

ORIGINAL

**FIVE-YEAR REVIEW REPORT FOR
DRAKE CHEMICAL SUPERFUND SITE
CLINTON, PENNSYLVANIA**



SDMS DocID 2182337



September 2013

**United States Environmental Protection Agency
Region 3
Philadelphia, Pennsylvania**

**Kathryn A. Hodgkiss, Acting Director
Hazardous Site Cleanup Division
U.S. EPA, Region III**

9/10/2013

Date

TABLE OF CONTENTS

List of Abbreviations	iv
Executive Summary	v
Five-Year Review Summary Form	vi
1.0 Introduction.....	1
2.0 Site Chronology.....	2
3.0 Background	3
3.1 PHYSICAL CHARACTERISTICS	3
3.2 LAND AND RESOURCE USE	6
3.3 HISTORY OF CONTAMINATION	6
3.4 INITIAL RESPONSE	6
3.5 BASIS FOR TAKING ACTION	7
4.0 Remedial Actions	8
4.1 REMEDY SELECTION.....	8
4.2 REMEDY IMPLEMENTATION	9
4.3 OPERATION AND MAINTENANCE (O&M)	11
5.0 Progress Since the Last Five-Year Review	11
5.1 INSTITUTIONAL CONTROLS	12
5.2 GROUND WATER REMEDY	12
6.0 Five-Year Review Process	14
6.1 ADMINISTRATIVE COMPONENTS.....	14
6.2 COMMUNITY INVOLVEMENT.....	14
6.3 DOCUMENT REVIEW	14
6.4 DATA REVIEW	17
6.5 SITE INSPECTION.....	26
6.6 INTERVIEWS.....	26
7.0 Technical Assessment	27
7.1 QUESTION A: IS THE REMEDY FUNCTIONING AS INTENDED BY THE DECISION DOCUMENTS?.....	27
7.2 QUESTION B: ARE THE EXPOSURE ASSUMPTIONS, TOXICITY DATA, CLEANUP LEVELS AND REMEDIAL ACTION OBJECTIVES (RAOs) USED AT THE TIME OF REMEDY SELECTION STILL VALID?	28
7.3 QUESTION C: HAS ANY OTHER INFORMATION COME TO LIGHT THAT COULD CALL INTO QUESTION THE PROTECTIVENESS OF THE REMEDY?.....	28
7.4 TECHNICAL ASSESSMENT SUMMARY.....	29
8.0 Issues	30
9.0 Recommendations and Follow-up Actions	31
10.0 Protectiveness Statements	32
11.0 Next Review	32

Appendix A: List of Documents Reviewed.....	A-1
Appendix B: Site Inspection	B-1
Appendix C: Photographs from Site Inspection Visit.....	C-1
Appendix D: 2005 Surface Water and Sediment WSampling.....	D-1

Tables

Table 1: Chronology of Site Events.....	2
Table 2: Ground Water Performance Standards	9
Table 3: Progress on Recommendations from the 2008 FYR.....	12
Table 4: Ground Water ARARs Review	15
Table 5. 2008-2013 Ground Water Monitoring Data	20
Table 6: Current Site Issues.....	30
Table 7: Recommendations to Address Current Site Issues.....	31

Figures

Figure 1: Site Location Map	4
Figure 2: Detailed Site Map	5
Figure 3: Institutional Control Base Map	16
Figure 4: Ground Water Monitoring Network.....	18
Figure 5: 1,2-DCA Ground Water Plume Map	19

List of Abbreviations

1,2-DCA	1,2-dichloroethane
AC&C	American Color and Chemical Company
ARAR	Applicable or Relevant and Appropriate Requirement
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	Contaminant of Concern
EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Difference
FYR	Five-Year Review
gpm	Gallons per Minute
IC	Institutional Control
µg/L	Micrograms per Liter
MCL	Maximum Contaminant Levels
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
O&M	Operation and Maintenance
OU	Operable Unit
PADEP	Pennsylvania Department of Environmental Protection
PRP	Potentially Responsible Party
RAO	Remedial Action Objective
RCRA	Resource Conservation and Recovery Act
RI/FS	Remedial Investigation and Feasibility Study
ROD	Record of Decision
RPM	Remedial Project Manager
SDWA	Safe Drinking Water Act
TCE	Trichloroethylene
TBC	To-Be-Considered
VOC	Volatile Organic Compounds

Executive Summary

Introduction

The Drake Chemical Superfund site (the Site) is located in Lock Haven, Clinton County, Pennsylvania. Drake Chemical Company operated at an 8-acre property at the Site from the 1960s until 1981, manufacturing chemical intermediates for color dyes, pesticides and other organic compounds.

EPA designated four operable units (OUs) to address the cleanup: OU1 was a remedy to address contaminated leachate stream; OU2 was a remedy to address contaminated buildings; OU3 was a remedy to address contaminated soils and OU4 was a remedy to address contaminated ground water. Ground water treatment is ongoing.

The triggering action for this five-year review (FYR) was the signing of the previous FYR on September 22, 2008. This FYR Report addresses all four OUs.

Technical Assessment

The remedies for OU1, OU2 and OU3 are functioning as intended. Contamination from the leachate stream was disposed off-site. The buildings were demolished and removed from the Site and the contaminated soils were treated by incineration. The OU4 ground water remedy is not functioning as intended. The system has been effective in reducing concentrations of target constituents in Zone 2, but has not adequately prevented constituent migration into downgradient Zone 3. EPA is working with the potentially responsible parties (PRPs) to improve the operation of groundwater treatment OU4 remedy.

Conclusion

The remedies for OU1, OU2 and OU3 are protective of human health and the environment. No contaminant pathways exist for human health from the OU1, OU2 and OU3 remedies. There are institutional controls, PA Hazardous Sites Cleanup Act (HSCA) 512 Orders, deed notices and local ordinances, in place that restrict any activities that would interfere or damage the integrity of the remedy.

The remedy for OU4 currently protects human health and the environment in the short term because no human exposure pathways to contaminated ground water currently exist due to institutional controls in place prohibiting consumption of ground water. However, in order for the remedy to be protective in the long term, the remedy documents need to be modified to require institutional controls, and the treatment system must capture and treat contaminated ground water. The discharge of treated water to the infiltration gallery trench must be maintained to be functional and operate effectively.

Because the remedial actions at all OUs are protective, the site is protective of human health and the environment.

GPRA Measure Review

As part of this Five-Year Review, the GPR (Government Performance Results Act) Measures have also been reviewed. The GPR Measures and their 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 not achieved SWRAU because the Institutional Controls have not been implemented.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site Name: Drake Chemical		
EPA ID: PAD003058047		
Region: 3	State: PA	City/County: Lock Haven/Clinton
SITE STATUS		
NPL Status: Final		
Multiple OUs? Yes	Has the site achieved construction completion? Yes	
REVIEW STATUS		
Lead agency: EPA		
Author name: Roy Schrock		
Author affiliation: EPA Region 3		
Review period: 12/01/2012 – 9/22/2013		
Date of site inspection: 3/05/2013		
Type of review: Statutory		
Review number: 3		
Triggering action date: 9/22/2008		
Due date (five years after triggering action date): 9/22/2013		

Five-Year Review Summary Form (continued)

Issues/Recommendations

OU(s) without Issues/Recommendations Identified in the Five-Year Review:
OU1 and OU2

Issues and Recommendations Identified in the Five-Year Review:

OU(s): OU3 and OU4	Issue Category: Institutional Controls			
	Issue: Institutional controls are in place but need to be required in a decision document.			
	Recommendation: Issue an ESD to modify the remedy to require institutional controls to prevent or restrict ground water use in the areas contaminated above the performance standards.			
Affect Current Protectiveness	Affect Future Protectiveness	Implementing Party	Oversight Party	Milestone Date
No	Yes	EPA	EPA	9/30/2014

OU(s): OU4	Issue Category: Remedy Performance			
	Issue: The contaminant plume is not completely captured by the existing extraction wells.			
	Recommendation: Install a new extraction well pump within DPW-04 to capture the contaminant plume.			
Affect Current Protectiveness	Affect Future Protectiveness	Implementing Party	Oversight Party	Milestone Date
No	Yes	PRP	EPA	9/30/2014

OU(s): OU4	Issue Category: Remedy Performance			
	Issue: The infiltration gallery is easily inundated, requiring the pumping system to be shut down.			
	Recommendation: Prepare an O&M plan and schedule to include preventive maintenance for the discharge gallery and preventive maintenance measures for the wells and carbon filtration tanks.			
Affect Current Protectiveness	Affect Future Protectiveness	Implementing Party	Oversight Party	Milestone Date
No	Yes	PRP	EPA	6/30/2014

OU(s): OU4	Issue Category: Remedy Performance			
	Issue: When operating, extraction wells are not consistently pumping at high enough rates to capture all contamination.			
	Recommendation: Increase and maintain the pumping rates to improve contaminant capture.			
Affect Current Protectiveness	Affect Future Protectiveness	Implementing Party	Oversight Party	Milestone Date
No	Yes	PRP	EPA	6/30/2014

OU(s): OU4	Issue Category: Remedy Performance			
	Issue: Sample analysis does not include 1,4-dioxane			
	Recommendation: Sample for 1,4-dioxane			
Affect Current Protectiveness	Affect Future Protectiveness	Implementing Party	Oversight Party	Milestone Date
No	Yes	PRP	EPA	6/30/2014

Sitewide Protectiveness Statement	
<i>Protectiveness Determination:</i> Protective	<i>Addendum Due Date</i>
<i>Protectiveness Statement:</i> Because the remedial actions at all OUs are protective, the site is protective of human health and the environment.	

Third Five-Year Review Report for Drake Chemical Superfund Site

1.0 Introduction

The purpose of a five-year review (FYR) is to evaluate the implementation and performance of a remedy in order to determine if the remedy will continue to be protective of human health and the environment. FYR reports document FYR methods, findings and conclusions. In addition, FYR reports identify issues found during the review, if any, and document recommendations to address them.

The United States Environmental Protection Agency (EPA) prepares FYRs pursuant to the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Section 121 and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). CERCLA Section 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 often than each 5 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 EPA interpreted this requirement further in the NCP, 40 Code of Federal Regulations (CFR) Section 300.430(f)(4)(ii), which 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 initiation of the selected remedial action.

This Five-Year Review addresses the remedy implemented at the Drake Chemical Superfund site (the Site) in Lock Haven, Clinton County, Pennsylvania. EPA conducted this FYR from December 2012 to September 2013. EPA is the lead agency for the remedy. Pennsylvania Department of Environmental Protection (PADEP), as the support agency representing the Commonwealth of Pennsylvania, has reviewed all supporting documentation and provided input to the EPA during the FYR process.

This is the third FYR for the Site. The triggering action for this statutory review is the previous FYR. The FYR is required because hazardous substances, pollutants or contaminants remain at the Site above levels that allow for unlimited use and unrestricted exposure. EPA designated four

OUs for the cleanup of the Site. The OUs consist of the leachate stream (OU1), building demolition (OU2), soil incineration (OU3) and ground water (OU4).

2.0 Site Chronology

Table 1: Chronology of Site Events

Event	Date
EPA was made aware of the site contamination	April 1, 1979
EPA initiated the first site inspection	July 1, 1980
EPA initiated a removal action to remove drums from the surface of the Site and emptied the on-site tanks	March 2, 1982
EPA completed the removal action to remove drums from the surface of the Site and emptied the on-site tanks	June 24, 1982
EPA issued notice letters to the Site's PRPs	October 29, 1982
EPA proposed the Site for listing on the National Priorities List (NPL)	December 30, 1982
Site finalized on the NPL	September 8, 1983
EPA completed a combined RI/FS for OU1 EPA began remedial design for OU1 EPA signed the first Record of Decision (ROD) to remediate an off-site leachate stream	September 30, 1984
EPA issued notice letters to the PRPs	November 21, 1984
EPA and site PRPs completed RI/FS negotiations	February 15, 1985
EPA finished remedial design for OU1	July 1, 1985
EPA completed a combined RI/FS for OU2 EPA signed the second ROD for on-site remediation of the remaining buildings, tanks and other OU2 structures	May 13, 1986
EPA completed the RI/FS for OU2	September 15, 1986
EPA began a removal action at the Site for building demolition	June 20, 1987
EPA completed the OU1 remedial action	August 15, 1987
EPA established the Site's Information Repository	August 31, 1988
EPA concluded the combined RI/FS study for OU3 / OU 4 EPA signed the third ROD for the remediation of contaminated soil, sludge and other debris at OU3 and ground water at OU4	September 29, 1988
EPA concluded OU2 remedial action	May 25, 1990
EPA began OU3 remedial action	September 30, 1991
EPA issued a Special Notice to the Site's PRPs	September 28, 1992
Alternative dispute resolution efforts underway	February 1, 1993
EPA entered into a Consent Decree with site PRPs	July 5, 1994
EPA signed an Explanation of Significant Difference (ESD)	June 14, 1995
Federal court entered into a Consent Decree with responsible party Site PRPs began OU4 remedial design	February 14, 1996
Site PRPs began remedial action for OU4	May 30, 1999
The EPA concluded remedial action for OU3	February 1, 2000
Site PRPs completed remedial action for OU4 Site PRPs started a long-term response action for OU4	September 28, 2000
EPA prepared Site's Preliminary Close-Out Report	September 29, 2000
PRP contractor, Key Environmental, Inc., prepared Site's Monitoring and Maintenance Plan	February 26, 2001
EPA completed the first site FYR	September 25, 2003
PADEP recorded a Section 512 order for institutional controls	December 2006
EPA completed the second site FYR	September 22, 2008
Local governments implemented ground water use restriction ordinances	February 2010

3.0 Background

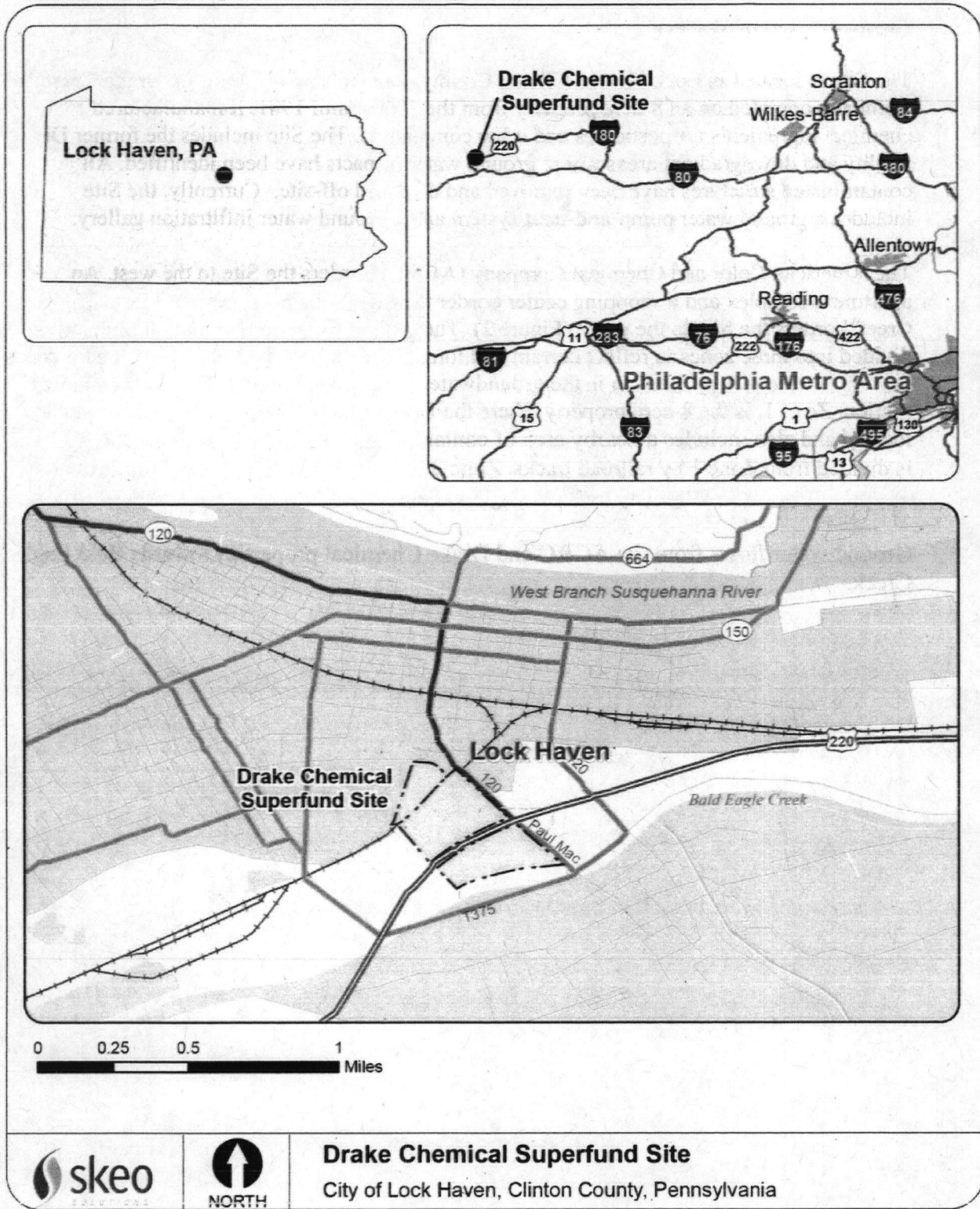
3.1 Physical Characteristics

The Site is located in Lock Haven, Clinton County, Pennsylvania (Figure 1). Drake Chemical Company operated on an 8-acre property from the 1960s until 1981. It manufactured chemical ingredients for pesticides and other compounds. The Site includes the former Drake facility and downgradient areas where ground water impacts have been identified. All contaminated structures have been removed and disposed off-site. Currently, the Site includes a ground water pump-and-treat system and a ground water infiltration gallery.

The American Color and Chemical Company (AC&C) borders the Site to the west. An apartment complex and a shopping center border the Site to the northwest and Bald Eagle Creek borders the Site to the south (Figure 2). The ground water contamination plume was divided into three zones to reflect current and former use of the property parcels. These zones were not based on any division in the groundwater contaminant plume. The northernmost section, Zone 1, is the 8-acre property where the Drake Chemical Company facility was located and also includes a nearby area of contaminated soil. Zone 2 is south of Zone 1 and is divided from Zone 1 by railroad tracks. Zone 3 is located south of Zone 2 and extends from the Route 220 Highway to Bald Eagle Creek.

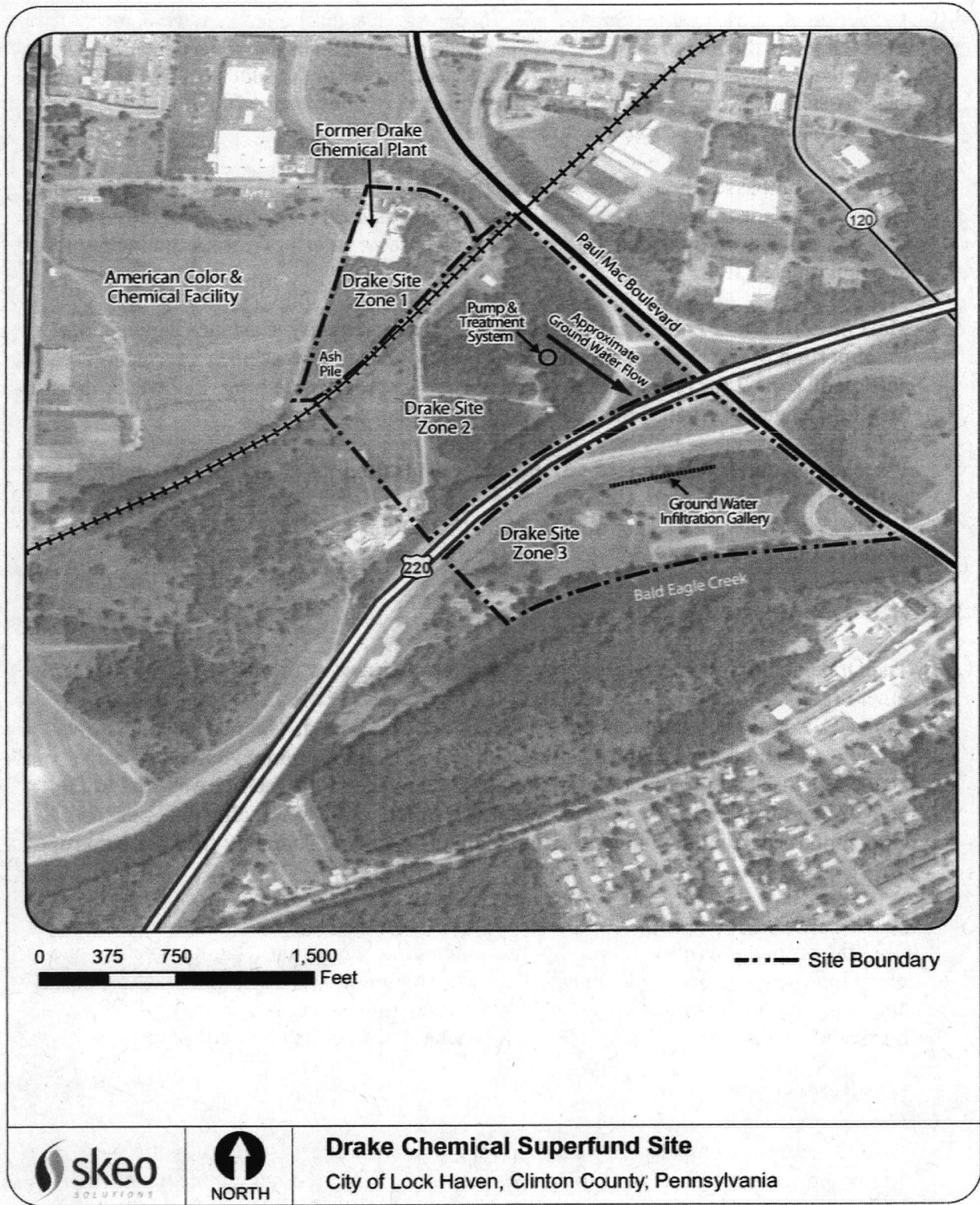
Ground water flows from the AC&C and Drake Chemical properties towards Bald Eagle Creek.

Figure 1: Site Location Map



Disclaimer: This map and any boundary lines within the map are approximate and subject to change. The map is not a survey. The map is for informational purposes only regarding the EPA's response actions at the Site.

Figure 2: Detailed Site Map



Disclaimer: This map and any boundary lines within the map are approximate and subject to change. The map is not a survey. The map is for informational purposes only regarding the EPA's response actions at the Site.

3.2 Land and Resource Use

The current land use near the Site is a mix of open space and commercial development. The AC&C borders the Site to the west. An apartment complex and a shopping center border the Site to the northwest and Bald Eagle Creek borders the Site to the south. The West Branch of the Susquehanna River is located about three quarters of a mile north of the Site. Approximately 10,300 people live within a mile of the Site.

Zone 1 encompasses three different property parcels. The one parcel is owned by a local family and is not currently used. The second parcel is used for commercial storage. The City of Lock Haven owns the third parcel that contains an ash pile from the incineration of contaminated soil.

Most of Zone 2 and Zone 3 are owned by a local municipality, Castanea Township; a small portion of the land belongs to the City of Lock Haven. Castanea Township uses a portion of Zone 2 for residential disposal of yard waste for mulching. In Zone 3, there are two little league baseball fields maintained by Castanea Township.

There are no current or planned ground water wells used for drinking water at the Site or in the City of Lock Haven. Use of ground water in the area is prohibited by local ordinances. There are no enclosed, inhabited structures located over the known extent of ground water contamination.

3.3 History of Contamination

The Drake facility manufactured chemical intermediates for color dyes, pesticides and other organic compounds. Operations at the Site started in the 1940s by a company named Kilsdunk with the production of color dye compounds that produced a known carcinogen named beta-naphthylamine. In the 1960s, the Commonwealth of Pennsylvania banned the use and production of beta-naphthylamine and the facility was sold to the Drake Chemical Company, which produced a variety of different chemical materials. Operations ceased in the fall of 1981 and Drake Chemical Company filed for bankruptcy in 1982.

Historically, a large portion of the 8-acre Zone 1 included lagoons for disposal of waste from the production of various compounds including beta-naphthylamine (a color dye compound) and the herbicide fenac. There were about 60 process tanks, reactors inside, and surrounding the process buildings. Waste materials and debris from the 1972 hurricane Agnes flooding were used as fill material during facility operations.

3.4 Initial Response

Drake Chemical Company filed for bankruptcy in 1982 after a series of Notices of Violations issued by the Pennsylvania Department of Environmental Resources. EPA initiated a removal action in 1982, which removed hundreds of drums from the ground surface and emptied on-site tanks filled with a variety of compounds. The EPA also placed a fence around the facility to prevent direct contact with the surface soil, buildings

and lagoons. The EPA placed the Site on the National Priorities List (NPL) in September 8, 1983.

3.5 Basis for Taking Action

The Remedial Investigation/Feasibility Study (RI/FS) focused on a leachate stream that ran off site toward Bald Eagle Creek. The second RI/FS addressed on-site buildings and surface features, soils, sludge and ground water.

The investigation found surface leachate discharges from a lagoon at Zone 1. The investigation concluded that there was a risk associated with direct contact with the water and sludge originating from a discharge swale from the Site. Off-site surface water analyses indicated little impact of leachate contamination on aquatic life and water quality in Bald Eagle Creek.

The investigation also identified a threat of direct contact with contaminated buildings, structures, storage areas, lagoons and debris piles as well as the physical threat of building collapse and tank corrosion. The historical use of beta-naphthylamine, a known bladder carcinogen and produced at the Site by Kilsdunk, was a primary concern.

Contaminated soil, sludge and debris buried at the Site also posed a direct contact threat and it was the source of the Site's ground water contamination. Both the soil and ground water were contaminated with over a hundred compounds, including beta-naphthylamine, 1-2, dichloroethane, benzene, trichloroethene, chlorobenzene and other hazardous substances.

Ground-water beneath the Site and adjacent to the Site was contaminated at a level greater than the EPA's acceptable risk range. In addition, contaminated ground water had the potential for migration into Bald Eagle Creek.

4.0 Remedial Actions

In accordance with CERCLA and the NCP, the overriding goals for any remedial action are protection of human health and the environment

4.1 Remedy Selection

The EPA designated four OUs for the cleanup of the Site. The OUs consist of the leachate stream (OU1), building demolition (OU2), soil incineration (OU3) and ground water (OU4). EPA determined that in order to expedite the remediation of the leachate stream, which posed the greatest threat of direct contact to the public, a phased approach would be implemented. The phased approach would allow design and construction work to proceed for OU1 and OU2 while remedial alternatives were developed for the more technically complex on-site soil contamination and ground water contamination,

OU1 – Leachate Stream

On September 30, 1984, the EPA signed the first Record of Decision (ROD) for OU1. The ROD selected a remedy to address a leachate stream that originated from the southern unlined lagoon on the Site. The purpose of the remedial action was to prevent the threat of direct human contact with the contaminants in the leachate stream and sediment. The OU1 remedy was an interim measure.

The remedial action objectives (RAOs) identified in the ROD include:

- Maintain the public health and safety.
- Attempt to make the publicly owned land safe for human access.
- Develop remedial actions that are both technically feasible and cost effective.

The selected remedy for OU1 included excavation of the contaminated soil and sediment from the off-site area south of Zone 1; construction of a French drain and an underground sewer line to collect and carry the runoff below the ground surface to Bald Eagle Creek and construction of a clay cap to cover the sewer line and adjacent surface soil.

OU2 – Building Demolition

On May 13, 1986, the EPA signed the second ROD for on-site remediation of the remaining buildings, tanks and other structures. The RAO was to reduce or eliminate exposure pathways by which building contaminants may reach potential receptors. The remedy also removed the physical threat of building collapse and tank corrosion.

OU3 – Soil Incineration

On September 29, 1988, the EPA signed the third ROD, which required the remediation of on-site contaminated soil, sludge and other debris. The purpose of the remediation was to prevent the threat of direct contact with the material on site as well as to remove the primary source of ground water contamination.

OU4 – Ground Water

The September 29, 1988 ROD also contained the selected remedy for ground water, a pump-and-treat system.

EPA signed an Explanation of Significant Differences (ESD) on June 14, 1995, to modify the ground water treatment to regular activated carbon and further defined the scope of work, periodic sampling requirements, operation and maintenance plans, and the possibility for a technical impracticability waiver.

Table 2 includes the performance standards set in the ESD.

Neither the 1988 ROD nor the 1995 ESD included institutional controls as part of the selected remedy.

Table 2: Ground Water Performance Standards

Contaminant Constituent	Performance Standard (µg/L)
1,2-dichloroethane (1,2-DCA)	5
benzene	5
beta-naphthylamine	10

4.2 Remedy Implementation

OU1 – Leachate Stream

The EPA began remedial design for OU1 on September 30, 1984 and completed the design on July 1, 1985. The EPA began remedial action on September 19, 1985 and completed the remedial action by August 15, 1987. Contaminated soils were placed on the Zone 1 property and eventually removed for off-site disposal as part of the OU2 remedy. The on-site lagoon was removed.

OU2 – Building Demolition

The EPA began the remedial design for OU2 on May 13, 1986 and completed the design on September 15, 1986. EPA began the remedial action on June 20, 1987 and completed the remedial action on May 25, 1990. An EPA removal action demolished and removed all buildings, tanks and other structures for off-site disposal at hazardous waste landfills and other hazardous waste treatment facilities.

OU3 – Incineration

EPA began the remedial design on January 3, 1989. Remedial action began on September 30, 1991, and was completed on February 1, 2000. The remedial action included construction of an on-site incinerator, excavation of the entire Zone 1 area to the water table (about 12 feet deep) and treatment of the soil using incineration. Treated soils were

placed in a large pile on the southern portion of the Site, graded to specifications and covered with clean materials.

The remedial action also included treatment of ground water during the excavation and treatment of surface runoff from rainfall. During excavation, some drums and tanks were discovered and were disposed of at an off-site hazardous waste facility. Following completion of the treatment, the incinerator and water treatment facilities were removed.

Although not required in the ROD, a Pennsylvania Section 512 Order was added to the Zone 1 properties to prohibit ground water use and to restrict activities that could affect the integrity of the capped area.

OU4 – Ground Water

The ground water remedy is being implemented by AC&C and Beazer East Inc. pursuant to a Consent Decree with EPA and PADEP dated February 14, 1996. These potentially responsible parties (PRPs) are implementing the ground water portion of the remedy because the ground water contaminant plume originating from the AC&C Facility passes through and around the Drake facility as they enter the Drake Zone 2 and Zone 3 properties. The PRPs initiated the remedial design activities in May 1996 and completed the remedial design in June 1998. Remedial action began on May 30, 1999, and was completed on September 28, 2000.

The ground water treatment system consists of four large-diameter extraction wells, two carbon treatment units that can be monitored and changed periodically, and a ground water infiltration trench to return treated water to the water table. Discharge of the treated ground water consists of pumping from the treatment plant in Zone 2 under Route 220 in water pipes to a groundwater infiltration trench in Zone 3 where the water is returned back to the water table. The introduction of clean water to Zone 3 is expected to improve the contaminant concentrations by adding clean treated water to Zone 3. The EPA and PRPs are currently considering improvements to the system.

In 2010, the City of Lack Haven and Castanea Township implemented ordinances that prohibit the use of ground water for potable purposes and required that all residents abandon existing potable wells and connect to public water supply.

4.3 Operation and Maintenance (O&M)

O&M activities are performed by the PRP's contractor, Key Environmental. The Monitoring and Maintenance Plan dated February 26, 2001 outlines the frequency of sampling, the wells to be sampled and the analysis required. Regular activities include recovery well, influent and effluent sampling to determine system performance, hydraulic monitoring, and routine system operations and maintenance.

In recent years, the treatment system has regularly been shutting down due to iron buildup. The system could not restart and operate until the PRP cleaned out the network of drainage pipes. At the time of this FYR, maintenance of the infiltration trench has been performed and the system is operating. However, the O&M plan must be updated to include maintenance details and a schedule.

In March 2011, the PRP submitted an evaluation of the ground water remediation system. The EPA and PRP have been discussing the system performance and potential improvements.

In September 2012, after a review of the evaluation report, EPA determined that the system does not operate continuously through all months of the year due to a lack of proper operation and maintenance of the system, as is required. The data indicate the system shuts down for extended periods due to iron build up in the treatment system as well as high water levels in the infiltration trench.

EPA reviewed the quarterly progress reports, and found that the ground water remediation systems on the adjacent AC&C property also shut down for extended periods and that coordination of the remedial systems has not been effective. In addition, it appears that chlorobenzene present in ground water beneath the adjacent AC&C facility has been allowed to migrate through Zone 1 and 2 of the Drake property into Zone 3.

5.0 Progress Since the Last Five-Year Review

The protectiveness statement from the 2008 FYR for the Site stated the following:

"The assessment of this Five-Year Review found that each of the remedial actions was constructed in accordance with the Records of Decisions and an Explanation of Significant Differences. The remedy is functioning as designed. For the OU4 ground water remedy, the extraction wells are operational but the system will need to be reviewed and evaluated to optimize the capture area and the effectiveness of the ground water remediation system to achieve performance standards and MCLs [maximum contaminant levels] throughout the contaminated ground water plume. The immediate threats to human health were addressed and the long term risk posed by ground water contamination is being addressed. The remedy is considered protective in the short term because there is no current exposure to contaminated soil or ground water at the Site.

The long-term protection is dependent on implementation of institutional controls to restrict the use of ground water. PADEP issued a Hazardous Sites Cleanup Act (HSCA) Section 512 Order for all three of the parcels in Zone 1 which now have restrictions noted on the deeds. The two downgradient parcels which are located south of the former Drake facility in Zones 2 and 3 still need institutional controls. In addition, further evaluation of the remedial operations is necessary."

The 2008 FYR included two issues and recommendations. This report summarizes each recommendation and its current status below.

Table 3: Progress on Recommendations from the 2008 FYR

Section	Recommendations	Party Responsible	Milestone Date	Action Taken and Outcome	Date of Action
5.1	Modify the remedy to require institutional controls to prevent or restrict ground water use in the areas contaminated above the performance standards.	EPA	9/30/2009	Not completed	9/30/14
5.2	Re-evaluate the OU4 monitoring network and remedy operations. Determine the need for potential modifications, upgrades, and or changes to the remedy in order to meet performance standards.	EPA	9/30/2011	Ongoing	7/22/13

5.1 Institutional Controls

A Pennsylvania Hazardous Sites Cleanup Act (HSCA) Section 512 Order has been recorded for the Zone 1 properties. The HSCA 512 Order includes institutional controls to prohibit any use of contaminated groundwater and any activities that would interfere or damage the integrity of the large pile on Zone 1. In addition, ground water use in Zones 2 and 3 are restricted by local ordinance in both the City of Lock Haven and Castanea Township that prohibit well installations and require connections to the public water supply.

5.2 Ground water Remedy

The PRPs submitted an evaluation of the OU4 remedy in March 2011. In September 2012, the EPA provided comments on the OU4 evaluation to the PRPs, including a list of required changes to the system. The PRPs responded to the EPA's comments in a January 2013 letter. EPA responded a second time in a Letter dated July 22, 2013. Discussions

between EPA and PRPs are ongoing. The comments focused on operation of the treatment system, capture zone extent and reporting requirements.

The following items were included in EPA's July 22, 2013 letter.

The O&M manual shall be updated to detail the additional preventive maintenance measures and the schedule for it. It shall also identify specific performance measures in the gallery that would trigger the related maintenance activities. The O&M manual shall also describe maintenance of the extraction wells and carbon tanks. Specifically addressing response measures for iron or sand build up in the extraction wells and other causes for pressure build up in the tanks. In addition, the maintenance manual shall describe the shutoff mechanism used to trigger the turn off of the groundwater extraction system when water in the infiltration gallery becomes too high.

EPA is requiring a detailed review of the boring logs, well construction details and placement elevations of the extraction pump at DPW-04. EPA is concerned that the use of only one extraction pump does not capture and prevent water flowing beyond the eastern boundary of Zone 2. Since this well is located the farthest to the east of any site extraction well, it is critical that we ensure that contamination is not moving past this well in any direction. EPA is requiring that this well be retrofitted with a second extraction pump in the well. EPA is also requiring a series of transducers in the monitoring wells P-D8, P-D7 and P-D6 adjacent to DPW-04 to confirm that significant drawdown is occurring: i.e., that the drawdown from pumping is capturing the groundwater along the eastern portion of the Site.

A new monitoring well shall be installed to help determine the flow path of chlorobenzene. This will be needed to evaluate EPA's concern about migration of this contaminant from the ACC Facility into Zone 2

EPA is requiring that the quarterly progress reports contain the operating parameters of most concern, including (1) operation times for extraction wells, the carbon treatment units and the infiltration gallery; (2) each and every incidence of system shut down, including partial shutdown and the cause of each shutdown; (3) influent and effluent concentration analysis for samples taken once a month; (4) average pumping rates for each well; (5) average quarterly pumping rates for combined well and pumps; and (6) transducer data showing influence on the eastern boundary wells during pumping.

6.0 Five-Year Review Process

6.1 Administrative Components

EPA initiated the FYR in December 2012. EPA remedial project manager (RPM) Roy Schrock led the EPA site review team, which also included EPA site community involvement coordinator Patricia Taylor, EPA site hydrogeologist, Mindi Snoparski, EPA site toxicologist, Nancy Riös Jafolla and EPA's Biological Technical Assistance Group coordinator, Bruce Pluta. Skeo Solutions provided contractor support to the EPA. The review schedule established consisted of the following activities:

- Community notification.
- Document review.
- Data collection and review.
- Site inspection.
- Local interviews.
- FYR Report development and review.

6.2 Community Involvement

In August 2013, the EPA published a public notice in the *Lock Haven Express* newspaper announcing the commencement of the FYR process for the Site, providing contact information for Roy Schrock, RPM and Patricia Taylor, CIC, inviting community participation. No one contacted the EPA as a result of the advertisement.

The EPA will make the final FYR Report available to the public. The EPA will place copies of the document in the designated site repository: Ross Public Library at 232 West Main Street, Lock Haven, Pennsylvania 17745.

6.3 Document Review

This FYR included a review of relevant, site-related documents, including the RODs, remedial action reports and recent monitoring data. Appendix A presents a complete list of the documents reviewed.

ARARs Review

Remedial actions are required to comply with the chemical-specific ARARs identified in the ROD. In performing the FYR for compliance with ARARs, only those ARARs that address the protectiveness of the remedy are reviewed.

The 1995 ESD identified chemical specific performance standards for three target ground water contaminant constituents, based on federal SDWA national primary drinking water standards. Cleanup goals from the 1995 ESD were compared to current SDWA and Pennsylvania standards (Table 4). There have been no changes in the standards for the three target ground water contaminants.

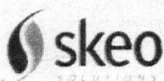
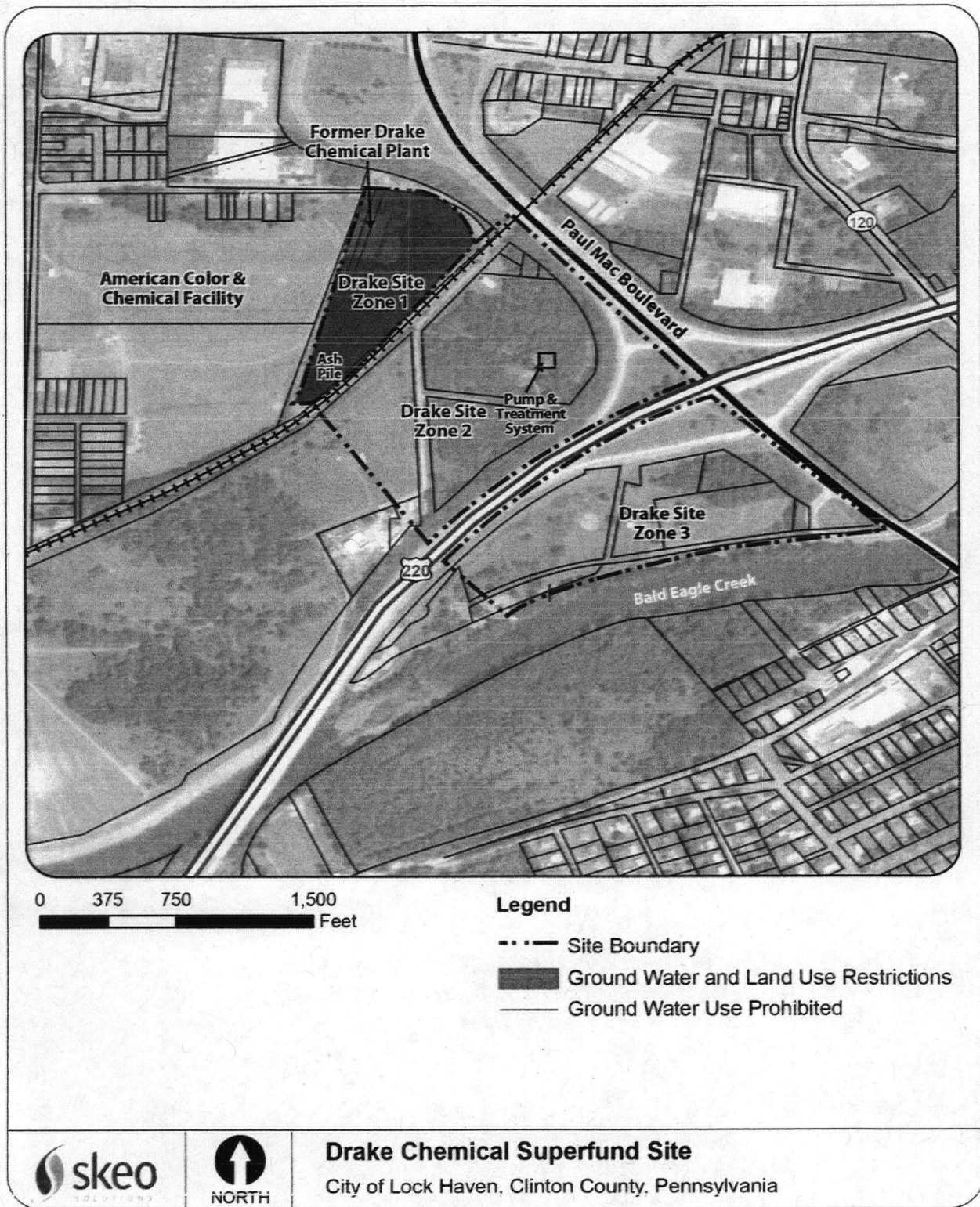
Table 4: Ground Water ARARs Review

Ground Water COC	1995 ESD ARAR (µg/L)	2013 ARAR ^a (µg/L)	ARARs Change
1,2-DCA	5 ^a	5	None
benzene	5 ^a	5	None
beta-naphthylamine	NA ^b	NA	None

a. EPA standards are available at: <http://water.epa.gov/drink/contaminants/index.cfm>.
 Pennsylvania standards are available at:
http://www.depweb.state.pa.us/portal/server.pt/community/land_recycling_program/20541/statewide_health_standards/1034862.

b. The ROD cleanup goal of 10 µg/L is based on the limit of detection.

Figure 3: Institutional Control Base Map



Drake Chemical Superfund Site

City of Lock Haven, Clinton County, Pennsylvania

Disclaimer: This map and any boundary lines within the map are approximate and subject to change. The map is not a survey. The map is for informational purposes only regarding the EPA's response actions at the Site.

6.4 Data Review

Ground Water

The ground water remediation system has been operating since November of 2000. To date, over 52 million gallons of ground water have been extracted and treated. Ground water is monitored quarterly from the wells depicted in Figure 4. Monitoring data for 2008 through 2013 is included in Table 5.

Currently, three of the four recovery wells are extracting groundwater for treatment. EPA approved the idling of recovery well RW-01 in 2001, because contaminant concentrations had met the performance standards. At other locations, performance standards for all constituents have not been met and the recovery system wells continue to operate.

Data indicate constituent concentrations have declined in Zone 2 due to the extraction and treatment of impacted ground water, and the subsequent migration of residual constituents from Zone 1 into Zone 2. The majority of constituent decline occurred within the first five years of remedial system operation (2000 to 2005). The treatment system continues to meet the non-detect effluent discharge standards for constituent concentrations.

The performance standard for 1,2-DCA has not been achieved in Zone 2. Figure 5 illustrates the 1,2-DCA plume as of 2011. Even though trichloroethylene (TCE) is not identified as a performance standard in the decisions documents, this Five-Year Review indicates that concentrations of trichloroethylene (TCE) exceed the MCL of 5 µg/L

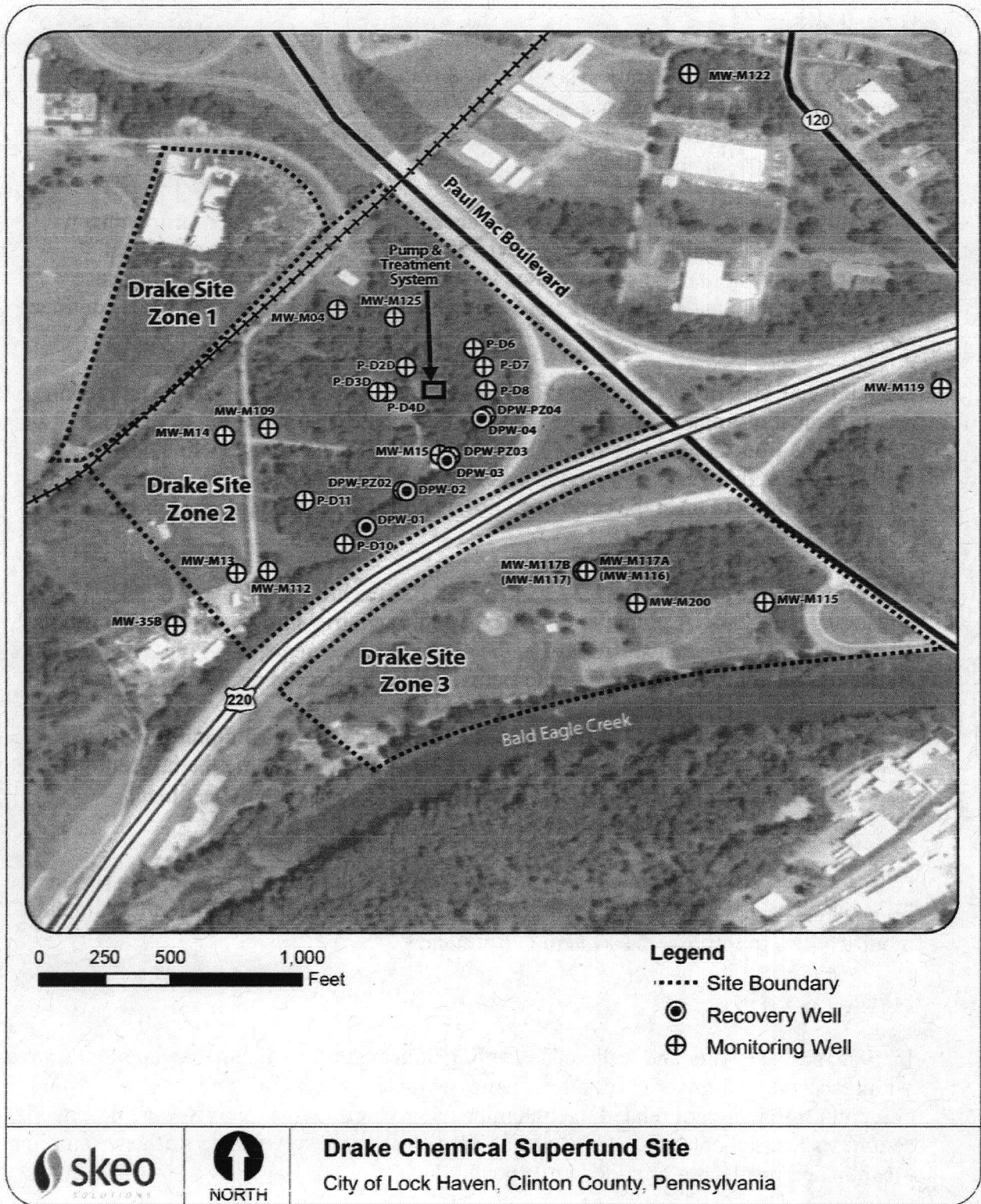
Recently concentrations of 1,2-DCA and chlorobenzene at Zone 3 monitoring points MW-117A and MW-117B have increased. However, after cleaning the infiltration trench concentrations began to decrease. Concentrations of groundwater constituent concentrations have not yet stabilized.

Due to extensive system shut downs and mechanical failures, contaminant bypass has been occurring throughout the operation of the system. EPA and the PRP are evaluating modifications to improve the system performance.

Surface Water

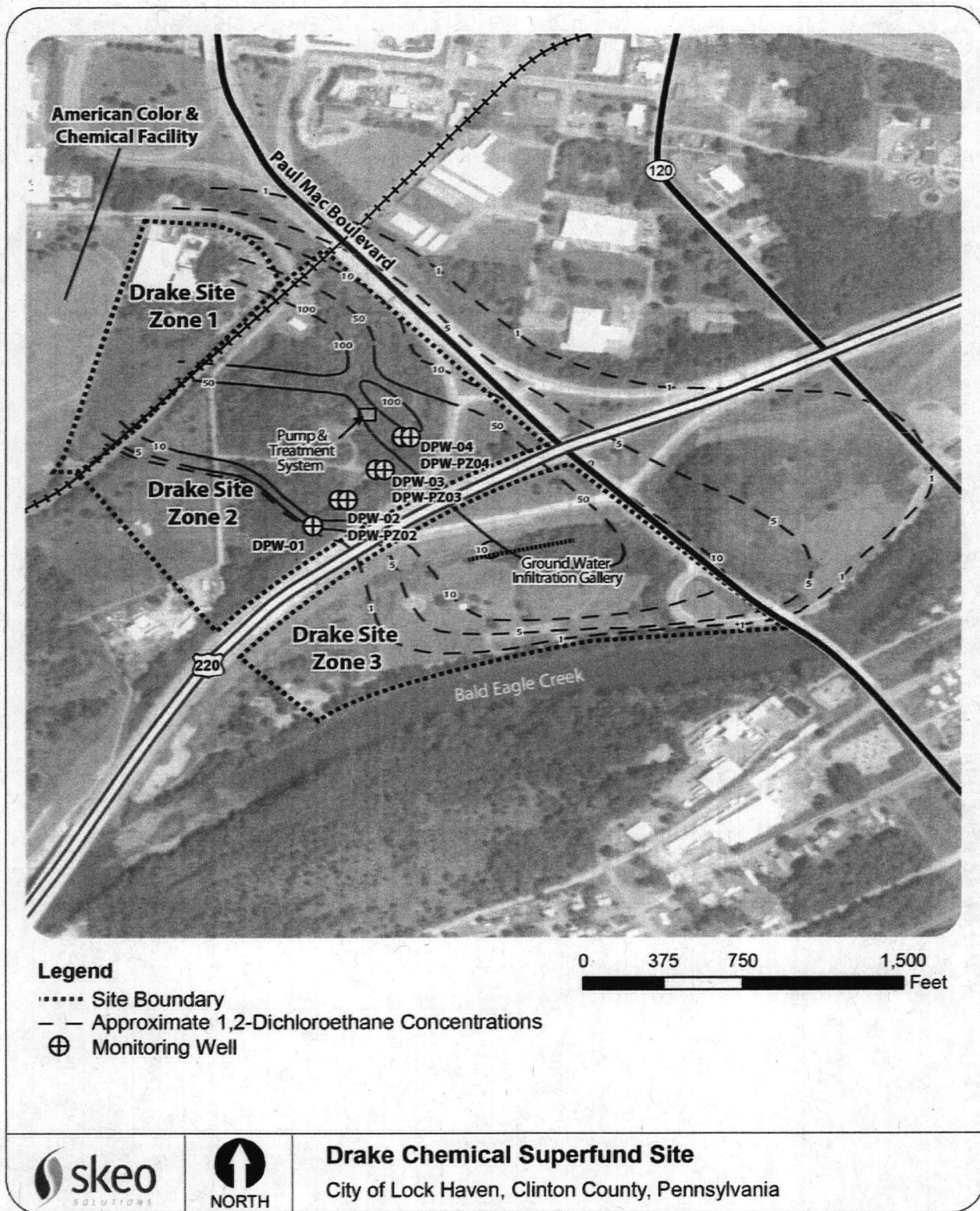
In 2005, surface water and sediment sampling indicated contaminant concentrations were within acceptable limits for volatile organic compounds. Several semivolatile compounds that are not related to contaminants produced by the facility were detected in sediments. Based on these results, ecological risks were not evaluated further. Sampling location and results are provided in Appendix D.

Figure 4: Ground Water Monitoring Network



Disclaimer: This map and any boundary lines within the map are approximate and subject to change. The map is not a survey. The map is for informational purposes only regarding the EPA's response actions at the Site.

Figure 5: 1,2-DCA Ground Water Plume Map



Disclaimer: This map and any boundary lines within the map are approximate and subject to change. The map is not a survey. The map is for informational purposes only regarding the EPA's response actions at the Site.

Table 5. 2008-2013 Ground Water Monitoring Data

		1,2-DCA	Benzene	Chlorobenzene	Methylene chloride	Trichloroethylene	beta-Naphthylamine	4-Chloroaniline
	Units	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l
Performance Standard		5	5	39	4.1	5	10	150
Current USEPA MCL		5	5	100	5	5	NA	NA
DPW-01	1/25/2008	4.1 J	<0.81	59	<0.75	<0.88	<1.2	<0.44
DPW-01	5/22/2008	4.0 J	<0.15	140	1.8 JB	<0.19	<1.4	<0.51
DPW-01	7/30/2008	5.7	1.5 J	220	<1.1	<0.80	<1.2	0.91 J
DPW-01	10/17/2008	5.4	1.1 J	210	<1.1	<0.80	<1.2	<0.46
DPW-01	1/20/2009	11	1.5 J	210	<1.1	5.2	<0.074	<1.0
DPW-01	4/14/2009	2.7 J	<0.99	93	<1.1	<0.80	<0.075	<1.1
DPW-01	7/7/2009	3.3 J	<0.99	110	<1.1	<0.80	<0.075	<1.1
DPW-01	10/29/2009	3.9 J	<0.99	79	<1.1	<0.80	<0.077	<1.1
DPW-01	1/12/2010	5.1	<0.99	100	<1.1	<0.80	<0.074	<1.0
DPW-01	5/18/2010	3.3 J	<0.99	88	<1.1	<0.80	<1.5	<0.86
DPW-01	7/20/2010	6	1.2 J	110	<1.1	<0.80	<1.4	<0.83
DPW-01	10/27/2010	3.8 J	<0.99	83	<1.1	<0.80	<1.4	<0.85
DPW-01	3/16/2011	3.6 J	<0.99	66	<1.1	<0.80	<1.5	<0.88
DPW-01	3/16/2011	3.4 J	<0.99	64	<1.1	<0.80	<1.5	<0.86
DPW-01	4/21/2011	3.1 J	<0.99	65	<1.1	<0.80	<1.5	<0.86
DPW-01	8/24/2011	4.1 J	<0.99	98	<1.1	<0.8	<1.4	<0.85
DPW-01	10/13/2011	37 J	<9.9	580	<11	<8	<1.5	<0.87
DPW-01	2/29/2012	2.2 J	<0.99	31	<1.1	<0.8	<1.4	<0.85
DPW-01	4/13/2012	2.9 J	<0.99	1.3 J	<1.1	<0.8	<1.5	<0.88
DPW-01	7/10/2012	1.8 J	<0.99	4.1 J	<1.1	<0.8	<1.5	<0.91
DPW-01	8/7/2012	---	---	---	---	---	<1.5	<0.9
DPW-01	12/13/2012	<0.96	<0.99	3.3 J	<1.1	<0.8	<1.5	<0.87
DPW-01	1/15/2013	<0.96	<0.99	0.54 J	<1.1	<0.8	<1.4	<0.85
DPW-02	1/25/2008	23 J	<8.1	1300	<7.5	<8.8	<1.2	<0.44
DPW-02	5/22/2008	23 J	<1.0	1200	14 JB	<1.4	<1.3	<0.50
DPW-02	7/30/2008	13 J	<4.9	750	<5.4	<4.0	<1.2	<0.46
DPW-02	10/17/2008	14 J	<9.9	860	<11	<8.0	<1.2	0.63 J
DPW-02	1/20/2009	<9.6	15 J	1200	<11	<8.0	<0.075	<1.1
DPW-02	4/14/2009	11 J	<9.9	610	<11	<8.0	<0.074	<1.0
DPW-02	7/7/2009	27 J	<9.9	970	<11	<8.0	<0.075	<1.1

		1,2-DCA	Benzene	Chlorobenzene	Methylene chloride	Trichloroethylene	beta-Naphthylamine	4-Chloroaniline
Units		µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l
Performance Standard		5	5	39	4.1	5	10	150
Current USEPA MCL		5	5	100	5	5	NA	NA
DPW-02	10/29/2009	19 J	<9.9	920	<11	<8.0	<0.076	<1.1
DPW-02	1/12/2010	18 J	<9.9	1000	<11	<8.0	<0.074	<1.0
DPW-02	5/18/2010	16 J	<9.9	960	<11	<8.0	<1.4	1.0 J
DPW-02	7/20/2010	19 J	<9.9	830	<11	<8.0	<1.4	<0.85
DPW-02	10/27/2010	13 J	<9.9	950	<11	<8.0	<1.4	<0.85
DPW-02	3/16/2011	<24	<25	1000	<27	<20	<1.4	<0.85
DPW-02	4/21/2011	30 J	<25	1000	<27	<20	<1.4	1.1 J
DPW-02	8/24/2011	19 J	<9.9	1000	<11	<8	<1.4	<0.85
DPW-02	10/13/2011	16 J	<9.9	930	<11	<8	<1.4	0.86 J
DPW-02	2/29/2012	12 J	<9.9	1000	<11	<8	<1.5	<0.86
DPW-02	4/13/2012	17 J	<9.9	800	<11	<8	<1.5	0.88 J
DPW-02	7/10/2012	16 J	<9.9	520	15 J	<8	<1.5	<0.87
DPW-02	12/13/2012	11 J	<9.9	690	<11	<8	<1.5	<0.88
DPW-02	1/15/2013	16 J	<9.9	790	<11	<8	<1.5	0.93 J
DPW-02	1/15/2013	15 J	5.4 J	580	<5.4	<4	<1.5	0.98 J
DPW-03	1/25/2008	21 J	<4.1	470	<3.8	11 J	<1.2	0.93 J
DPW-03	5/22/2008	21	<0.37	350	4.9 JB	11 J	<1.3	2.3 J
DPW-03	7/30/2008	22	3.2 J	370	<2.2	17	<1.2	1.5 J
DPW-03	10/17/2008	19 J	<4.9	430	<5.4	11 J	<1.2	<0.44
DPW-03	1/20/2009	43	2.8 J	250	<2.2	17	<0.076	1.5 J
DPW-03	4/14/2009	<2.4	<2.5	420	<2.7	6.8 J	<0.074	1.3 J
DPW-03	7/7/2009	34	4.5 J	400	<2.2	18	<0.076	1.4 J
DPW-03	10/29/2009	25	<4.9	390	<5.4	9.9 J	<0.074	1.2 J
DPW-03	1/12/2010	28	2.8 J	320	<2.2	12	0.76 J	2.1 J
DPW-03	5/18/2010	27	<4.9	360	<5.4	14 J	<1.4	1.4 J
DPW-03	7/20/2010	33	<4.9	330	<5.4	12 J	<1.5	1.6 J
DPW-03	10/27/2010	22 J	<4.9	330	<5.4	9.1 J	<1.5	1.5 J
DPW-03	3/16/2011	22 J	<7.9	320	<8.7	9.5 J	<1.4	<0.85
DPW-03	4/21/2011	23 J	<7.9	370	<8.7	14 J	<1.4	1.3 J
DPW-03	8/24/2011	18	2.7 J	300	<2.7	8.8 J	<1.4	<0.85
DPW-03	10/13/2011	27	3 J	270	<3.3	8.3 J	<1.5	1.1 J
DPW-03	2/29/2012	19 J	<4	280	<4.4	9 J	<1.5	<0.87
DPW-03	4/13/2012	21 J	<4.9	250	<5.4	9.7 J	<1.5	0.93 J

	Units	1,2-DCA	Benzene	Chlorobenzene	Methylene chloride	Trichloroethylene	beta-Naphthylamine	4-Chloroaniline
		µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l
Performance Standard		5	5	39	4.1	5	10	150
Current USEPA MCL		5	5	100	5	5	NA	NA
DPW-03	4/13/2012	21	<4	260	<4.4	9.6 J	<1.5	<0.88
PW-03	7/10/2012	36	<4	290	10 J	13 J	<1.5	<0.89
DPW-03	12/13/2012	13 J	<4.9	310	<5.4	4.9 J	<1.5	<0.86
DPW-03	1/15/2013	11 J	<4.9	280	<5.4	5.3 J	<1.4	<0.85
DPW-04	1/25/2008	140	9.7 J	1200	<7.5	63	<1.2	11
DPW-04	5/22/2008	160	<1.3	1100	15 JB	68	<1.3	16
DPW-04	7/30/2008	150	12 J	870	<5.4	66	<1.2	14
DPW-04	10/17/2008	160	14 J	1300	<11	73	<1.2	13
DPW-04	1/20/2009	110	15 J	2000	<11	53	<0.075	15
DPW-04	4/14/2009	130	<9.9	500	<11	23 J	<0.074	17
DPW-04	7/7/2009	380	28 J	1500	<11	140	<0.076	13
DPW-04	10/29/2009	220	<25	1500	<27	90 J	<0.075	15
DPW-04	1/12/2010	230	13 J	970	<5.4	65	<0.074	16
DPW-04	5/18/2010	220	<25	1400	<27	66 J	<1.4	11
DPW-04	7/20/2010	290	<25	1300	<27	82 J	<1.4	9.1 J
DPW-04	10/27/2010	190	9.9 J	1100	<11	54	<1.5	12
DPW-04	3/16/2011	200	<25	1300	<27	79 J	<1.5	12
DPW-04	4/21/2011	98	1.7 J	130	<1.1	40	<1.4	1.2 J
DPW-04	8/24/2011	180	12 J	1200	<11	64	<1.5	6.5 J
DPW-04	10/13/2011	200	13 J	1300	18 J	74	<1.5	9 J
DPW-04	2/29/2012	130	<15	970	<16	46 J	<1.5	7.1 J
DPW-04	4/13/2012	170	<15	1200	<16	79	<1.5	8.9 J
DPW-04	7/10/2012	190	<9.9	600	27 J	60	<1.5	3.2 J
DPW-04	12/13/2012	70	<9.9	880	<11	33 J	<1.5	8.8 J
DPW-04	1/15/2013	37	<4.9	410	<5.4	19 J	<1.6	7 J
MW-M04	5/22/2008	91 J	34 J	2900	<8.2	<4.2	12	210
MW-M04	10/15/2008	100 J	26 J	3100	<27	29 J	18	230
MW-M04	4/15/2009	92 J	<40	3200	<44	<32	15	240
MW-M04	10/28/2009	100 J	<49	3400	<54	<40	<0.073	180
MW-M04	5/20/2010	100 J	<49	3100	<54	<40	<1.4	190
MW-M04	10/28/2010	85 J	<49	3400	<54	<40	<1.5	200
MW-M04	4/21/2011	93 J	<49	3800	<54	42 J	<1.5	140

		1,2-DCA	Benzene	Chlorobenzene	Methylene chloride	Trichloroethylene	beta-Naphthylamine	4-Chloroaniline
Units		µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l
Performance Standard		5	5	39	4.1	5	10	150
Current USEPA MCL		5	5	100	5	5	NA	NA
MW-M04	10/12/2011	120 J	41 J	5200	<44	37 J	<1.5	180
MW-M04	4/12/2012	74 J	<40	3800	<44	<32	<1.5	140
MW-M04	12/12/2012	73	26	3800	<4.4	29	<1.5	150
MW-M115	5/22/2008	31	<0.13	53	1.7 JB	5.6	<1.3	<0.50
MW-M115	10/14/2008	50	<0.99	78	<1.1	11	<1.2	<0.44
MW-M115	4/15/2009	33	<0.99	71	<1.1	7.4	<0.074	<1.0
MW-M115	10/27/2009	50	<0.99	99	<1.1	11	<0.074	<1.0
MW-M115	5/20/2010	39	<0.99	84	<1.1	11	<1.4	<0.85
MW-M115	10/26/2010	22	<0.99	48	<1.1	5.6	<1.5	<0.89
MW-M115	4/21/2011	24	<0.99	78	<1.1	7.6	<1.5	<0.86
MW-M115	10/11/2011	27	<0.99	39	<1.1	3.7 J	<1.4	<0.85
MW-M115	4/11/2012	27 B	<0.99	58	<1.1	6	<1.5	<0.88
MW-M115	12/11/2012	21	<0.41	58	<0.44	5.4	<1.4	<0.85
MW-M117A	5/22/2008	4.7 J	<0.13	2.9 J	<0.33	0.62 J	<1.3	<0.50
MW-M117A	10/14/2008	15	<0.99	13	<1.1	2.4 J	<1.2	<0.44
MW-M117A	4/15/2009	5.5	<0.99	11	<1.1	1.4 J	<0.074	<1.0
MW-M117A	10/27/2009	31	<0.99	38	<1.1	5	<0.074	<1.0
MW-M117A	5/20/2010	2.8 J	<0.99	3.4 J	<1.1	0.95 J	<1.4	<0.85
MW-M117A	10/26/2010	2.2 J	<0.99	2.5 J	<1.1	<0.80	<1.5	<0.90
MW-M117A	4/20/2011	<0.96	<0.99	1.9 J	<1.1	<0.80	<1.5	<0.86
MW-M117A	10/11/2011	64	<0.99	38	<1.1	4.7 J	<1.5	<0.89
MW-M117A	2/9/2012	4.2 J	<0.99	14	<1.1	1.4 J	---	---
MW-M117A	4/12/2012	2 J	<0.99	6.9	<1.1	<0.8	<1.5	<0.88
MW-M117A	12/11/2012	17	<0.41	38	<0.44	3.7	<1.4	<0.85
MW-M117B	5/22/2008	160	4.7 J	360	<1.0	31	<1.3	<0.49
MW-M117B	10/14/2008	57	1.6 J	220	<1.1	16	<1.2	<0.44
MW-M117B	4/15/2009	35	1.0 J	170	<1.1	12	<0.080	<1.1
MW-M117B	10/27/2009	54	1.4 J	140	<1.1	13	<0.074	<1.0
MW-M117B	5/20/2010	120	2.7 J	210	<1.1	25	<1.4	<0.83
MW-M117B	10/26/2010	57	1.2 J	210	<1.1	15	<1.5	<0.86
MW-M117B	4/20/2011	79	1.8 J	150	<1.1	19	<1.4	<0.83
MW-M117B	10/11/2011	9.3	<0.99	30	<1.1	<0.80	<1.5	<0.87

		1,2-DCA	Benzene	Chlorobenzene	Methylene chloride	Trichloroethylene	beta-Naphthylamine	4-Chloroaniline
Units		µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l
Performance Standard		5	5	39	4.1	5	10	150
Current USEPA MCL		5	5	100	5	5	NA	NA
MW-M117B	2/9/2012	2.7 J	<0.99	20	<1.1	1.4 J	---	---
MW-M117B	4/11/2012	5.8	<0.99	34	<1.1	2.8 J	<1.5	3.5 J
MW-M117B	12/11/2012	22	<0.41	74	<0.44	6	<1.4	<0.85
MW-M14	5/22/2008	34	<0.87	840	10 JB	<1.1	<1.4	33
MW-M14	10/15/2008	35 J	<9.9	1000	<11	<8.0	<1.2	44
MW-M14	4/15/2009	16	4.2 J	380	<1.1	1.2 J	<0.074	<1.0
MW-M14	10/28/2009	8.8 J	<4.9	300	<5.4	<4.0	<0.074	27
MW-M14	5/20/2010	30	8.5 J	840	<5.4	<4.0	<1.4	33
MW-M14	10/28/2010	30 J	10 J	880	<11	<8.0	<1.4	35
MW-M14	4/20/2011	23 J	<9.9	670	<11	<8.0	<1.5	27
MW-M14	10/11/2011	23 J	6.8 J	320	<5.4	<4.0	<1.5	32
MW-M14	4/11/2012	39	16 J	1000	5.7 JB	4.1 J	<1.5	25
MW-M14	12/12/2012	26	9.7	860	<0.44	3.1	<1.5	19
MW-M200	5/22/2008	34	<0.13	46	1.4 JB	6.2	<1.3	<0.50
MW-M200	10/14/2008	69	1.0 J	85	<1.1	13	<1.2	<0.44
MW-M200	4/15/2009	39	<0.99	72	<1.1	8.3	<0.078	<1.1
MW-M200	10/27/2009	57	<0.99	94	<1.1	11	<0.074	<1.0
MW-M200	5/20/2010	47	<0.99	71	<1.1	11	<1.4	<0.85
MW-M200	10/26/2010	29	<0.99	67	<1.1	6.2	<1.5	<0.86
MW-M200	4/20/2011	31	<0.99	42	<1.1	6.7	<1.5	<0.86
MW-M200	10/11/2011	32	<0.99	65	<1.1	6.7	<1.5	<0.87
MW-M200	4/11/2012	38 B	<0.99	62	<1.1	7.5	<1.5	<0.86
MW-M200	12/11/2012	29	<0.41	68	<0.44	7.7	<1.5	<0.91
P-D2D	10/15/2008	60 J	<15	1800	<16	45 J	2.3 J	3.2 J
P-D2D	10/28/2009	83 J	<25	2300	<27	60 J	<0.074	2.5 J
P-D2D	10/28/2010	74 J	<25	2100	<27	48 J	<1.5	2.1 J
P-D2D	10/12/2011	69 J	<25	2000	<27	48 J	<1.5	1.2 J
P-D2D	12/11/2012	54	<10	1500	<11	43	<1.5	<0.9
P-D3D	10/14/2008	11	<0.99	70	<1.1	19	<1.2	<0.44
P-D3D	10/27/2009	6.8	<0.99	30	<1.1	7.5	<0.074	<1.0
P-D3D	10/26/2010	10	<0.99	38	<1.1	11	<1.5	<0.88
P-D3D	10/11/2011	6.3	<0.99	14	<1.1	3.2 J	<1.5	<0.86

		1,2-DCA	Benzene	Chlorobenzene	Methylene chloride	Trichloroethylene	beta-Naphthylamine	4-Chloroaniline
Units		µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l
Performance Standard		5	5	39	4.1	5	10	150
Current USEPA MCL		5	5	100	5	5	NA	NA
P-D3D	12/11/2012	12	0.79 J	100	<0.44	22	<1.4	<0.85
P-D6	5/22/2008	30	<0.13	3.0 J	<0.33	3.9 J	<1.3	<0.50
P-D6	10/14/2008	44	<0.99	3.8 J	<1.1	5.1	<1.2	<0.43
P-D6	4/14/2009	27	<0.99	2.4 J	<1.1	2.6 J	<0.074	<1.0
P-D6	10/27/2009	33	<0.99	4.1 J	<1.1	4.5 J	<0.074	<1.0
P-D6	5/20/2010	32	<0.99	3.4 J	<1.1	5.4	<1.5	<0.86
P-D6	10/26/2010	28	<0.99	2.8 J	<1.1	4.4 J	<1.5	<0.86
P-D6	4/20/2011	24	<0.99	3.3 J	<1.1	4.1 J	<1.4	<0.84
P-D6	10/11/2011	20	<0.99	1.7 J	<1.1	2.5 J	<1.4	<0.85
P-D6	4/11/2012	24	<0.99	3 J	<1.1	4.6 J	<1.5	<0.89
P-D6	12/11/2012	36	<0.41	8	<0.44	6.5	<1.5	<0.86
P-D8	10/14/2008	92	6.0 J	510	<5.4	32	<1.2	<0.45
P-D8	10/28/2009	61	<4.9	270	<5.4	18 J	<0.074	<1.0
P-D8	10/26/2010	87	4.2 J	340	<4.4	24	<1.5	1.0 J
P-D8	10/12/2011	73	3.5 J	330	<3.3	25	<1.5	<0.86
P-D8	12/11/2012	180	16	1600	<1.8	81	<1.4	<0.84

Shaded values exceed performance standard or MCL

6.5 Site Inspection

On March 5, 2013, stakeholders gathered at the Site to perform the third FYR site inspection. In attendance were Roy Schrock, EPA RPM; Cheryl Sinclair, PADEP; Mark Lahr, PRP contractor; and Ryan Burdge and Johnny Zimmerman-Ward, Skeo Solutions. For a full list of site inspection activities, see the Site Inspection Checklist in Appendix B. Site photographs are available in Appendix C.

Site visit participants met at the ground water pump-and-treat building at the Site. The system is in an enclosed building, which is fenced and locked (see Figure 2). The PRP contractors provided an overview of the system and discussed the recent improvements to the extraction system. The pump-and-treat system is a carbon adsorption system with three recovery pumping wells and two carbon tanks. The recovery wells pump at 8, 7 and 5 gallons per minute (gpm) and can be adjusted, as needed. The PRP contractors explained that DPW-02 was retrofitted due to iron fouling, which dropped the overall pumping rate down to five gpm. Effluent is currently not sampled for iron. The system and surrounding area are well maintained. The wells in the area of the system were inspected; each was locked, labeled and undamaged.

Treated ground water is discharged to an infiltration trench south of the treatment building. The trench is located adjacent to a baseball field, near Bald Eagle Creek. The area appeared to be well maintained and was clear of any large vegetation. There were no signs of trespassing at any of the inspected areas.

The PRPs are considering options for discharge to the local POTW or perhaps an NPDES discharge to Bald Eagle Creek for occasions when the infiltration trench is not functioning.

The PRP contractors explained how they use vacuum pumping to clean the underground pipes in the infiltration trench in recent years. The PRP contractors indicated cleaning the trench every two years might be beneficial. The cleanout of the trench is currently not in the O&M plan. EPA stated that it would like to see the cleanout plan, as well as extraction well pumping maintenance, added to the O&M plan.

On March 5, 2013, Skeo Solutions staff visited the designated site repository, Ross Public Library, as part of the site inspection and noted that the Site repository should be updated.

6.6 Interviews

The FYR process included interviews with City of Lock Haven officials. The purpose was to document the perceived status of the Site and any perceived problems or successes with the remedy. City staff stated that people do not mention the Site anymore and that it is no longer a priority in the community. The City owns the parcel with the ash pile and asked whether it is acceptable to allow vegetative cover on the pile. EPA and PADEP responded that the area does not have large trees and is acceptable. The goal is to maintain the cap so the ash is not exposed.

City staff stated that city residents are on city owned public water supply and that private well use is prohibited by a local ordinance. EPA explained that the current infiltration trench backs up for the Drake groundwater remedy and asked if the City was aware that AC&C was considering use of the city sewer system when the infiltration trench cannot handle the flow. City staff indicated they were aware of this possibility but they were not certain if the current sewer could handle the additional flow. They mentioned that a new waste water treatment plant for the area is planned and that the new plant could potentially accept the additional water from Site.

7.0 Technical Assessment

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

OU1 Leachate Stream

The OU1 remedy is functioning as intended. Contaminated soil was removed and there is no direct contact threat. No further review of this action is required.

OU2 Building Demolition

The OU2 remedy is functioning as intended. The buildings were demolished and removed offsite in 1990. No further review of this action is required.

OU3 Incineration

The OU3 remedy – on-site incineration of contaminated, soil, sludge and debris – is functioning as intended. All contaminated soil and debris from the ground surface to the water table was excavated and incinerated. Treated soil/ash remains on site in a graded and covered pile.

There are institutional controls to prohibit any activities that would interfere or damage the integrity of the large pile on Zone 1. The institutional controls also prohibit any use of contaminated ground water in Zone 1. These institutional controls are in place, but are not yet required in a decision document.

OU4 Ground water

The OU4 ground water remedy for extraction, treatment and discharge is not functioning as intended. The system has generally been effective in reducing constituent concentrations of target and indicator constituents in Zone 2, but has not adequately prevented constituent migration into downgradient Zone 3.

Contaminated ground water in Zones 1 and 2 are captured in extraction wells and treated prior to discharge to a ground water infiltration gallery. The treatment system continues to meet the non-detect effluent discharge standards for site constituents. However,

frequent ground water extraction system shut downs of long duration, coupled with extended periods of pumping at low rates, have allowed contaminants to migrate from Zone 2 into Zone 3, and possibly east of Zone 2. Furthermore, the infiltration gallery in Zone 3 does not produce infiltration and ground water mounding as intended. Instead, during periods of higher precipitation and ground water flow a water level sensor in the infiltration gallery causes the ground water extraction system to shut down. The O&M Plan must be updated to include cleaning out the infiltration gallery before it backs up.

Institutional controls restricting ground water use are in place, but are not called for in a decision document. Currently, the local municipalities have enacted ground water use ordinances that require connection to public water and prohibit the installation of ground water wells in the area. These ordinances cover all areas potentially affected by the Site.

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

Many of the exposure assumptions, toxicity data and cleanup levels are still valid. However, there have been changes in toxicity criteria for monitored contaminants since the last Five Year Review that do not impact the remedial action at this time. The standard for beta-naphthylamine was based on the laboratory detection limits, not ARARs. Note the current Regional Screening Level (RSL) for beta-naphthylamine for tap water is 0.033 ug/L at an 1E-06 cancer risk. The RSL for 4-chloroaniline is 0.32 ug/L at an 1E-06 cancer risk. Also, levels of 4-chloroaniline in monitoring and recovery wells are above the RSL. Ground water cleanup levels included in the ESD are based on ARARs and have not changed since the ROD was signed. However, no cleanup goal was identified for TCE in the ESD, but it is present in ground water above the MCL. In addition, 1,4-dioxane is a contaminant commonly found where TCE and other VOCs are present in ground water. Currently, sample analysis does not include 1,4-dioxane.

Vapor intrusion has not been assessed at the Site because currently no inhabited buildings are located within the identified zones. However, this could be a concern if the Site is developed.

In 2005, surface water and sediment sampling indicated contaminant concentrations were within acceptable limits for volatile organic compounds. Several semivolatile compounds that are not related to contaminants produced by the facility were detected in sediments. Based on these results, ecological risks were not evaluated further. Sampling location and results are provided in Appendix D.

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

No other information has come to light that would call into question the protectiveness of the remedy.

7.4 Technical Assessment Summary

The remedies for OU1, OU2 and OU3 as described in the remedial action section are functioning as intended. The OU4 ground water remedy is not functioning as intended. The system has been effective in reducing constituent concentrations of target and indicator constituents in Zone 2, but has not adequately prevented constituent migration into downgradient Zone 3. The EPA is working with the potentially responsible parties (PRPs) to modify the OU4 remedy and improvements are in progress.

8.0 Issues

Table 6 summarizes the current site issues.

Table 6: Current Site Issues

Issue	Affects Current Protectiveness?	Affects Future Protectiveness?
1) Institutional controls are in place but need to be required in a decision document.	No	Yes
2) The contaminant plume is not completely captured by the existing extraction wells.	No	Yes
3) The infiltration gallery is easily inundated, requiring the pumping system to be shut down.	No	Yes
4) When operating, extraction wells are not consistently pumping at high enough rates to capture all contamination.	No	Yes
5) Sample analysis does not include 1,4-dioxane	No	Yes

1.0 Recommendations and Follow-up Actions

Table 7 provides recommendations to address the current site issues.

Table 7: Recommendations to Address Current Site Issues

Issue	Recommendation / Follow-Up Action	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness?	
					Current	Future
1) Institutional controls are in place but need to be required in a decision document.	Issue an ESD to modify the remedy to require institutional controls to prevent or restrict ground water use in the areas contaminated above the performance standards.	EPA	EPA	9/30/2014	No	Yes
2) The contaminant plume is not completely captured by the existing extraction wells.	Install a new extraction well pump within DPW-04 to capture the contaminant plume.	PRP	EPA	9/30/2014	No	Yes
3) The infiltration gallery is easily inundated, requiring the pumping system to be shut down.	Prepare an O&M plan and schedule to include preventive maintenance for the discharge gallery and preventive maintenance measures for the wells and carbon filtration tanks.	PRP	EPA	6/30/2014	No	Yes
4) When operating, extraction wells are not consistently pumping at high enough rates to capture all contamination.	Increase and maintain the pumping rates to improve contaminant capture.	PRP	EPA	6/30/2014	No	Yes
5) Sample analysis does not include 1,4-dioxane	Sample for 1,4-dioxane	PRP	EPA	12/30/2013	No	Yes

10.0 Protectiveness Statements

The remedies for OU1, OU2 and OU3 are protective of human health and the environment. No contaminant pathways exist for human health from the OU1, OU2 and OU3 remedies. There are institutional controls, PA HSCA 512 Orders, deed notices and local ordinances, in place that restrict any activities that would interfere or damage the integrity of the remedy.

The remedy for OU4 currently protects human health and the environment in the short term because no human exposure pathways to contaminated ground water currently exist due to institutional controls in place prohibiting consumption of ground water. However, in order for the remedy to be protective in the long term, the remedy documents need to be modified to require institutional controls, and the treatment system must capture and treat contaminated ground water. The discharge of treated water to the infiltration gallery trench must be maintained to be functional and operate effectively.

Because the remedial actions at all OUs are protective, the site is protective of human health and the environment.

11.0 Next Review

The next FYR will be due within five years of the signature/approval date of this FYR.

Appendix A: List of Documents Reviewed

Drake Chemical Superfund Site Leachate Stream Operable Unit 1, Record of Decision September 30, 1984, US EPA Region 3.

Drake Chemical Superfund Site Building Demolition Operable Unit 2, Record of Decision, May 13, 1986, US EPA Region 3.

Drake Chemical Superfund Site Soil Incineration and Groundwater Treatment Operable Units 3 and 4, Record of Decision, September 29, 1988, US EPA Region 3.

Explanation of Significant Differences, Drake Chemical Superfund Site, Operable Unit 4, June 14, 1995, US EPA Region 3.

Preliminary Closeout Report for the Drake Chemical Superfund Site, September 29, 2000, EPA Region 3.

Groundwater Remedial System Evaluation, Drake Chemical Superfund Site, March 2011, Key Environmental.

EPA Response re: Groundwater Remedial System Evaluation, Drake Chemical Superfund Site, September 2012, US EPA Region 3.

AC&C Response to EPA Comments regarding Remedial System Evaluation, Drake Chemical Superfund Site, January 2013, AC&C.

EPA Response to AC&C January 2013 letter dated July 22, 2013, US EPA Region 3.

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). Fill in all that apply.

Agency US EPA

Contact Roy Schrock RPM 03/04/2013 _____
 Name Title Date Phone No.

Problems/suggestions Report attached: _____

Agency PADEP

Contact Cheryl Sinclair Geologist 03/04/2013 _____
 Name Title Date Phone No.

Problems/suggestions Report attached: _____

Agency City of Lack Haven

Contact Ruchard Marcinkevage City Manager 03/04/2013 _____
 Name Title Date Phone No.

Problems/suggestions Report attached: _____

Agency City of Lack Haven

Contact Jason Dershem Engineer 03/04/2013 _____
 Name Title Date Phone No.

Problems/suggestions Report attached: _____

4. **Other Interviews** (optional) Report attached: _____

III. ON-SITE DOCUMENTS AND RECORDS VERIFIED (check all that apply)

1. **O&M Documents**

- | | | | |
|--|---|-------------------------------------|---|
| <input checked="" type="checkbox"/> O&M manual | <input checked="" type="checkbox"/> Readily available | <input type="checkbox"/> Up to date | <input type="checkbox"/> N/A |
| <input type="checkbox"/> As-built drawings | <input type="checkbox"/> Readily available | <input type="checkbox"/> Up to date | <input checked="" type="checkbox"/> N/A |
| <input checked="" type="checkbox"/> Maintenance logs | <input checked="" type="checkbox"/> Readily available | <input type="checkbox"/> Up to date | <input type="checkbox"/> N/A |

Remarks: The O&M Plan should be updated to include managing cleaning out the infiltration trench when it becomes backed up.

2. **Site-Specific Health and Safety Plan** Readily available Up to date N/A

- Contingency plan/emergency response plan Readily available Up to date N/A

Remarks: _____

3. **O&M and OSHA Training Records** Readily available Up to date N/A

Remarks: _____

4. **Permits and Service Agreements**

- | | | | |
|--|---|--|---|
| <input type="checkbox"/> Air discharge permit | <input type="checkbox"/> Readily available | <input type="checkbox"/> Up to date | <input checked="" type="checkbox"/> N/A |
| <input type="checkbox"/> Effluent discharge | <input type="checkbox"/> Readily available | <input type="checkbox"/> Up to date | <input checked="" type="checkbox"/> N/A |
| <input type="checkbox"/> Waste disposal, POTW | <input type="checkbox"/> Readily available | <input type="checkbox"/> Up to date | <input checked="" type="checkbox"/> N/A |
| <input checked="" type="checkbox"/> Other permits: <u>hazardous waste permit</u> | <input checked="" type="checkbox"/> Readily available | <input checked="" type="checkbox"/> Up to date | <input type="checkbox"/> N/A |

Remarks: The PRP contractor is applying for NPDES permit and City permit to possibly discharge to creek or sewer during high flow.

5.	Gas Generation Records	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A
Remarks: _____				
6.	Settlement Monument Records	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A
Remarks: _____				
7.	Ground Water Monitoring Records	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Remarks: <u>The extent of the contaminated ground water plume is currently unknown.</u>				
8.	Leachate Extraction Records	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A
Remarks: _____				
9.	Discharge Compliance Records			
	<input type="checkbox"/> Air	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A
	<input checked="" type="checkbox"/> Water (effluent)	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Remarks: _____				
10.	Daily Access/Security Logs	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Remarks: _____				

IV. O&M COSTS

1.	O&M Organization			
	<input type="checkbox"/> State in-house	<input type="checkbox"/> Contractor for state		
	<input type="checkbox"/> PRP in-house	<input checked="" type="checkbox"/> Contractor for PRP		
	<input type="checkbox"/> Federal facility in-house	<input type="checkbox"/> Contractor for Federal facility		
	<input type="checkbox"/> _____			
2.	O&M Cost Records			
	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date		
	<input type="checkbox"/> Funding mechanism/agreement in place	<input checked="" type="checkbox"/> Unavailable		
	Original O&M cost estimate: _____ <input type="checkbox"/> Breakdown attached			
	Total annual cost by year for review period if available			
	From: <u>mm/dd/yyyy</u>	To: <u>mm/dd/yyyy</u>	_____	<input type="checkbox"/> Breakdown attached
	Date	Date	Total cost	
	From: <u>mm/dd/yyyy</u>	To: <u>mm/dd/yyyy</u>	_____	<input type="checkbox"/> Breakdown attached
	Date	Date	Total cost	
	From: <u>mm/dd/yyyy</u>	To: <u>mm/dd/yyyy</u>	_____	<input type="checkbox"/> Breakdown attached
	Date	Date	Total cost	
	From: <u>mm/dd/yyyy</u>	To: <u>mm/dd/yyyy</u>	_____	<input type="checkbox"/> Breakdown attached
	Date	Date	Total cost	
	From: <u>mm/dd/yyyy</u>	To: <u>mm/dd/yyyy</u>	_____	<input type="checkbox"/> 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 Applicable N/A

A. Fencing

1. **Fencing Damaged** Location shown on site map Gates secured N/A
 Remarks: _____

B. Other Access Restrictions

1. **Signs and Other Security Measures** Location shown on site map N/A
 Remarks: _____

C. Institutional Controls (ICs)

1. **Implementation and Enforcement**

Site conditions imply ICs not properly implemented Yes No N/A

Site conditions imply ICs not being fully enforced Yes No N/A

Type of monitoring (e.g., self-reporting, drive by): _____

Frequency: _____

Responsible party/agency: _____

Contact _____	_____	mm/dd/yyyy	_____
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 Yes No N/A

Violations have been reported Yes No N/A

Other problems or suggestions: Report attached

2. **Adequacy** ICs are adequate ICs are inadequate N/A
 Remarks: _____

D. General

1. **Vandalism/Trespassing** Location shown on site map No vandalism evident
 Remarks: _____

2. **Land Use Changes On Site** N/A
 Remarks: Castanea Township uses a portion of the Site for residential yard waste and mulch. Part of the Site is also used for storage.

3. **Land Use Changes Off Site** N/A
 Remarks: _____

VI. GENERAL SITE CONDITIONS

A. Roads <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A			
1.	Roads Damaged	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> Roads adequate <input type="checkbox"/> N/A
Remarks: _____			
B. Other Site Conditions			
Remarks: _____			
VII. LANDFILL COVERS <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A			
A. Landfill Surface			
1.	Settlement (low spots)	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Settlement not evident
Aerial extent: _____		Depth: _____	
Remarks: _____			
2.	Cracks	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Cracking not evident
Lengths: _____		Depths: _____	
Remarks: _____			
3.	Erosion	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Erosion not evident
Aerial extent: _____		Depth: _____	
Remarks: _____			
4.	Holes	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Holes not evident
Aerial extent: _____		Depth: _____	
Remarks: _____			
5.	Vegetative Cover	<input type="checkbox"/> Grass	<input type="checkbox"/> Cover properly established
<input type="checkbox"/> No signs of stress		<input type="checkbox"/> Trees/shrubs (indicate size and locations on a diagram)	
Remarks: _____			
6.	Alternative Cover (e.g., armored rock, concrete)		<input checked="" type="checkbox"/> N/A
Remarks: _____			
7.	Bulges	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Bulges not evident
Aerial extent: _____		Height: _____	
Remarks: _____			
8.	Wet Areas/Water Damage	<input type="checkbox"/> Wet areas/water damage not evident	
<input type="checkbox"/> Wet areas		<input type="checkbox"/> Location shown on site map	Aerial extent: _____
<input type="checkbox"/> Ponding		<input type="checkbox"/> Location shown on site map	Aerial extent: _____
<input type="checkbox"/> Seeps		<input type="checkbox"/> Location shown on site map	Aerial extent: _____
<input type="checkbox"/> Soft subgrade		<input type="checkbox"/> Location shown on site map	Aerial extent: _____
Remarks: _____			

9.	Slope Instability	<input type="checkbox"/> Slides	<input type="checkbox"/> Location shown on site map
	<input type="checkbox"/> No evidence of slope instability		
	Aerial extent: _____		
	Remarks: _____		
B. Benches			
	<input type="checkbox"/> Applicable : <input checked="" type="checkbox"/> 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	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> N/A or okay
	Remarks: _____		
2.	Bench Breached	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> N/A or okay
	Remarks: _____		
3.	Bench Overtopped	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> N/A or okay
	Remarks: _____		
C. Letdown Channels			
	<input type="checkbox"/> Applicable <input checked="" type="checkbox"/> 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 (Low spots)	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> No evidence of settlement
	Aerial extent: _____		Depth: _____
	Remarks: _____		
2.	Material Degradation	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> No evidence of degradation
	Material type: _____		Aerial extent: _____
	Remarks: _____		
3.	Erosion	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> No evidence of erosion
	Aerial extent: _____		Depth: _____
	Remarks: _____		
4.	Undercutting	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> No evidence of undercutting
	Aerial extent: _____		Depth: _____
	Remarks: _____		
5.	Obstructions	Type: _____	<input type="checkbox"/> No obstructions
	<input type="checkbox"/> Location shown on site map	Aerial extent: _____	
	Size: _____		
	Remarks: _____		

F. Cover Drainage Layer <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A		
1. Outlet Pipes Inspected <input type="checkbox"/> Functioning <input type="checkbox"/> N/A	Remarks: _____	
2. Outlet Rock Inspected <input type="checkbox"/> Functioning <input type="checkbox"/> N/A	Remarks: _____	
G. Detention/Sedimentation Ponds <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A		
1. Siltation Area extent: _____ Depth: _____ <input type="checkbox"/> N/A	<input type="checkbox"/> Siltation not evident	
Remarks: _____		
2. Erosion Area extent: _____ Depth: _____	<input type="checkbox"/> Erosion not evident	
Remarks: _____		
3. Outlet Works <input type="checkbox"/> Functioning <input type="checkbox"/> N/A	Remarks: _____	
4. Dam <input type="checkbox"/> Functioning <input type="checkbox"/> N/A	Remarks: _____	
H. Retaining Walls <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A		
1. Deformations <input type="checkbox"/> Location shown on site map <input type="checkbox"/> Deformation not evident	Horizontal displacement: _____ Vertical displacement: _____	
Rotational displacement: _____		
Remarks: _____		
2. Degradation <input type="checkbox"/> Location shown on site map <input type="checkbox"/> Degradation not evident	Remarks: _____	
I. Perimeter Ditches/Off-Site Discharge <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A		
1. Siltation <input type="checkbox"/> Location shown on site map <input type="checkbox"/> Siltation not evident	Area extent: _____ Depth: _____	
Remarks: _____		
2. Vegetative Growth <input type="checkbox"/> Location shown on site map <input type="checkbox"/> N/A	<input type="checkbox"/> Vegetation does not impede flow	
Area extent: _____		Type: _____
Remarks: _____		
3. Erosion <input type="checkbox"/> Location shown on site map <input type="checkbox"/> Erosion not evident	Area extent: _____ Depth: _____	
Remarks: _____		

4.	Discharge Structure	<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A
Remarks: _____			
VIII. VERTICAL BARRIER WALLS		<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
1.	Settlement	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Settlement not evident
Area extent: _____		Depth: _____	
Remarks: _____			
2.	Performance Monitoring	Type of monitoring: _____	
<input type="checkbox"/> Performance not monitored			
Frequency: _____		<input type="checkbox"/> Evidence of breaching	
Head differential: _____			
Remarks: _____			
IX. GROUND WATER/SURFACE WATER REMEDIES		<input checked="" type="checkbox"/> Applicable	<input type="checkbox"/> N/A
A. Ground Water Extraction Wells, Pumps and Pipelines		<input checked="" type="checkbox"/> Applicable	<input type="checkbox"/> N/A
1.	Pumps, Wellhead Plumbing and Electrical		
<input checked="" type="checkbox"/> Good condition <input type="checkbox"/> All required wells properly operating <input type="checkbox"/> Needs maintenance <input type="checkbox"/> N/A			
Remarks: <u>DPW 01 currently not operational.</u>			
2.	Extraction System Pipelines, Valves, Valve Boxes and Other Appurtenances		
<input checked="" type="checkbox"/> Good condition <input type="checkbox"/> Needs maintenance			
Remarks: _____			
3.	Spare Parts and Equipment		
<input checked="" type="checkbox"/> Readily available <input checked="" type="checkbox"/> Good condition <input type="checkbox"/> Requires upgrade <input type="checkbox"/> Needs to be provided			
Remarks: _____			
B. Surface Water Collection Structures, Pumps and Pipelines		<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
1.	Collection Structures, Pumps and Electrical		
<input type="checkbox"/> Good condition <input type="checkbox"/> Needs maintenance			
Remarks: _____			
2.	Surface Water Collection System Pipelines, Valves, Valve Boxes and Other Appurtenances		
<input type="checkbox"/> Good condition <input type="checkbox"/> Needs maintenance			
Remarks: _____			
3.	Spare Parts and Equipment		
<input type="checkbox"/> Readily available <input type="checkbox"/> Good condition <input type="checkbox"/> Requires upgrade <input type="checkbox"/> Needs to be provided			
Remarks: _____			
C. Treatment System		<input checked="" type="checkbox"/> Applicable	<input type="checkbox"/> N/A

<p>1. Treatment Train (check components that apply)</p> <p><input type="checkbox"/> Metals removal <input type="checkbox"/> Oil/water separation <input type="checkbox"/> Bioremediation</p> <p><input type="checkbox"/> Air stripping <input checked="" type="checkbox"/> Carbon adsorbers</p> <p><input type="checkbox"/> Filters: _____</p> <p><input type="checkbox"/> Additive (e.g., chelation agent, flocculent): _____</p> <p><input type="checkbox"/> Others: _____</p> <p><input checked="" type="checkbox"/> Good condition <input type="checkbox"/> Needs maintenance</p> <p><input checked="" type="checkbox"/> Sampling ports properly marked and functional</p> <p><input checked="" type="checkbox"/> Sampling/maintenance log displayed and up to date</p> <p><input checked="" type="checkbox"/> Equipment properly identified</p> <p><input type="checkbox"/> Quantity of ground water treated annually: _____</p> <p><input type="checkbox"/> Quantity of surface water treated annually: _____</p> <p>Remarks: _____</p>
<p>2. Electrical Enclosures and Panels (properly rated and functional)</p> <p><input type="checkbox"/> N/A <input checked="" type="checkbox"/> Good condition <input type="checkbox"/> Needs maintenance</p> <p>Remarks: _____</p>
<p>3. Tanks, Vaults, Storage Vessels</p> <p><input type="checkbox"/> N/A <input checked="" type="checkbox"/> Good condition <input checked="" type="checkbox"/> Proper secondary containment <input type="checkbox"/> Needs maintenance</p> <p>Remarks: _____</p>
<p>4. Discharge Structure and Appurtenances</p> <p><input type="checkbox"/> N/A <input checked="" type="checkbox"/> Good condition <input type="checkbox"/> Needs maintenance</p> <p>Remarks: _____</p>
<p>5. Treatment Building(s)</p> <p><input type="checkbox"/> N/A <input checked="" type="checkbox"/> Good condition (esp. roof and doorways) <input type="checkbox"/> Needs repair</p> <p><input checked="" type="checkbox"/> Chemicals and equipment properly stored</p> <p>Remarks: _____</p>
<p>6. Monitoring Wells (pump and treatment remedy)</p> <p><input checked="" type="checkbox"/> Properly secured/locked <input checked="" type="checkbox"/> Functioning <input checked="" type="checkbox"/> Routinely sampled <input checked="" type="checkbox"/> Good condition</p> <p><input type="checkbox"/> All required wells located <input type="checkbox"/> Needs maintenance <input type="checkbox"/> N/A</p> <p>Remarks: _____</p>
<p>D. Monitoring Data</p>
<p>1. Monitoring Data</p> <p><input checked="" type="checkbox"/> Is routinely submitted on time <input checked="" type="checkbox"/> Is of acceptable quality</p>
<p>2. Monitoring Data Suggests:</p> <p><input type="checkbox"/> Ground water plume is effectively contained <input checked="" type="checkbox"/> Contaminant concentrations are declining</p>

E. Monitored Natural Attenuation			
1. Monitoring Wells (natural attenuation remedy)			
<input type="checkbox"/> Properly secured/locked	<input type="checkbox"/> Functioning	<input type="checkbox"/> Routinely sampled	<input type="checkbox"/> Good condition
<input type="checkbox"/> All required wells located	<input type="checkbox"/> Needs maintenance	<input checked="" type="checkbox"/> N/A	
Remarks: _____			
X. OTHER REMEDIES			
If there are remedies applied at the site and 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 designed to accomplish (e.g., to contain contaminant plume, minimize infiltration and gas emissions). <u>The remedies for OU1, OU2 and OU3 are functioning as intended. The OU4 ground water remedy is not functioning as intended. The system has been effective in reducing constituent concentrations of target and indicator constituents in Zone 2, but has not adequately prevented constituent migration into downgradient Zone 3.</u>			
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. <u>The extraction system has shut down for extended periods due to clogging of the infiltration trench and a lack of replacement parts.</u>			
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. <u>The infiltration trench is easily inundated, forcing the system to shut down.</u>			
D. Opportunities for Optimization			
Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy. <u>The EPA is working with the PRPs to modify the OU4 remedy and improvements are in progress</u>			

Site Inspection Participants

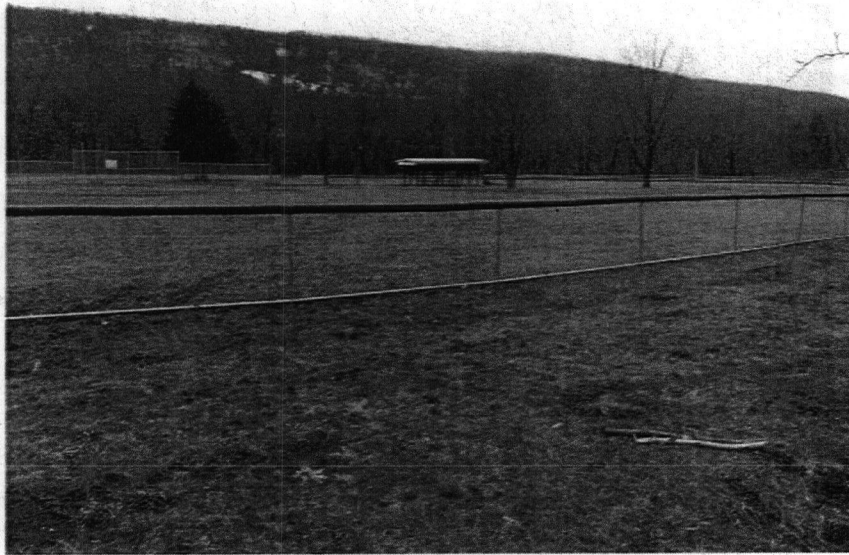
Roy Schrock, EPA RPM;

Cheryl Sinclair, PADEP;

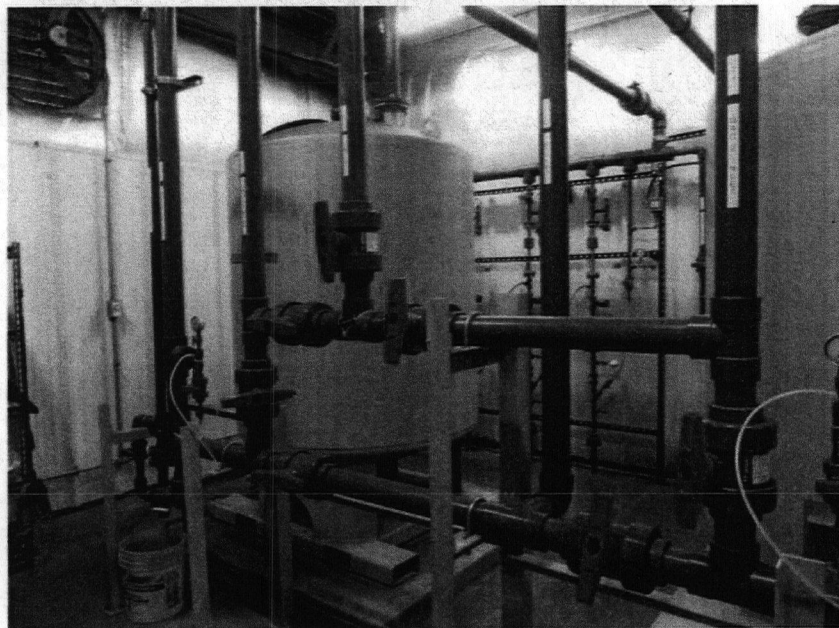
Mark Lahr and Dave Miller, Key Environmental, PRP contractor;

Ryan Burdge and Johnny Zimmerman-Ward, Skeo Solutions, EPA Contractor

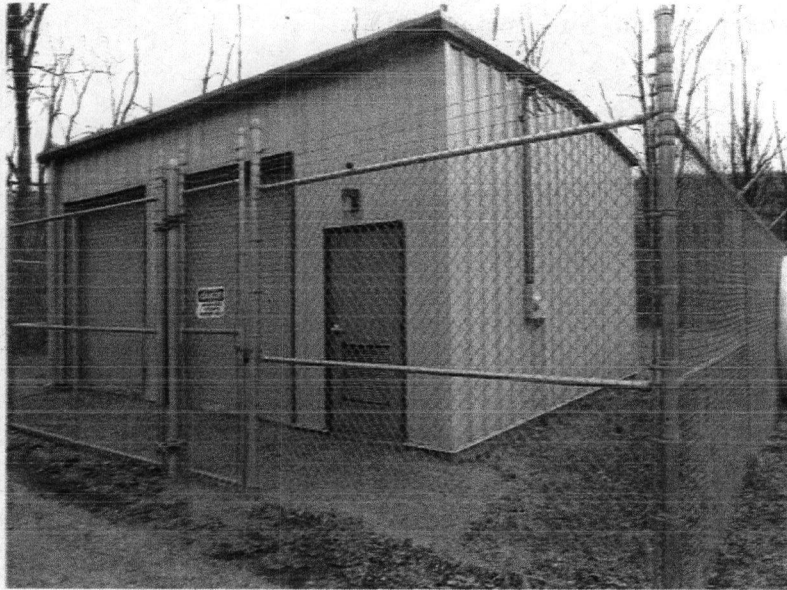
Appendix C: Photographs from Site Inspection Visit



View of baseball field from infiltration trench



Carbon tank treatment system



Ground water treatment building

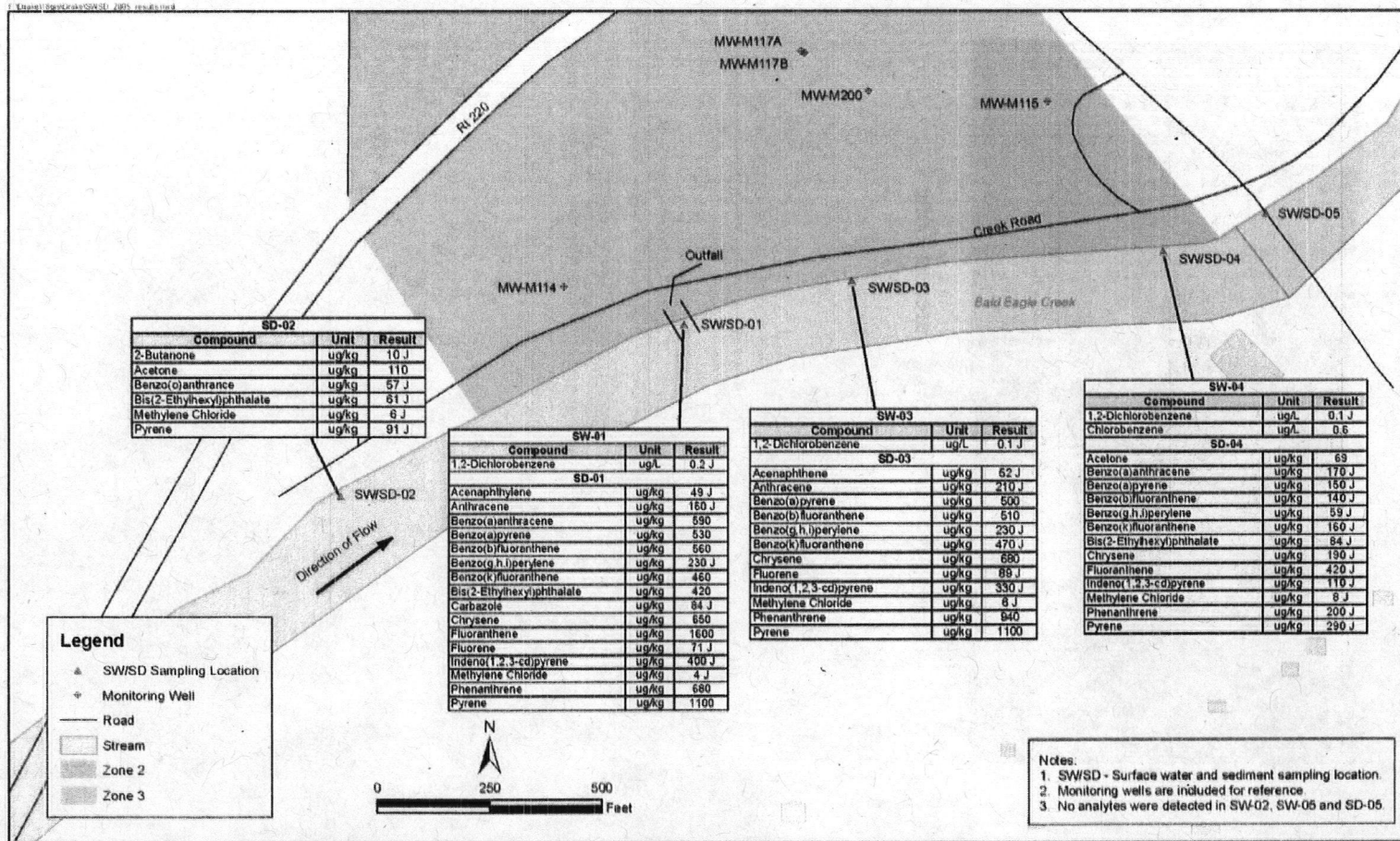


Sign at local park in Zone 3



Privately-owned storage area in Zone 1

Appendix D. 2005 Surface Water and Sediment Sampling



CDM

Drake Chemical Superfund Site
Lock Haven, Pennsylvania

Figure 4-2
Contaminant Detections in
Surface Water and Sediment 2005