	U	20	U
Zinc	6010B	µg/L	2,000	11		10	U	10	U	51		51		10	U
Thallium	7841	µg/L	2	2	U	2	U	2	U	2	U	2	U	2	U
General Chemistry															
Chloride*	325.2	mg/L	250	5.3		74.6		33.3		535.8		234.5		761.4	
Field Measurements (YSI 556 meter)															
pH	na	s.u.	NR	5.51		6.96		6.51		5.67		6.08		6.48	
Condustivity	na	mS/cm	NR	0.193		0.874		0.366		1.09		1.25		2.17	
Turbibity	na	ntu	NR	74.5		88.4		250.0		211.0		122.0		88.6	
Dissolved Oxygen	na	mg/L	NR	5.12		0.00		0.28		0.30		0.60		0.44	
Temperature	na	°C	NR	15.19		16.00		15.87		16.78		15.54		15.49	
Total Dissolved Solids	na	g/L	NR	0.12		0.56		0.24		1.1		0.8		1.4	
Oxygen Reduction Potential	na	mV	NR	160		-195		-120		83		40		-65	

Notes:

Groundwater MSC for Residential Used Aquifer with TDS <2500
Detections above screening criteria are highlighted
* Listed value is a secondary maximum contaminant limit (SMCL)
NR = Not Regulated
mg/L = Milligrams per Liter
µg/L = Micrograms per Liter
s.u. = Standard units
mS/cm = Millisiemens per centimeter
ntu = Nephelometric turbidity units
°C - Degrees Celsius
g/L = Grams per liter
mV = Milivolts

ORIGINAL

Table 7 – Westbay Well Sampling Results (VOCs)

Compound	Method	Units	MSC Criteria	MW7-8S		MW8-4S		MW8-6S		MW9-12S		MW9-3S		MW9-4S		MW10-6S		MW11-2S		MW11-4S		MW12-4S	
			Sample Date	4/28/09		4/28/09		4/28/09		4/28/09		4/28/09		4/28/09		4/29/09		4/28/09		4/29/09		4/28/09	
PADEP Bureau of Labs (BOL)			Sequence ID #	610		607		608		609		624		626		630		628		629		623	
VOCs (Method 8260B)																							
Acetone	8260B	µg/L	3,700	25	U	25	U	25	U	25	U	25	U	25	U	25	U	25	U	25	U	25	U
Benzene	8260B	µg/L	5	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Bromodichloromethane	8260B	µg/L	100	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Bromoform	8260B	µg/L	100	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Bromomethane	8260B	µg/L	10	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
2-Butanone	8260B	µg/L	4,000	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
Carbon Disulfide	8260B	µg/L	1,900	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Carbon Tetrachloride	8260B	µg/L	5	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U	5	U
Chlorobenzene	8260B	µg/L	100	0.5	U	0.5	U	**0.96**		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Chloroethane	8260B	µg/L	230	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Chloroform	8260B	µg/L	80	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Chloromethane	8260B	µg/L	30	**1.6**		**2**		0.5	U	**0.77**		**1.3**		**3.2**		0.5	U	**1.9**		**1.2**		**1.7**	
Dibromochloromethane	8260B	µg/L	NR	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U
1,1-Dichloroethane	8260B	µg/L	27	**2.6**		0.5	U	**1.9**		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dichloroethane	8260B	µg/L	5	**1**		0.5	U	**0.64**		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,1-Dichloroethene	8260B	µg/L	7	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
cis-1,2-Dichloroethene	8260B	µg/L	70	**4.6**		0.5	U	**0.76**		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
trans-1,2-Dichloroethene	8260B	µg/L	100	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dichloropropane	8260B	µg/L	5	0.48	J	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
cis-1,3-Dichloropropene	8260B	µg/L	NR	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
trans-1,3-Dichloropropene	8260B	µg/L	NR	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Ethylbenzene	8260B	µg/L	700	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
2-Hexanone	8260B	µg/L	NR	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
4-Methyl-2-pentanone	8260B	µg/L	190	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
Methylene chloride	8260B	µg/L	5	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Styrene	8260B	µg/L	100	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,1,2,2-Tetrachloroethane	8260B	µg/L	0.3	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Tetrachloroethene	8260B	µg/L	5	**0.61**		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Toluene	8260B	µg/L	1,000	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,1,1-Trichloroethane	8260B	µg/L	200	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,1,2-Trichloroethane	8260B	µg/L	5	**1.2**		0.5	U	0.6	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.6	U	0.5	U
Trichloroethene	8260B	µg/L	5	**4.3**		0.5	U	**0.67**		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Vinyl chloride	8260B	µg/L	2	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
m,p-Xylene	8260B	µg/L	10,000	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
o-Xylene	8260B	µg/L		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U

Notes:
Groundwater MSC for Residential Used Aquifer with TDS <2500
Detections above screening criteria are highlighted
Total xylene MSC value shown for Xylene isomers
NR = Not Regulated
µg/L = Micrograms per Liter
na = Sample data not reported by Department BOL

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Table 8 – Westbay Well Sampling Results (Metals and General Chemistry)

Compound	Method	Units	MSC Criteria	MW7-9S	MW8-4S	MW8-8S	MW8-12S	MW9-3S	MW9-4S	MW10-6S	MW11-2S	MW11-4S	MW12-4S
			Sample Date	4/28/09	4/28/09	4/28/09	4/28/09	4/28/09	4/28/09	4/29/09	4/29/09	4/29/09	4/28/09
PADEP Bureau of Labs (BOL)			Sequence ID #	610	607	608	609	624	626	630	628	629	623
Total Metals													
Mercury	7470	µg/L	2	0.2 U	0.2 U	0.2 U	0.50	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Aluminum	6010B	µg/L	200*	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	253
Antimony	6010B	µg/L	6	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Arsenic	6010B	µg/L	10	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
Barium	6010B	µg/L	2,000	86	106	2,160	1,250	168	212	116	889	44	85
Beryllium	6010B	µg/L	4	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Cadmium	6010B	µg/L	5	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Calcium	6010B	µg/L	NR	48,000	30,000	107,000	140,000	12,300	17,200	5,470	85,300	7,570	46,900
Chromium	6010B	µg/L	100	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Cobalt	6010B	µg/L	730	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Copper	6010B	µg/L	1,000	10 U	40	10 U	10 U	10 U	10 U	10 U	10 U	10 U	16
Iron*	6010B	µg/L	300	20 U	24	20 U	20 U	20 U	56	21	213	20 U	686
Lead	6010B	µg/L	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	9.8
Magnesium	6010B	µg/L	NR	14,300	4,260	14,400	48,300	29,200	4,110	1,880	11,700	2,080	14,800
Manganese	6010B	µg/L	300	115	1 U	4,570	80	10 U	10 U	10 U	26	10 U	121
Nickel	6010B	µg/L	100	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Potassium	6010B	µg/L	NR	1,650	1,220	1,740	2,880	1000 U	1000 U	1000 U	1850	1000 U	2010
Selenium	6010B	µg/L	50	7 U	7 U	7 U	7 U	7 U	7 U	7 U	7 U	7 U	7 U
Silver	6010B	µg/L	100	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Sodium	6010B	µg/L	NR	8,360	2,410	16,600	69,600	23,700	3,850	2,410	2,540	1,830	10,800
Vanadium	6010B	µg/L	260	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Zinc	6010B	µg/L	2,000	18	57	10 U	13	78	10 U	20	18	10 U	11300
Thallium	7841	µg/L	2	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
General Chemistry													
Chloride*	325.2	mg/L	250	84.5	7.8	182.5	638.7	2.8	2.4	2.8	2.7	2.4	10.4
Field Measurements (YSI 556 meter)													
pH	na	s.u.	NR	6.39	5.57	7.01	5.33	5.57	5.55	5.19	6.93	5.46	na
Condustivity	na	mS/cm	NR	0.524	8.85	0.937	1.52	0.001	0.162	0.087	0.001	0.085	na
Turbibity	na	ntu	NR	549.0	80.2	110.0	855.0	178.0	220.0	83.8	46.0	255.0	na
Dissolved Oxygen	na	mg/L	NR	11.65	8.87	10.39	10.61	14.04	12.27	10.11	10.13	8.93	na
Temperature	na	°C	NR	19.77	20.28	17.97	18.21	20.28	18.08	14.15	13.01	14.12	na
Total Dissolved Solids	na	g/L	NR	0.33	4.3	0.60	1.0	0.00	0.11	0.06	0.00	0.06	na
Oxygen Reduction Potential	na	mV	NR	118	148	103	228	173	215	217	125	218	na

Notes:

Groundwater MSC for Residential Used Aquifer with TDS <2500

Detections above screening criteria are highlighted

* Listed value is a secondary maximum contaminant limit (SMCL)

NR = Not Regulated

mg/L = Milligrams per Liter

µg/L = Micrograms per Liter

s.u. = Standard units

mS/cm = Millisiemens per centimeter

ntu = Nephelometric turbidity units

°C - Degrees Celsius

g/L = Grams per liter

mV = Millivolts

General Site Conditions

The landfill cover was mowed in the fall of 2009 and the physical condition of the Site structures and monitoring locations during the O&M sampling and inspection periods were generally intact. Groundwater monitoring wells are secured with locks.

Conditions at Sediment Basin No. 1, located at the southern portion of the landfill, were in good condition and prevent the flow across Swamp Bridge Road. Sediment Basin No. 2 located on the north eastern portion of the landfill was also in good condition throughout the O&M inspection period. Both basins had overflowed in the summer and fall of 2004 due to heavy rainfall and blockage of the gravel along the perforated discharge piping at the base of the basin. Since clean-out of the gravel in September of 2006, no overflow from either basin has been observed.

Site Inspection

On June 2, 2010, EPA and PADEP conducted an on-site inspection as part of this Five-Year Review to assess the protectiveness of the remedy including the presence of fencing to restrict access, the integrity of the cover system including the drainage / erosion control measures and the gas venting system.

The inspection was conducted by the EPA Remedial Project Manager and the PADEP Project Manager responsible for oversight of the O&M. Tetra Tech EMI contract support was also collecting the landfill vent air samples at the time of the inspection. Based on the inspection and the annual sampling event reports prepared by PADEP's subcontractor, URS, the security and access to the Site was good with no signs of vandalism. The landfill cover was adequate. There were no visible signs of gas emissions or leachate drainage to the vegetation. The structural aspects of the erosion / sediment control systems are intact. Problems noted in the previous Five-Year Review were addressed by PADEP.

The monitoring wells and the gas vents were inspected and sampled by URS in the annual monitoring events. The analytical results are discussed in the data review section above.

The institutional controls to restrict new well installation in the contaminated zone were established on June 8, 2001 by an Access Order issued during the construction phase of the remedial action and are still in effect. The property owner initially signed an Environmental Protection Easement and Declaration of Restrictive Covenants which specified the institutional control, but the easement was never recorded in the chain of title. The easement was replaced by the Access Order which required that the property owner shall not interfere with the operation, alter or disturb the integrity, of any structures or devices now or hereinafter built, installed or otherwise placed by EPA and/or its Representatives on the Site or Property. This effectively prevents any well installation through the cap, which covers the landfill as shown on Figure 2. Maintenance of the institutional control is part of the O&M activities conducted by PADEP pursuant to the

State Superfund Contract (SSC). If the property is sold to any new owner, PADEP is obligated to put new institutional controls in place.

Interviews

One community interview was conducted by EPA and PADEP at the West Cocalico Township offices with Ms. Norma Enk, the Township Manager. EPA began by discussing the Five-Year Review process and purpose of the review. EPA presented the findings of the most recent round of samples taken from the groundwater monitoring and residential wells and reported that the residential wells are free of any contamination from the Site. There was no concern about the Site generated from the ad in the local newspaper announcing the Five-Year Review. PADEP reported that previous concerns about the overflow from the sediment basins have been addressed.

Ms. Enk reported that a small siding business was going to locate south of the Site on Swamp Bridge Road and they would need to install a new water supply well. Based on the current sampling results of the monitoring and residential wells, EPA and DEP did not feel that the new business would be affected by contamination from the Site, but PADEP would include the new well in the monitoring program.

Ms. Enk was pleased that EPA and PADEP were making the effort to keep the local government informed and expressed interest in receiving and reading copies of the Five-Year Review.

VII. Technical Assessment

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

Yes. The objectives were to consolidate the landfill materials, contain the potential for migration of contamination from the Site to the groundwater by capping the landfill and to prevent direct contact. These objectives were met.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy still valid?

Standards and TBCs

Have standards identified in the ROD been revised, and would such revisions call into question the protectiveness of the remedy?

No numerical chemical-specific performance standards for groundwater were identified in the ROD or ESD. However, the ROD required groundwater monitoring to ensure the landfill did not impact residential wells.

Do newly promulgated standards call into question the protectiveness of the remedy?

See above.

Have TBCs changed so as to call into question the protectiveness of the remedy?

No. However, the recent monitoring data were evaluated with respect to current TBCs and risk information, and those results are discussed below.

Residential Wells -- Over the 2006-2009 time period, residential wells show occasional metals concentrations exceeding 2010 Regional Screening Levels (RSL)s—usually for copper, iron, or manganese. These common metals are not suspected to be site-related in these wells. These analytes were unfiltered results.

Monitoring Wells -- (Conventional wells and Westbay wells)
Conventional monitoring wells, MW-1S, MW-1I, MW-5S, MW-5I, and MW-5D were also sampled for VOCs and SVOCs. Over 2006 - 2008, concentrations of VOCs in monitoring wells have usually been below MCLs. Benzene was detected in 2006 up to 3X the MCL of 5 ug/L, and TCE that year slightly exceeded its MCL of 5 ug/L with a maximum of 6.3 ug/L, but in 2009 all monitoring-well VOCs were below MCLs.

However, several chemicals in 2009 monitoring-well data exceeded RSLs: these were mercury (MW5S), arsenic (MW5S), barium (MW8 6S), iron (MW12 4S), manganese MW1I, MW 1D, MW12 4S), zinc (MW5 s and MW 8 4S) 1,1-dichloroethane (DCA) (MW 7 9S), 12DCA (MW 7 9S), 1,2-dichloropropane (MW 7 9S), PCE (MW 7 9S), 1,1,2- trichloroethane TCA (MW 7 9S), and TCE (MW 7 9S).

Mercury and barium are addressed above. The other metals are still present but remain below MCLs. The organic compounds appear to be mainly detected in well MW 7 9S and may be increasing in the past five years, but this well will be monitored. Organic compound that were detected above the MCL in the first Five-Year Review are now below the MCL.

Incorporating these chemicals in a simple screening risk assessment using maximum concentrations, default exposure assumptions, and toxicity factors from the May 2010 RSL table (with the addition of a NYSDOH-based RfC for TCE of 0.01 mg/m^3), the total cancer risk from consuming monitoring well groundwater (for drinking, and bathing for children or showering for adults) would be approximately 1E-4, with most of the cancer risk due to arsenic. The adult Hazard Index would be 11, due to iron, manganese, mercury, and zinc; the child Hazard Index would be 26, due to those same metals. These risks are expected to be biased high due to the use of maximum concentrations.

It should be noted that all the inorganic metals analysis done in the annual reports reviewed were results for total metals and not dissolved metals. None of the samples were filtered.

Overall, the risk at the Site for the monitoring wells has decreased with implementation of the remedy.

The metals associated with the risk may be a result of background conditions. A comprehensive comparison to background should be performed. There is no current exposure to monitoring-well water.

Exposure

Have land uses on or near the site changed, and would this affect the protectiveness of the remedy?

No

Have routes of exposure or receptors been newly identified or changed in a way that could affect the protectiveness of the remedy?

EPA and PADEP discontinued sampling the springs north of the landfill because no contaminants were detected. Surface water in the creeks north and east of the site are still sampled. Sampling was also discontinued in the leachate seeps because the landfill cover eliminated the seeps.

At the time of the previous Five-Year Review, methane exceedances above the LEL had been reported. Since then, methane detections have been below the LEL and appear to be decreasing (i.e., the maximum detection since 2005, 4.4%, was reported in 2006). EPA evaluated the perimeter methane measurements on 7/14/2010, and reported that the only two findings in the recent sampling event were detected. Both were well below the LEL.

Only two of the landfill gas soil samples contained VOCs using a hand held probe with no data validation. Both SG-22 at the southern border of the site and SG-25 at the western border of the site had 1.3 ppmv of VOCs. The nearest residences to either of these border points are over 100 feet away, making the possibility of vapor intrusion unlikely.

Gas vents were also sampled for this Five-Year Review. The EPA Air/Superfund coordinator modeled the vent concentrations to annual average ambient air concentrations, and these were all below the RSLs for residential air.

Ambient air was also sampled directly. Trimethylbenzenes, benzene, PCE, and TCE exceeded residential RSLs, but the HI was less than 1 for these chemicals, and the cancer risk was below 1E-4 (in fact, below 1E-5).

Therefore, the gas-vent modeling and ambient air concentrations both indicate that VOC emissions from the gas vents do not appear to be a concern, assuming that the day of sampling was representative of typical conditions.

Are there newly identified contaminants or contaminant sources that could affect the protectiveness of the remedy?

No

Are there unanticipated toxic byproducts of the remedy not previously addressed by the decision documents?

No.

Have physical site conditions or the understanding of these conditions changed in a way that could affect the protectiveness of the remedy?

No.

Toxicity and Other Contaminant Characteristics

Have toxicity factors changed in a way that could affect the protectiveness of the remedy? Have other contaminant characteristics changed in a way that could affect the protectiveness of the remedy?

Toxicity factors have changed since 1996. However, protectiveness is not expected to be affected by these changes. The cap prevents direct exposure with the landfill contents. The monitoring program covers a wide spectrum of contaminants, which can be assessed whenever necessary. Residential wells are acceptable under current conditions; although total metals analysis exceeds RSLs on occasion, these may be attributable to background.

Monitoring wells, gas vents, and ambient air were evaluated above, using current toxicity factors from the May 2010 RSL table.

Changes in Risk Assessment Methods

Have standardized risk assessment methodologies changed in a way that could affect the protectiveness of the remedy?
New risk assessment guidance has appeared since 1996, most notably in the fields of dermal and inhalation risk assessment. However, monitoring wells, gas vents, and ambient air were evaluated above, using current toxicity factors from the May 2010 RSL table. The protectiveness of the remedy remains unaffected.

Expected Progress Toward Meeting RAOs

Is the remedy progressing as expected?

Yes.

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

No.

Technical Assessment Summary

Performance standards for the remediation of groundwater outside the landfill (source area) were not identified in the original ROD. The 1996 ROD was a source control remedy which required groundwater monitoring. The data from the monitoring wells are compared to MCLs to evaluate effectiveness of the remedy on the groundwater.

Over the 2006-2009 time period, residential wells show occasional total unfiltered metals concentrations exceeding RSLs. These common metals are suspected not to be site-related in these wells, but a comprehensive comparison to background should be conducted to verify this. In addition, metals analyses should be filtered.

Mercury and barium in the 2009 monitoring-well data exceed MCLs. These monitoring wells are east of the Site and are considered downgradient.

According to a simple screening risk assessment, the total cancer risk from consuming monitoring-well water would be approximately 1E-4, with most of the cancer risk due to arsenic. The Hazard Indices for both children and adults would exceed 1, due to four metals.

It should be noted that all the inorganic metals analysis done in the annual reports reviewed were results for total metals and not dissolved metals. None of the samples were filtered. In the future, inorganic metal analyses should be filtered.

Compared to the risk assessment in the initial ROD of unacceptable groundwater exposure, these risks have decreased with implementation of the remedy.

The metals associated with the risk in the monitoring wells may be a result of background conditions. A comprehensive comparison to background should be performed. There is no current exposure to monitoring-well water.

Only two of the landfill gas soil samples obtained by using a hand held probe with no data validation contained VOCs. Both SG-22 at the southern border of the site and SG-25 at the western border of the site had 1.3 ppmv of VOCs. The nearest residences to either of these border points are over 100 feet away, making the possibility of vapor intrusion unlikely.

VIII. Issues

Issues	Affects Current Protectiveness (Y/N)	Affects Future Protectiveness (Y/N)
1. PADEP analyzed for metals, but did not monitor residential wells for organics, svocs, pesticides or PCBs from 2006-2009 as required by the ROD.	N	Y
2. A number of metals in groundwater residential wells and monitoring wells are above the EPA Region 3 2010 RSLs. The metals analyses were based on unfiltered groundwater samples.	N	Y
3. No groundwater flow figures were available.	N	N

IX. Recommendations and Follow-Up Actions

Issue	Recommendations and Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness (Y/N)	
					Current	Future
1	PADEP should perform the analysis required by the 1996 ROD on residential wells.	**PADEP**	**EPA**	**9/30/11**	**N**	**Y**
2	A comprehensive comparison to background should be performed to determine if observed metals are related to the Site. Future inorganic analyses should be performed on filtered samples.	**PADEP**	**EPA**	**9/30/11**	**N**	**Y**
3	Develop a current groundwater flow figure to assist with evaluation of groundwater conditions.	**PADEP**	**EPA**	**9/30/11**	**N**	**N**

X Protectiveness Statement

The Site remedy is protective of human health and the environment in the short-term because the remedial action as outlined in the ROD and ESD was implemented and all immediate threats at the site have been addressed.

Long-term protectiveness of the remedial action will continue to be verified by obtaining additional groundwater samples to fully evaluate the groundwater conditions at the Site and any potential impact to the downgradient areas.

Current data indicates that two downgradient monitoring wells display low levels of VOC contamination below MCLs which are expected to continue to diminish.

Several other monitoring wells have low levels of metals. Two compounds are currently above MCLs. Barium is a site related compound and the concentrations in monitoring wells are decreasing over time. Mercury is not a Site related compound based on the 1996 Record of Decision.

Residential wells show occasional metals concentrations exceeding regional screening levels (RSLs). However, these results are unfiltered analyses and it is expected these concentrations will be reduced when filtered analysis is required in the next sampling event. Since the remedy was constructed, residential wells have been sampled multiple times for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and polynuclear aromatic hydrocarbons (PAHs). The 2004 and 2005 groundwater data show no concentrations above MCLs or at risk levels of concern (cancer or hazard index) in residential wells. In 2006, residential groundwater data showed no organic contamination. Sampling for residential wells will be repeated in the fall of 2010.

XI. Next Review

The next Five-Year Review for the Berkley Products Dump Site is five years from the date of this review.