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Addendum to the Henderson Road Superfund Site

Five-Year Review Report

Dated November 21, 2008

King of Prussia, Pennsylvania

PREPARED BY:

U. S. Environmental Protection Agency
Region III
Philadelphia, Pennsylvania

Approved by:

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

Date: 1/30/2013

Executive Summary

A Five-Year Review Addendum is completed for site remedies when the protectiveness determination is deferred until further information is obtained. When deferring protectiveness in the Five-Year Review Report, the Environmental Protection Agency ("EPA") provides a timeframe for when the information will be obtained and a protectiveness statement can be made. This Five-Year Review Addendum provides updated progress since the previous Five-Year Review and a protectiveness determination for the Operable Unit-1 remedy at the Henderson Road Superfund Site ("Site"). The protectiveness statement was deferred in the 2008 Five-Year Review for the Site.

The third Five-Year Review for the Site was signed by James J. Burke, Director of the Hazardous Site Cleanup Division, on November 21, 2008. The protectiveness statement contained in the report reads as follows:

The remedial action associated with OU-1 (Injection Well Operable Unit), is expected to achieve protectiveness in the long term, but a protectiveness determination is being deferred at this time. A groundwater extraction and treatment system has been installed that has been successful in reducing the contaminants, but final standards have yet to be achieved. There have been a number of changes to MCLs and factors used in assessing risk since the original ROD was issued. In addition, sampling for1, 4-dioxane has not been conducted, nor have current background concentrations been evaluated. As provided in the 1988 ROD, a formal reevaluation of the groundwater cleanup goals should be performed. Also, a vapor intrusion evaluation needs to be performed. It is expected that these actions will take approximately two years to implement, at which time a protectiveness determination will be made.

The remedial action at OU-2 (Landfill Operable Unit) is protective. The landfill has been capped and a leachate collection and treatment system has been installed, thereby reducing infiltration and the migration of contaminants. As a result of the Site inspection, the landfill gas vent risers need to be inspected and repaired, as necessary.

A determination regarding the protectiveness of the Operable Unit–1 remedy was deferred in the November 2008 Five-Year Review pending a vapor intrusion evaluation and the initiation of 1, 4-dioxane sampling. Based on the results of a 2011 vapor intrusion evaluation and the 1, 4-dioxane sampling results (coupled with the fact that institutional controls are in place which prohibit exposure to contaminated groundwater), it can now be determined that the remedy for Operable Unit–1 is protective of human health and the environment.

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Progress Since the Five-Year Review Completion Date

Issues from the November 2008 Five-Year Review Report

November 2008 - Five-Year Review Issues

Issue	Currently Affects Protectiveness (Y/N)	Affects Future Protectiveness (Y/N)
1. Groundwater cleanup values	N	Y
2. Vapor intrusion	Y	Y
3. Damaged landfill vent risers	N	N
4. 1, 4-dioxane	Y	Y

November 2008 - Recommendations and Follow-up Actions

Issue	Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Protectiveness Affected? (Y/N) Current	Future
1. Groundwater cleanup values	Perform reevaluation of groundwater cleanup levels per 1988 ROD	PRP	EPA	9/30/2010	N	Y
2. Vapor intrusion	Perform a vapor intrusion evaluation	PRP	EPA	9/30/2010	Y	Y
3. Damaged landfill vents	Repair/replace damaged risers	PRP	EPA	3/31/2009	N	N
4. 1, 4-dioxane	Sample groundwater for 1, 4-dioxane	PRP	EPA	9/30/2009	Y	Y

Actions taken to resolve the issues identified above:

Issue # 1, "Groundwater cleanup values": Page 24 of the Injection Well Operable Unit ("IWOU") ROD requires "Periodic evaluation of the progress of the treatment system in achieving Applicable or Relevant and Appropriate Requirements ("ARARs") and, if appropriate, reevaluation of the aquifer restoration objective and ARARs, considering feasibility and cost-effectiveness."

Also stated in the IWOU ROD: "EPA has selected aquifer restoration as the clean-up goal for the Site because data uncertainties and complexities related to the movement of wastes to the aquifer make predictions difficult regarding potential off-site release which would pose a risk to human health and the environment".

Since the issuance of the 2008 Five-Year Review, EPA has identified, and informed the Potentially Responsible Party ("PRP") Group of, data gaps that exist at the Site. For example, EPA had informed the PRP Group that the existing monitoring well network was not considered satisfactory to adequately delineate either the depth or the lateral extent of the contaminated groundwater plume.

In an effort to address these data gaps, the PRP Group, from 2010 to 2011, installed two monitoring well ("MW") clusters; HR-31 and HR-32, that each contain three wells for the purpose of monitoring the shallow, intermediate and deep groundwater zones immediately north of the Pennsylvania Turnpike. Geophysical testing was also performed on MW 24-476 in an attempt to identify the actual depth that the contaminated groundwater enters the well.

The PRP Group is compiling recent monitoring well data and has been meeting with EPA and the United States Geologic Survey to discuss their understanding of the current groundwater situation and to collaborate on the development of a groundwater conceptual site model.

Although a milestone date of 9/30/2010 is listed for completion of this issue in the 2008 Five Year Review report, the actual Remedial Action Objective ("RAO") reevaluation is (and has been) an on-going process with a timeline that is in part dependent on the groundwater conceptual site model and the near-term monitoring well analytical results.

Although not identified as an issue in the 2008 Five-Year Review, the Protectiveness Statement alludes to changes in the MCLs: "*There have been a number of changes to MCLs and factors used in assessing risk since the original ROD was issued.*" While these changes do not affect the current protectiveness (indeed, institutional controls, in the form of County-wide well installation restrictions, are currently in place that prohibit exposure to contaminated groundwater), EPA plans to review this aspect of the remedy during the upcoming Five-Year Review preparation process.

Issue # 2, "Vapor Intrusion": Vapor Intrusion ("VI") was identified as an issue in the November 2008 Five-Year Review. Since the previous (2003) Five-Year Review, EPA has identified vapor intrusion as a new pathway to be evaluated for sites with volatile organic contaminants ("VOCs"). When VOCs exist in groundwater, a vapor intrusion evaluation is warranted for those buildings located above or adjacent to the contaminated groundwater plume.

At the Henderson Road Site, several structures are located atop the known contaminated plume. Since 2007, in an effort to evaluate air quality, the PRP Group has been conducting

interior and exterior air sampling on a quarterly basis at five separate locations:

1) Injection well;
2) Injection well pit;
3) Garage area;
4) Breakroom; and
5) Outdoors

These sample locations are shown on the attached figure.

The quarterly sample results indicate that although there are Site-related constituents at levels above their respective regional screening levels ("RSLs") within the injection well and the injection well pit area, the indoor air sampled within the occupied areas (the garage and the break room), remains below the RSL for all constituents except xylenes. It was determined that the xylene exceedances are not attributable to vapor intrusion, however, for the following reasons: 1) the total xylenes concentrations in the injection well and the injection well pit are at levels that are below those levels within the garage area and 2) oils are commonly utilized, burned, spilled (on occasion), etc. within the garage area as part of routine truck maintenance.

On September 16, 2011, a meeting was held at EPA Region 3 to determine whether or not VI constituted a current protectiveness issue at the Site. To summarize, it was determined that VI does not currently seem to be an issue at the Site but that the quarterly air sampling at the five locations in and around the injection well area should continue. The conclusion was reached by all in attendance: Patricia Flores (Air Protection Division), Joe McDowell (Senior RPM), Mindi Snoparsky (Site hydrologist), Jeff Tuttle (Site toxicologist) and Tim Gallagher (Site RPM). This determination was documented in a September 2011 memo to the Site file.

Subsequent to the September 16, 2011 meeting, revised assessments for TCE and PCE were posted to the Integrated Risk Information System (9/28/11 and 2/10/12, respectively). Because of this, an additional comparison was performed utilizing the most recent Henderson Road air sampling results and the April 2012 Regional Screening Level Summary Tables. The result of the comparison again reveals that vapor intrusion is not currently a concern within the occupied areas at the Site. Indoor air monitoring will continue on a quarterly basis.

Issue # 3, "Damaged Landfill Vents": During the Five-Year Review walk through inspection of the landfill cap, several upright landfill gas vents were observed in poor condition, potentially affecting the passive venting operations. These vents were repaired and/or replaced by the milestone date of 3/31/2009.

Issue # 4, "1, 4-dioxane": EPA has become aware that sites with VOCs in groundwater sometimes contain 1, 4-dioxane, a solvent stabilizer, as a contaminant as well. The concern with 1, 4-dioxane is that it is not removed by some of the more conventional groundwater treatment technologies (such as air stripping and carbon filtration), is water soluble, and can move ahead of a VOC groundwater plume. Analysis of this compound was not included in

either the remedial investigation sampling or the groundwater monitoring program. Sampling for 1, 4-dioxane was recommended in the 2008 Five-Year Review.

In response to this, the PRP Group began analyzing for 1, 4-dioxane, as part of their quarterly groundwater monitoring program, in February 2009. This analysis continues to date and a review of the data reveals results that have ranged from non-detect to 21.8 parts per billion. The 1, 4-dioxane exceedances in the Site monitoring wells do not affect protectiveness, however, due to the adequacy of the institutional controls that prohibit exposure to contaminated groundwater.

Although it is not currently sampled for on a routine basis at the Upper Merion Reservoir [1] ("UMR"), EPA has informed the operators of the UMR, Aqua America, of the presence of 1, 4-dioxane in some of the Site monitoring wells. Aqua America sampled for 1, 4-dioxane in June 2009 and again in February 2011 with results below their reporting limit.

Protectiveness Statement

A determination regarding the protectiveness of the Operable Unit – 1 remedy was deferred in the November 2008 Five-Year Review pending a vapor intrusion evaluation and sampling for 1,4-dioxane. Based on the results of the 2011 vapor intrusion evaluation and the results of the 1,4-dioxane sampling (coupled with the fact that institutional controls are in place which prohibit exposure to contaminated groundwater), it can now be determined that the remedy for Operable Unit – 1 is currently protective of human health and the environment.

The remedial action at OU-2 (Landfill Operable Unit) is protective. The landfill has been capped and a leachate collection and treatment system has been installed, thereby reducing infiltration and the migration of contaminants.

Next Five-Year Review

The next Five-Year Review for the Site is due no later than November 21, 2013.

(1) The Upper Merion Reservoir, located approximately 2,000 feet north of (and hydraulically downgradient from) the Site, is owned and operated by Aqua America, Inc. and is a source of drinking water for over 210,000 people. Stored reservoir water is pumped and treated prior to its distribution to Aqua America's customers. Reservoir water is sampled on a frequent basis by Aqua America, the results of which are periodically provided to the EPA.

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Pennsylvania Tpke
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Field Blank Location
Henderson Road Superfund Site
Air sampling locatious
50 feet

Five-Year Review Report

Third Five-Year Review Report

Henderson Road Superfund Site

Upper Merion Township
Montgomery County, PA

November 2008

PREPARED BY:

United State Environmental Protection Agency
Region III
Philadelphia, PA

Approved by: James J. Burke

Date: 11/21/08

James J. Burke, Director
Hazardous Sites Cleanup Division
U.S. EPA Region III

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

SUBJECT: Signature for the Henderson Road Superfund Site Five-Year Review

FROM: James Webb, Associate Director
Office of Superfund Site Remediation (3HS20)

TO: James J. Burke, Director
Hazardous Site Cleanup Division (3HS00)

Attached for your signature is the third Five-Year Review for the Henderson Road Superfund Site, Lower Merion Township, Montgomery County, Pennsylvania. The Site consists of a former "injection well" that was once used to dispose of liquid contaminants, a groundwater extraction and treatment system, and a landfill. The Site was divided into two operable units. Operable Unit 1 addresses the injection well and the groundwater and Operable Unit 2 addresses the landfill.

This Five-Year Review has determined that the remedial action associated with OU-1 (Injection Well Operable Unit), is expected to achieve protectiveness in the long term, but a protectiveness determination is being deferred at this time. A groundwater extraction and treatment system has been installed that has been successful in reducing the contaminants, but final standards have yet to be achieved. There have been a number of changes to MCLs and factors used in assessing risk since the original ROD was issued. In addition, sampling for 1,4-dioxane has not been conducted, nor have current background concentrations been evaluated. As provided in the 1988 ROD, a formal reevaluation of the groundwater cleanup goals should be performed. Also, a vapor intrusion evaluation needs to be performed. It is expected that these actions will take approximately two years to implement, at which time a protectiveness determination will be made.

The remedial action at OU-2 (Landfill Operable Unit) is protective. The landfill has been capped and a leachate collection and treatment system has been installed, thereby reducing infiltration and the migration of contaminants. As a result of the Site inspection, the landfill gas vent risers need to be inspected and repaired, as necessary.

I recommend that you sign this Five-Year Review.

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Henderson Road Superfund Site
Lower Merion Township, PA
Third Five-Year Review Report

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Figures

Tables

Attachments

List of Acronyms

ARAR	Applicable or Relevant and Appropriate Requirement
AWQC	Aquatic Water Quality Criteria
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
DWEL	Drinking Water Equivalent Level
EPA	United States Environmental Protection Agency
IWOU	Injection Well Operable Unit
LOU	Landfill Operable Unit
MCL	Maximum Contaminant Level
MCLG	Maximum Contaminant Level Goal
NCP	National Contingency Plan
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
O&M	Operation and Maintenance
PADEP	Pennsylvania Department of Environmental Protection
PAH	Polyaromatic Hydrocarbon
PCB	Polychlorinated Biphenyl
PRP	Potentially Responsible Parties
PSWC	Philadelphia Suburban Water Company
RA	Remedial Action
RD	Remedial Design
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
TSC	Technical Steering Committee
SNARL	Suggested No Adverse Response Level
VES	Volatile Extraction System
VOC	Volatile Organic Compound

Executive Summary

The remedy for the Henderson Road Superfund Site in Upper Merion Township, Montgomery County, Pennsylvania included the relocation of Site waste materials to an existing on-Site landfill, capping of the landfill, collection and treatment of leachate from the landfill, installation and operation of a groundwater extraction and treatment system, installation and operation of a volatile extraction system, implementation of a comprehensive groundwater monitoring program, and institutional controls. The Site achieved construction completion with the signing of the Preliminary Close-Out Report on October 28, 1992. An initial Five-Year Review was completed on September 28, 1998. The second Five-Year Review report was completed on September 23, 2003. The second report is the trigger for this Five-Year Review.

The remedial action associated with OU-1 (Injection Well Operable Unit), is expected to achieve protectiveness in the long term, but a protectiveness determination is being deferred at this time. A groundwater extraction and treatment system has been installed that has been successful in reducing the contaminants, but final standards have yet to be achieved. There have been a number of changes to MCLs and factors used in assessing risk since the original ROD was issued. In addition, sampling for 1,4-dioxane has not been conducted, nor have current background concentrations been evaluated. As provided in the 1988 ROD, a formal reevaluation of the groundwater cleanup goals should be performed. Also, a vapor intrusion evaluation needs to be performed. It is expected that these actions will take approximately two years to implement, at which time a protectiveness determination will be made.

The remedial action at OU-2 (Landfill Operable Unit) is protective. The landfill has been capped and a leachate collection and treatment system has been installed, thereby reducing infiltration and the migration of contaminants. As a result of the Site inspection, the landfill gas vent risers need to be inspected and repaired, as necessary.

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

Environmental Indicators
Human Health: Current Human Exposure Controlled and Protective Remedy in-place.
Groundwater Migration: Groundwater Migration Under Control

As a result of this Five-Year Review, EPA plans to change the Human Health Environmental Indicator to: Insufficient Data to Determine Human Exposure Control Status

Site-wide Ready for Anticipated Use (RAU)
The site achieved RAU status on June 26, 2006.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site Name: Henderson Road Superfund Site		
EPA ID: PAD009862939		
EPA Region III	**State:** Pennsylvania	**City/County:** Upper Merion Township/Montgomery County
SITE STATUS		
NPL Status: X Final _ Deleted _ Other (specify)		
Remediation Status: _Under Construction X Operating _ Complete		
Multiple OUs? X YES_NO	**Construction Completion date:** 10/28/1992	
Has site been put into reuse? X YES___NO		
REVIEW STATUS		
Lead Agency: X EPA _State _Tribe Other Federal Agency		
Author Name: Timothy M. Gallagher		
Author Title: Remedial Project Manager	**Author Affiliation:** U. S. EPA - Region 3	
Review Period: 01/08/2008 to 11/2008		
Date(s) of Site Inspection: 7/17/2008		
Type of Review: X Post-SARA __ Pre-SARA __ NPL-Removal only __ Non-NPL Remedial Action Site __ NPL State/Tribe-lead		
Review number: _ 1 (first) _ 2 (second) X 3 (third) Other		
Triggering Action: Previous Five-Year Review Report		
Triggering Action Date (from WasteLAN): 09/23/2003		
Due Date (five years after triggering action date): 09/23/2008		

Five-Year Review Summary Form, cont'd.

Issues:

1. Groundwater cleanup values.
2. Vapor intrusion.
3. Several landfill gas vent risers are damaged.
4. 1,4-dioxane.

Recommendations and Follow-up Actions:

1. Perform reevaluation of groundwater cleanup levels per 1988 ROD.
2. Perform vapor intrusion evaluation.
3. Inspect and repair all landfill gas vent risers.
4. Sample the groundwater for 1,4-dioxane.

Protectiveness Statement(s):

The remedial action associated with OU-1 (Injection Well Operable Unit), is expected to achieve protectiveness in the long term, but a protectiveness determination is being deferred at this time. A groundwater extraction and treatment system has been installed that has been successful in reducing the contaminants, but final standards have yet to be achieved. There have been a number of changes to MCLs and factors used in assessing risk since the original ROD was issued. In addition, sampling for 1,4-dioxane has not been conducted, nor have current background concentrations been evaluated. As provided in the 1988 ROD, a formal reevaluation of the groundwater cleanup goals should be performed. Also, a vapor intrusion evaluation needs to be performed. It is expected that these actions will take approximately two years to implement, at which time a protectiveness determination will be made.

The remedial action at OU-2 (Landfill Operable Unit) is protective. The landfill has been capped and a leachate collection and treatment system has been installed, thereby reducing infiltration and the migration of contaminants. As a result of the Site inspection, the landfill gas vent risers need to be inspected and repaired, as necessary.

Other Comments: Nothing noted.

Henderson Road Superfund Site
Lower Merion Township, PA
Third Five-Year Review Report

I. Introduction

The purpose of Five-Year Reviews 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 review, if any, and specify recommendations to address them.

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

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

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

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

EPA Region III conducted this third Five-Year Review of the remedial actions implemented at the Henderson Road Superfund Site in Upper Merion Township, Montgomery County, PA. The triggering action for this review is the date of the second Five-Year Review report, as shown in the EPA's WasteLAN database, September 23, 2003. This review was conducted by the Remedial Project Manager for the entire Site from January 2008 through November 2008. This report documents the results of the review.

This Five-Year Review 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.

II. Site Chronology

Table 1 - Chronology of Site Events

Event	Date
Initial Discovery of Site Contamination	November 1, 1979
NPL Listing	September 21, 1984
Administrative Order on Consent for performance of an RI/FS for the Injection Well Operable Unit (IWOU) and the Landfill Operable Unit (LOU)	November 15, 1985
Remedial Investigation/Feasibility Study Complete for the IWOU	June 29, 1988
Record of Decision for IWOU	June 30, 1988
Consent Decree for Remedial Design and Remedial Action for IWOU	February 24, 1989
Remedial Design Complete for IWOU	September 12, 1992
Remedial Action Start for IWOU	August 28, 1989
Construction Complete for IWOU	October 30, 1992
Remedial Investigation/Feasibility Study Complete for the LOU	September 29, 1989
Record of Decision for LOU	September 29. 1989
Administrative Order for Remedial Design and Remedial Action for LOU	August 10, 1990
Remedial Design Complete for LOU	March 15, 1991
Remedial Action Start for LOU	March 15, 1991
Construction Complete for LOU	September 4, 1992
Preliminary Close-Out Report is signed	October 28, 1992
First Five-Year Review	September 28, 1998
Second Five-Year Review	September 23, 2003
Start of the Long Term Shutdown/Rebound Test for the GW Pump and Treat Operations	July 17, 2006
Start of the Shutdown/Rebound Test for the Volatile Extraction System	August 23, 2007

III. Background

Physical Characteristics

The Henderson Road Superfund Site is located at 362-372 South Henderson Road in Upper Merion Township, Montgomery County, Pennsylvania (see Attachment 1). The Site consists of 7.64 acres bound on the north by the Pennsylvania Turnpike, on the south by Conrail Railroad tracks, on the east by the SEPTA Norristown High-Speed Line and an intermittent stream named Frog Run, on the northwest by the Chester Valley Railroad tracks (owned by Conrail), and on the west by Henderson Road. A 36-inch pressurized water main, operated by the Philadelphia Suburban Water Company (PSWC, subsequently Aqua Pennsylvania, Inc.), crosses the eastern portion of the Site. An abandoned and flooded quarry located 2,000 feet north of the Site is operated by Aqua Pennsylvania, Inc. as a drinking water supply reservoir. The Site was used by O'Hara Sanitation Company, Inc. for waste transfer, waste recycling, and vehicle maintenance. The Site is currently operated by Browning Ferris, Inc. as a trash truck repair facility. The Site is currently owned by the O'Hara family.

Land and Resource Use

The current and projected land use for the property surrounding the Site is commercial and industrial. The population surrounding the Site uses public water as its primary source of water supply. A groundwater well, located at a nearby commercial facility, that was once used by the employees of a former lumber yard (and addressed in the OU-1 Record of Decision (ROD)) has since been closed and the facility now uses the public water supply. There are no known private wells currently being used that could potentially be impacted by the Site.

History of Contamination

The Site was brought to the attention of the State authorities in 1977 by an anonymous telephone call. On March 22, 1977, a truck, that was observed while being filled at a local manufacturing facility, entered the O'Hara Sanitation property and, subsequently, left empty. A former water supply well, referred herein as "the injection well", located inside a maintenance garage at the Site, was being used as a liquid waste depository. According to the Pennsylvania Department of Environmental Protection (PADEP), 6,000 gallons of liquid waste were disposed into the well the following day. PADEP characterized the waste as including a wide range of organic compounds. This disposal was not an isolated incident. It was later determined that the well was used for waste disposal between 1974 and 1977. The total amount and exact composition of waste injected into the well is unknown.

A landfill is situated to the east of the former O'Hara Sanitation Company, Inc. office and occupies a surface area of approximately 5.2 acres containing a waste volume of approximately

125,000 cubic yards. The O'Hara Sanitation Company collected and transported residential and commercial trash. The Site was also used for truck maintenance and storage, container storage, recycling operations and office facilities. From October 1975 through 1979, and allegedly through 1984, landfill operations took place at the Site. The waste material which consisted primarily of construction and demolition debris and some residential trash, was placed randomly on existing cinder materials from a cinder block manufacturing company formerly located at the Site. A portion of the fill area extended onto neighboring property owned by Conrail and the Pennsylvania Turnpike Commission.

Basis for Taking Action

From September 1978 to June 1983, several rounds of groundwater, surface water, and sediment sampling were conducted by the EPA and PADER. Based on sample results, the Henderson Road Site was proposed for the Superfund National Priorities List (NPL) on September 8, 1983. In November 1985, seven firms (O'Hara Sanitation Company, Inc.; Smithkline Beecham Corporation; Alumax Inc.; Childers Products Company; Sandvik, Inc.; Scott Paper Company; and Gould Inc.) and two individuals (William J. O'Hara and Betty O'Hara), known as potentially responsible parties (PRPs), entered into a Consent Order with the EPA to conduct a Remedial Investigation/Feasibility Study (RI/FS) for the Site. The initial Remedial Investigation (RI) Report was submitted to the EPA in October 1986. Based on subsequent meetings between the EPA and the PRPs in 1987, the Henderson Road Site was separated into two operable units; the Injection Well Operable Unit (IWOU) and the Landfill Operable Unit (LOU). Additional investigations of the Site commenced. EPA approved the final RI/FS for the IWOU in June 1988.

The following compounds and constituents were detected at concentrations above 100 micrograms per liter (parts per billion) or are considered to be chemicals of concern detected in groundwater samples taken from the injection well or monitoring wells:

Benzene, Chlorobenzene, Chloroethane, Chloroform, 1, l – Dichloroethane, 1, 2 – Dichloroethane, Trans-1, 2–Dichloroethylene, 1,2–Dichloropropane, Ethylbenzene, Phenol, Methylene Chloride, Toluene, Tetrachloroethene, Bis (2-Ethylhexyl) Phthalate, Butyl Benzyl Phthalate, Zinc, Copper, Dimethylnapthalene, Benzoic Acid, Vinyl Chloride, 1,1,l– Trichloroethane, Trichloroethene, Tetrachloroethene, Xylenes, Dichlorobenzene Isomers, Naphthalene, Butyl Benzyl Phthalate, Trichlorobenzene, Trimethylbenzene, Tetramethylbenzene, 4,6-Dinitro-o-Cresol, Dimethylbenzene, Methylphenol, Benzyl Alcohol, Di-n-Butyl Phthalate, Cadmium, N-Nitrosodiphenylamine, Napthalene, 4–Chloroaniline.

During the LOU RI, samples taken of surface soil, surface sediment, surface water, leachate, and soil beneath fill material contained twelve volatile compounds (VOCs), 25 semi-volatile compounds (SVOCs), five pesticides, and two types of PCBs. The following organic

compounds were identified in soil, sediment, and/or cinders at the Site in concentrations greater than 1 mg/kg: Bis (2-chloroethyl) Ether, Benzidine, 1,2-Dichloroethane, Tetrachloroethene, Polycyclic Aromatic Hydrocarbons, Bis (2-Ethylhexyl) Phthalate, Hexachlorobutadiene, Polychlorinated Biphenyls, Ethyl Benzene, Dichlorobenzene, Toluene, 2,6-Dinitrotoluene, Hexachlorobenzene, Hexachloroethane, and Trichloroethene. Low concentrations of Barium, Lead, and Chromium were also detected at the Site, as well as two pesticides.

Based upon the potential for release of contaminants to the ground water beneath the landfill, the following contaminants were considered to be of concern for the LOU: Aldrin, Benzene, Bis (2-Chloroethyl) Ether, Chloroform, Ethylbenzene, Hexachlorobenzene, Lead, Toluene, Trichlorofuoromethane, Polychlorinated Aromatic Hydrocarbons, 4,4-DDT, Benzidine, Barium, Chromium, 1,3-Dichloropropane, Hexachlorobutadiene, Polychlorinated Biphenyls, Trichloroethene, Tetrachloroethene

The most significant threat posed by the Site is increased risk of cancer due to ingestion of contaminated ground water. Included in this risk is potential ingestion by several hundred thousand customers of Aqua Pennsylvania, Inc. served by the Upper Merion Reservoir located approximately 2,000 feet north of the Site (Figure 1).

Figure 1 – View, looking SE, of the Upper Merion Reservoir

The soils and/or leachate within the LOU were also determined to contribute to the ground water risk via downward infiltration of contaminants. Ingestion of contaminated soil and

inhalation of wind-borne soil also contributed to the calculated risk posed by the Site.

The IWOU and LOU Records of Decision (ROD) selected Site cleanup levels intended to reduce the risk posed by ingestion of ground water contaminated by the Site to an acceptable level by reducing groundwater contaminant levels for each contaminant to the most conservative value derived from the following: Maximum Contaminant Level (MCL), Maximum Contaminant Level Goal (MCLG), Aquatic Water Quality Criteria (AWQC), Drinking Water Equivalent Level (DWEL), Suggested No Adverse Response Level (SNARL), model outputs developed during risk assessment, processes described in the Superfund Public Health Evaluation Manual, and specific values accepted by EPA (where no other ARAR exists). If such levels are achieved for each contaminant (or background levels for certain contaminants), the calculated cancer risk posed by the IWOU would be reduced to an acceptable risk level. The groundwater risk posed by the LOU would be reduced from 8.4×10^{-3} to 4.2×10^{-6} by reducing infiltration through the LOU (cap), thus preventing leaching of contaminants into the groundwater.

IV. Remedial Actions

Remedy Selection

Remedial Action Objectives - The remedial action objectives which were developed for both the IWOU and the LOU and specified in the RODs are listed below:

- Reduce the risk for groundwater, soil, fill materials, leachate, and air to an acceptable level for carcinogens and noncarcinogens;
- Restore the aquifer beneath the Site to "Class IIA" classification;
- Prevent significant transport/migration of the contaminants in soil; fill, and leachate to groundwater;
- Prevent the generation of leachate and thereby prevent the release of contaminants to groundwater;
- Significantly reduce the potential for release of Site contaminants to the environment through fugitive particulate or vapor emissions.

Remedy Components

IWOU

The IWOU ROD, issued by EPA Region III on June 30, 1988, included the following major components to address ground water contamination:

- Installation of clusters of groundwater recovery wells on-Site and, if necessary, downgradient;
- Air stripping of groundwater and probable discharge to the intermittent stream adjacent to the Site; a portion of the ground water may be re-injected to the aquifer in the vicinity of the injection well as part of unsaturated zone treatment;
- Closure of the injection well, including excavation of contaminated oil pit sediments, in accordance with federal Underground Injection Well Program requirements and removal of significant waste, if feasible, directly out of the injection well;
- Placement of deed restrictions limiting or prohibiting use of groundwater on the affected properties;
- Installation of a treatment system on the one off-Site active potable well (the McIlvain Well) considered to be affected by the Site-related contamination;
- Periodic on-Site and off-Site groundwater monitoring throughout the Operation and Maintenance period;
- Further data collection and evaluation of the unsaturated and saturated zones during Remedial Design and periodically during Remedial Action, to determine the feasibility of in-situ volatilization of volatile organics or other treatment in the unsaturated zone;
- Periodic re-evaluation of cleanup goals throughout Operation and Maintenance.

The well pit sediments had been cleaned out but it was determined that it would be beneficial to use the injection well as a recovery well and a point of vapor extraction. As a result of the additional data collection and evaluation activities required by the ROD, it was concluded that a significant amount of contamination could be removed by pumping and treating groundwater and by extracting and treating vapors from the injection well. The periodic on and off-Site monitoring of groundwater was initiated and is being performed pursuant to the

Operations and Maintenance (O&M) Plan. The air stripping treatment system was replaced and enhanced during Remedial Design with biological treatment and carbon filtration of the groundwater as allowed in the ROD. During the first year of operation of the groundwater treatment plant, the groundwater regime was reinvestigated via groundwater sampling and pumping tests. As a result of this "Phase II" investigation, two additional recovery wells to enhance ground water recovery were connected to the ground water treatment plant. The treatment plant originally discharged to the sanitary sewer system. Discharge of treated water to the adjacent intermittent stream via the treatment plant's alternative discharge system is now occurring under a National Pollution Discharge Elimination System (NPDES) permit issued by the Pennsylvania Department of Environmental Protection (PADEP). A list of the groundwater cleanup standards is included as Exhibit 16 of the IWOU ROD.

LOU

The ROD for the LOU, issued by EPA Region III on September 29, 1989, included the following major components to address soil, surface water, air, and groundwater contamination:

- Run-on, run-off, and erosion controls;
- Short and long-term leachate collection;
- Capping of the landfill, and relocation of the on-Site water main unless a means of maintaining the water line on-Site while still achieving remedial objectives and State ARARs can be implemented;
- Groundwater recovery and treatment if, after two years of pumping groundwater beneath the Site for the IWOU, Site-related groundwater contamination is detected at or near the property line and groundwater is still leaving the Site.
- Relocating trash, shallow soils, and shallow cinder fill from the Pennsylvania Turnpike property adjacent to the Site to the Henderson Road Site (LOU), additional characterization of the Turnpike property, and appropriate remediation to address wastes, contaminated soil, leachate, and bedrock left in place.
- Monitoring in coordination with the IWOU remedial action.
- Institutional controls on-Site and on adjacent properties to restrict activities that could interfere with remediation at the Site.
- Further sample collection and data evaluation in the western portion of the Site, in coordination with the IWOU remedial action, to determine the feasibility of in-

situ volatilization or other treatment and/or capping in that area.

- Periodic reevaluation of clean-up goals throughout operation and maintenance in coordination with the IWOU remedial action.

Ongoing groundwater monitoring (in conjunction with the IWOU monitoring plan) and re-evaluation of the remedial action has begun and is planned through the Operations and Monitoring Plan. The water main was isolated from the LOU rather than relocated pursuant to an agreement with the PSWC (now Aqua Pennsylvania, Inc.) and as provided in the ROD. The cleanup standards for the LOU are itemized in Exhibit 15 of the ROD.

Remedy Implementation

The remedial activities for the IWOU are being implemented pursuant to a partial Consent Decree entered by and between EPA, seven firms (William J. O'Hara, Inc.; Smithkline Beecham Corporation; Alumax, Inc.; Congoleum Corporation; Sandvik, Inc.; Scott Paper Company; and Childers Products Company), and two individuals (William J. O'Hara and Betty E. O'Hara). The remedial activities for the LOU are being implemented pursuant to a unilaterally issued Administrative Order by EPA to eight firms (O'Hara Sanitation Company, Inc.; William J. O'Hara, Inc.; Smithkline Beecham Corporation; Alumax Inc.; Congoleum Corporation; Sandvik, Inc.; Scott Paper Company; and Gould, Inc.) and two individuals (William J. O'Hara and Betty E. O'Hara).

Implementation of the remedial action activities for the IWOU commenced in July 1989 with the clean-out of the injection well pit. In August 1989, the injection well was cleaned out to a depth of 174 feet using compressed air from a drill rig.

On September 19, 1989, the treatment system for the McIlvain potable water well was installed. This well was used for drinking water by employees of a lumber yard located near the Site. Well water analytical results revealed that low levels of organic contaminants, including 1, 1 -dichloroethane, chloroethane, and chlorobenzene were present within the well water. Based on these results, the ROD required that a potable water treatment system be installed to remove contaminants from the water prior to human consumption. The chosen treatment system consisted of activated carbon tanks. The treatment system became fully operational and functional on March 15, 1990. In 1995 the owner closed the well, removed the treatment system and connected to the public water supply.

Remedial action activities for the LOU began in February 1991 with the removal of debris, soil, and cinder fill from the PA Turnpike property along the north boundary of the LOU. The excavated material was incorporated into the main waste fill area of the LOU. The remedial design plans were reviewed by the Pennsylvania Turnpike Commission (PTC) and several

modifications were made to conform to standard PTC design requirements and to accommodate future expansion of the Pennsylvania Turnpike. Included as part of the remedial action was the installation of a leachate collection system within the LOU. The portion of the collection system along the north boundary of the Site was installed while the PA Turnpike property excavation was still open. The collection system consists of perforated pipe installed within a stone-filled perimeter trench. The pipes are sloped to drain by gravity to a collection sump at the eastern end of the Site. Collected leachate is then pumped to the treatment plant.

On April 2, 1991, excavation for the foundation of the ground water treatment plant began. The excavated material was hauled onto and consolidated within the LOU. Approximately 300 truck loads of material were excavated in preparation for the treatment plant construction. To provide a stable base for the plant construction, two lifts of granular crushed stone were placed and compacted. A more uniformly graded crushed stone was subsequently placed up to within six inches of the base of the foundation. A layer of geotextile fabric was then placed, followed by six inches of granular crushed stone to bring the backfill up to grade.

In May 1991, work began on the treatment plant. Construction contractors began work on the concrete foundation, piping and electrical connections from extraction wells to the plant, and installation of additional monitoring wells. On June 5, the concrete floor of the treatment plant was placed. The tanks and equipment for the treatment plant were installed during the week of June 17. On June 25, the carbon was pumped into the two tanks used to provide a final polish of the treated effluent. The structural steel for the walls and roof of the plant was brought on Site on July 8. Erection of the walls and placement of the mezzanine floor followed. During the week of July 15, the siding was placed on the exterior plant walls. Additional equipment and the associated electrical and piping work continued thereafter.

The treatment plant began operation during the week of August 28, 1991. Initially, only purge water from the monitoring well drilling operations was pumped through the plant. Due to the initial low flows through the plant, the official first day of operation was not until September 4, 1991, the first day that flow from the injection well was pumped through the plant. The initial pumping rate was 50-60 gallons per minute. Completion of the ground water treatment plant enabled efficient and economic additional investigation of ground water ("Phase II" investigation) since water from nearby drilled or pumped wells could be treated. The treatment plant would also enable future treatment of landfill leachate. The ground water treatment plant includes an equalization tank, two biological treatment towers with associated chemical feeds, and two activated carbon "polishing" units. The treatment plant was constructed with capability to discharge treated water to the local POTW or to the intermittent stream along the eastern boundary of the Site. When it is in operation, approximately 1.6 million gallons of contaminated groundwater per month are treated by the treatment system. Treated water is currently discharged to the nearby stream in accordance with a National Pollutant Discharge Elimination System (NPDES) permit issued by PADEP.

Initial grading of the landfill material began in August 1991 in preparation for placement of the solid waste cap. Debris within 25 feet of the Conrail tracks along the southern boundary of the Site was consolidated into the LOU. The landfill material was graded to a minimum slope of 3% and a maximum slope of 25% (4 horizontal to 1 vertical) for adequate drainage and slope stability. The remainder of the leachate collection system was placed along the eastern, southern, and part of the western sides of the LOU during July and August 1991. The main storm water control system was installed concurrent with the leachate collection system in July and August of 1991.

Site activities were shut down in Fall 1991 because the amount of time remaining before cold weather was insufficient to complete LOU capping. After the initial grading performed during the following Spring, the water main isolation system was constructed. The Philadelphia Suburban Water Company's (PSWC) 36-inch potable water distribution main crosses the eastern edge of the LOU. The water main was isolated from the LOU for the following reasons: (1) to avoid water leaking from the main and increasing leachate production within the LOU; (2) to avoid main failure from carrying LOU material into the adjacent seasonal stream; (3) to allow repairs on the main without disturbing the cap; and (4) to avoid contaminating water within the main from contact with landfill material. PSWC and EPA agreed that isolating the water main from the LOU was a reasonable and protective remedy which would meet ARARs.

The water main was isolated from the landfill material by placing a PVC liner under the pipe, and covering the liner with a six-inch thick layer of concrete. Reinforced concrete was placed on the west wall (landfill side) and bottom of the isolation trench. The base of the isolation trench was fitted with a drainage system that consists of a one-foot thick layer of crushed stone placed around an installed perforated pipe. At four locations, this pipe system drains to the adjacent seasonal stream. A vertical riser pipe was installed with each of the four drain pipes to monitor for the presence of standing water within the isolation trench which could indicate a water main leak or a blocked drainage line. The design plans were reviewed by PSWC. Several modifications to the design and construction were made to accommodate the water company's concerns. PSWC provided an inspector to witness the construction.

Figure 2 – Volatile Extraction System

The volatile extraction system (VES, pictured), which was installed to extract contaminant vapors from the head space in some monitoring wells, was tied into the treatment

plant during the week of March 30, 1992. On February 20, 1992, EPA approved a VES design after extensive pilot testing, which maximized the extent of subsurface vacuum in order to maximize the amount of organic contamination recovered from the unsaturated zone. The VES originally had been vacuuming air through a series of carbon-filled drums. Once the treatment plant was fully operational, the vacuum system within the plant could accomplish the task and the "bugs" within the biological towers would benefit from the additional contaminant amounts. Treatment for the extracted vapors has since been changed from bio to vapor phase carbon. When operating, the extracted vapors are directed to vapor phase carbon tanks for treatment. The VOC extraction rate is approximately 0.23 lb/hr. EPA approved a shutdown/rebound test for the VES on August 23, 2007. The shutdown is currently scheduled to continue until December 2008.

Work on the LOU leachate clarifier began in March 1992. The clarifier was designed to remove metals from the landfill leachate prior to allowing the leachate to flow through the plant for further treatment.

In April 1992, the PRPs contracted a drilling firm to install five additional monitoring wells, ("Phase II" wells). The decision to drill these wells was based upon the recommendations of the Saturated Zone Report prepared by the PRPs. The placement and depth of the five wells were designed with the intent to gain additional information about the direction of contamination flow from the injection well. Two of the five wells (HR-24 and HR-26) were chosen for use as extraction wells. Pump tests were run on the two new extraction wells to determine the maximum possible pumping rate, and the extent of draw-down in adjacent monitoring wells. On Sept. 12, 1992, EPA approved the connection of the two wells to the treatment plant.

After completion of the water main isolation work, placement of the solid waste cap began. The construction of the solid waste cap was the primary component of the remedial action for the LOU. The cap was placed over areas of the Site which contain construction debris and some municipal waste fill. This construction debris consisted primarily of wood, metal, plastic, concrete, and asphalt mixed with soil. An asphalt paving cap was placed over the western portion of the Site and is part of the parking facility at the Site.

The infiltration barrier originally chosen for the solid waste cap system consisted of a one- foot layer of compacted clay. EPA determined that the clay which was stockpiled for the project could not meet the required performance criteria for permeability. The PRPs then proposed to use a geo-composite bentonite mat for the infiltration barrier.

The cap system consisted of the placement of a one-foot layer of protective cover soil directly on the surface of the LOU. This cover soil was intended to act as a protective buffer between the waste material and the additional components of the cap system should any of the waste materials shift upward towards the cap system. A one-foot layer of low permeability clay was placed directly above the protective cover soil. This one-foot layer of clay was placed on

areas of the landfill where infiltration prevention was most critical, such as around the main storm water inlet on the landfill surface where water was likely to pond, and on the southern edge of the Site, within 25 feet of the Conrail tracks where the clay was used to provide an edge seal with the bentonite mat. On areas of the landfill where the layer of clay was not placed, the protective soil cover was placed to a depth of two feet. These layers of soil were compacted in six-inch thicknesses to 95% of the standard proctor maximum soil density.

The bentonite mat was placed directly on the previously installed soil over the entire landfill. The bentonite mat consists of a thin layer of bentonite clay sandwiched between one woven and one non-woven geotextile. Permeability tests were conducted on the bentonite mat and the required performance criteria for the cap were satisfactorily met. Powdered bentonite was placed inside/atop overlapping mat seams for additional protection against leakage. Directly above the bentonite mat a geonet drainage layer was placed. On top of the geonet an additional non-woven geotextile, that is intended to stop fine particles of soil from entering the geonet, was placed. Above the various geotextiles, a one and one half foot layer of cover soil was installed and compacted to 95 % of the standard proctor maximum soil density. The final six inches of soil was then placed and compacted to 92% of the standard proctor maximum soil density. To complete the cap system, a six-inch layer of topsoil was placed and vegetated with a low-maintenance grass seed variety.

Figure 3 – View, looking SW, of the Landfill

On July 31, 1992, leachate within the leachate collection system, began to be pumped to a clarifier, for metals treatment, and then into the ground water treatment plant. Leachate production declined since start-up of the collection system and has not been generated from the landfill since 1998. (A leachate collection manhole was inspected during the site inspection; the manhole was, essentially, dry).

A deed notice was filed on November 29, 1990 to notify future owner(s) of the existence of Site contamination and the need for remedial action at the Site.

The Montgomery County Health Department has enacted regulations (Chapter XVII, Montgomery County Health Department, Division of Water Quality Management, Individual Water Supply System Regulations) that restrict the use of groundwater in the county, including the area around the Henderson Road Site. These regulations require the issuance of a permit before any well is drilled and requires that the well be sampled for volatile organic compounds. If contaminant concentrations exceed safe drinking water levels, then a treatment system must be installed to reduce the contaminant concentrations to safe drinking water levels before it can be used as potable water supply.

System Operations/Operation and Maintenance

Operation and Maintenance (O&M) requirements for the IWOU include general equipment and well maintenance, replacement of vapor-phase and liquid-phase carbon, maintenance of the clarifier and filter press (including solids disposal), addition of process chemicals, analysis of groundwater treatment system influent and effluent, periodic sampling of groundwater extraction and monitoring wells, and compliance testing of air and surface water discharges. O&M requirements for the LOU include vegetation maintenance and erosion repair, leachate monitoring, periodic sampling of groundwater monitoring wells, and methane monitoring. The annual O&M cost for the past five years, as reported by a representative of the Henderson Road Technical Steering Committee consultant, RT Environmental Services, Inc. (RT Environmental), for each of the operable units, are presented below in Table 2.

Table 2 – O&M Costs

YEAR	IWOU COSTS	LOU COSTS	TOTAL
2003	$295,240	$61,480	$356,720
2004	$301,393	$63,324	$364,717
2005	$301,393	$63,324	$364,717
2006	$135,464	$37,324	$172,788*
2007	$182,681	$25,343	$208,024

* EPA approved the Technical Steering Committee's request for the implementation of a long-term shutdown/rebound test in June 2006, thus explaining the reduction in O&M costs from the previous year.

O&M monitoring reports are submitted on a quarterly basis. The reports contain descriptions of significant events during the reporting period, maintenance logs, operations summaries, and analytical results. The reports also contain a summary of cleanup progress based on the analysis of the groundwater samples. The cleanup summaries include graphs of contaminant concentrations over time to illustrate the cleanup progress.

Approximately every two years, from 1995 to 1999, shutdown/rebound tests have been conducted to evaluate the contaminant "rebound" under static (non-pumping) conditions. Three

such shutdown/rebound tests were conducted within that time frame, the first two tests were for two- week durations and the third test lasted three weeks. During these tests the extraction system was shutdown and a select group of monitoring wells were sampled weekly to determine to what degree that Site-related contaminants would recover or increase. During the 1999 test the concentrations of contaminants showed a slight increase from the previous week's sampling indicating that contaminant equilibrium had not been reached within that time period.

On May 9, 2003 EPA approved a proposal submitted by RT Environmental for a long term shutdown/rebound test that extended from June to December 2003. The approved proposal called for the measuring of water levels and the sampling of monitoring wells every two weeks. The test was expected to determine at what concentration level and within what time frame the contaminants would stabilize at each well location. As a result of the test, a modified pumping sequence was implemented.

EPA approved RT Environmental's request for the implementation of a second long-term shutdown/rebound test in June 2006. This latest test began on July 17, 2006 and is currently ongoing. During the shutdown, quarterly monitoring well sampling and water level monitoring is being conducted. If, during the test, dramatic increases in contaminant levels in the monitoring wells are observed, EPA may require the immediate re-startup of the groundwater extraction and treatment system. At the conclusion of this latest shutdown/rebound test, a formal evaluation of the Site clean-up goals and progress in achieving those goals will be conducted by representatives of the PRP, EPA and the U.S. Geological Survey. The shutdown test is scheduled to continue until December 2008.

LOU O & M includes grass cutting, observation of the leachate monitoring well, and observation of the cap area for settlement. The shallow groundwater level, as measured in LOU leachate sumps, was lowered after landfill capping. Leachate was collected and treated earlier during the remedial action. However, no leachate has been collected in over 10 years, apparently due to the effectiveness of the landfill cap. Landfill gas vent sampling was discontinued over five years ago after a number consecutive years of "non-detect" sample results. Any problem items related to the landfill that require repair are reported in quarterly progress reports, provided by RT.

V. Progress Since Last Five-Year Review

The previous Five-Year Review for the Site was completed on September 23, 2003. At that time it was concluded that the remedies selected for the Site remained protective of human health and the environment.

This is the third Five-Year Review for the Site and the second review performed under EPA's Comprehensive Five-Year Review Guidance (June 2001). Table 3 summarizes the

progress at the Site since the last Five-Year Review. The issues and recommendations in Table 3 were generated from the previous Five-Year Review Report for the Site. The statement on protectiveness from the previous Five-Year Review declared that "The Site is currently protective of human health and the environment because immediate threats have been addressed and the remedies, as required, are operating and functioning as intended by the RODs. The institutional controls are effectively preventing exposure to Site contaminants".

Table 3 - Actions Taken Since the Last Five-Year Review

Issues	Recommendation /Follow-up Actions	Party Responsible	Milestone Date	Action Taken/Outcome	Date of Action
1. Repair needed to asphalt at MW manhole cover in BFI parking lot.	Repair crack in asphalt	PRP	10/31/03	Asphalt around the manhole cover was replaced.	October 2003
2. Small trees growing along landfill fence line.	Increase frequency of tree removal or trim around the fence line when landfill cover is cut.	PRP	10/31/03	Trees removed during routine landfill maintenance.	September 2003
3. Landfill gas vents need straightening.	Straighten the gas vents.	PRP	10/31/03	Vents straightened during routine maintenance.	September 2003
4. VE system sample ports need to be sealed when samples are not being taken.	Seal VE system sample ports.	PRP	10/31/03	Sample port openings have been secured.	October 2003
5. Shorten vegetation height.	PRP should consider more frequent cuttings.	PRP	10/31/03	Grass cut during routine landfill maintenance.	September 2003

VI. Five-Year Review Process

Administrative Components

On January 15, 2008, Upper Merion Township supervisor, Joe Bartlett, RT Environmental representative, Walter Hungarter, and Ragesh Patel, PADEP, were informed by letter that the Five-Year Review process was initiated.

The Five-Year Review team was led by Tim Gallagher, EPA Remedial Project Manager (RPM) and included Mindi Snoparsky, EPA Hydrogeologist, Jeff Tuttle, EPA Toxicologist, Tom Cinti, EPA Office of Regional Counsel, Dave Polish, EPA Community Involvement Coordinator (CIC), and Larry Piazza, US Army Corps of Engineers.

A schedule for completion of the Five-Year Review was followed that included the following components:

- Community Involvement
- Document Review
- Data Review
- Site Inspection
- Five-Year Review Report Development and Review

Community Involvement

A notice was published in the King of Prussia Courier on July 23, 2008 by the Site CIC, Dave Polish, announcing that a Five-Year Review was being conducted for the Site and that any comments and concerns that the community may have regarding the Site should be submitted to EPA. EPA did not receive any response to the notice expressing any comments or concerns regarding the Site.

A notice will be published in the same local newspaper announcing that the Five-Year Review report for the Site is completed and that the results of the review and report are available to the public at the Upper Merion Library and the US EPA Region III Office.

Document Review

This Five-Year Review process included the review of a number of relevant documents including, among others, the Records of Decision, the 1989 Consent Decree (IWOU), the 1990 Administrative Order (LOU), the IWOU and LOU RI/FS, the 1985 Administrative Order on Consent, and past O&M quarterly reports.

Data Review

Since the remedial action components were completed in 1992, an extensive groundwater monitoring plan has been implemented to evaluate the progress of the remedial action components for both the IWOU and the LOU. These results have been reported in quarterly O&M reports prepared and submitted by RT, on behalf of the Technical Steering Committee which consists of various technical representatives and consultants for the Site PRPs. The result of this monitoring effort has indicated that VOC contaminant concentrations in the monitoring wells on and near the Site property have decreased between the years 1992 and 2003. However, since the June 2003 shutdown of the groundwater pumping system, an increase of some of the VOC contaminant levels in some of the wells (See attachment 3 for the Monitoring Well Location Map) has been observed. (Note, after a number of consecutive sampling efforts yielded consistent "non-detects", EPA approved a PRP request to discontinue metals and SVOC sampling of the groundwater over eight years ago).

Results of the 2007 sampling efforts reveal that several compounds exceeded ARARs (See Table 4 below), including: benzene (present in 10 monitoring wells, at levels up to 198 ug/L), chlorobenzene (5 wells, at levels up to 121 ug/L), 1-1 DCA (6 wells, at levels up to 44.7 ug/L), 1,2-DCA (1 well, at 6.5 ug/L), total xylenes (1 well, 2,180 ug/L), and vinyl chloride (1 well, 3.6 ug/L). The highest concentrations of compounds exceeding ARARs were measured in wells HR-3-255, HR-3-280, HR-7-383, and HR-6-241. Wells HR-3-255 and HR-3-280 are in the general vicinity of the injection well. Well HR-6-241 is at the site boundary to the northwest of the injection well, and well HR-7-383 is at the site boundary to the north of the injection well. In general, since the June 30, 2003 shutdown, concentrations of the contaminants of concern for most wells have risen but have not shown a dramatic and steady increase. Concentrations of chlorobenzene in well HR-24-476 showed a dramatic increase after the July 2006 shutdown and have leveled off above the ARAR. Concentrations of 1,1-DCA and 1,2-DCA for off-Site well HR-22-380 have shown a steadily increasing trend since the July 2006 shutdown. None of the upgradient or off-site downgradient wells exceeded ARARs during the years 2005 through 2007. (Refer to Attachments 4 through 6 which provide the maximum concentration plumes of the prevalent Site COC, benzene, in each of the shallow, intermediate and deep zones between the years 2002 - 2005).

Maps of the aerial distribution of the chemical constituents indicate that there are two plumes; a benzene/chlorobenzene/chloroethane plume and a TCE/DCA/vinyl chloride plume. A comparison of the aerial distribution of chemical constituents and water levels indicates that the plumes are moving in the direction of groundwater flow and are following the hydraulic gradient. Transport of chemical contaminants across and off the Site may have been affected by rising water levels caused by cessation/reduction of pumping at the Site.

Water level data are available from January 2003 to December 2007. However, for most

wells only one water level measurement is available between February 2004 and July 2006; a few wells have two water level measurements during this 30-month period. Water levels on-Site and off-Site slowly recovered after the June 2003 shutdown. As of December 2007, the water levels are approximately 27-31 feet higher than in June 2003 when the extraction wells were pumping at their full rate. The greatest recovery was in off-Site well HR-5-195 (37 feet higher than the June 2003 level). A comparison with the USGS Montgomery County observation well indicates that this rise was caused by cessation/reduction of pumping at the Site and not climactic conditions.

Water level data indicate that monitoring wells of varying depth react to the pumping of the extraction wells while the treatment plant is operating and represent different potentiometric surfaces. When the extraction wells are not operating, water levels appear to represent a single potentiometric surface. With the exception of well HR-5-195, water levels in shallow wells (less than 200 feet deep) do not appear to be affected by pumping of the recovery wells. Water levels in intermediate depth wells (200-300 feet) are affected by pumping of the recovery wells. Plan view maps show a small cone of depression at the former full pumping rate, but not at reduced pumping rates. Water level data are available for only four deep wells (greater than 300 feet). Groundwater flow from the Site is both to the north and east. Flow to the east may be caused by the pumping of the McCoy quarry.

Aqua Pennsylvania continues to monitor water quality in the Upper Merion Reservoir and these analytical results are provided monthly to EPA, through RT Environmental. The results indicate a decreasing trend in TCE and other related VOC concentrations within the reservoir since the Site remedial actions were implemented. The TCE concentrations have not exceeded the MCL since July 2001 (5.6 ppb).

The groundwater extraction and treatment system had been processing approximately 1.6 million gallons of contaminated groundwater per month prior to the commencement of the first extended shutdown of the system. After the initial shutdown period, a modified pumping scheme was activated (a pump that had previously been shut down was re-energized) resulting in the production of approximately 3 million gallons of groundwater being processed through the treatment system per month. EPA approved the PRP's latest request for the implementation of a long-term shutdown/rebound test in June 2006. This test began on July 17, 2006 and is currently ongoing. The shutdown is currently scheduled to continue until December 2008. When operating, the treatment plant effluent water is discharged to Frog Run in accordance with an NPDES permit issued by the PADEP. Since inception, over 280 million gallons of groundwater have been treated and approximately 2,500 pounds of contaminants have been removed.

In December 2005, the PRP submitted the "Request for Remedy Modification of the Henderson Road Site IWOU: ROD Mandated Reevaluation/Application for TI Waiver or ACL Determination" report to EPA. This report was submitted to provide EPA information for the

periodic review of the IWOU remedial action objectives that is called for in the ROD. Within the document, the PRP concluded "that hydrological constraints sufficiently inhibit the ability to achieve groundwater restoration at the [Site] and that the ability to achieve groundwater restoration is technically impractical within a reasonable time frame." It was further explained that the Site's karst formation renders the Site technically impracticable to achieve aquifer restoration. After an evaluation of the report, EPA determined that plume containment (i.e. continued groundwater recovery and treatment) would still be necessary whether or not a technical impracticability decision is rendered. EPA continues to analyze Site data (i.e. groundwater sample results during various length shutdown/rebound tests) that will be used to perform the periodic review.

The volatile extraction system (VES) that was originally designed to extract contaminated vapors from the head space of several of the monitoring wells began operation in 1992 and was later enhanced by modifications which allowed it to extract vapors from the injection well also. When operating, the extracted vapors are directed to vapor phase carbon tanks for treatment. The VOC extraction rate is approximately 0.23 lb/hr. EPA approved a shutdown/rebound test for the VES on August 23, 2007. The shutdown is currently scheduled to continue until December 2008.

Table 4 – VOC Compounds and Associated ARARs
(From Exhibit 16 in the 1988 ROD)

Compound	ARAR (ug/l)
Acetone	**
Benzene	5.52 (5.0 MCL)
Bromodichloromethane	100
2-Butanone	**
Carbon Disulfide	**
Chlorobenzene	60
Chloroethane	19,000
Chloroform	100
Chloromethane	**
1,1-Dichloroethane	5.06*
1,2-Dichloroethane	6.02*
1,1-Dichloroethene	7
cis-1,2-Dichloroethene	70
1,2-Dichloroethene	70
1,2-Dichloropropane	6.28*
Ethylbenzene	680
2-Hexanone	**
4-Methyl-2-Pentanone	**
Methylene Chloride	47

Styrene	**
Tetrachloroethylene	6.9 (5.0 MCL)
Toluene	2,000
Total Xylenes	175
1,1,1-Trichloroetheane	200
Trichloroethylene	25.8* (5.0 MCL)
Vinyl Chloride	2
Carbon Tetrachloride	5
Trichloroflouromethane	12,000
Dibromochloromethane	100

* ROD alternate concentration limit based on background contamination.
** No ARAR specified in the ROD.

The landfill area is inspected and maintained on a regular basis. Leachate observation wells are checked for the presence of leachate, landfill gas vents are checked for gas production and the landfill cap area is observed for any signs of erosion or settling. Leachate has not been observed in the wells in over 10 years, landfill gas sampling was discontinued over 5 years ago and no significant settlement of the landfill area has ever been observed.

Site Inspection

An inspection of the Site was conducted on July 17, 2008 by Tim Gallagher, EPA RPM, Mindi Snoparsky, EPA, Jeff Tuttle, EPA, Larry Piazza, USACE, Gary Brown RT Environmental and Walt Hungarter, RT Environmental (see Attachment 2 for Site Inspection Checklist). At the time of the inspection, an EPA-approved shutdown/rebound test was being conducted on both the groundwater extraction and treatment system and the volatile extraction system to evaluate the system's effectiveness and potential future system optimization measures.

Prior to the commencement of the site walk, Mr. Gallagher inquired about the status of the issues raised during the prior Five-Year Review inspection (Table 3). An RT Environmental representative stated that all of the five issues that were raised had been addressed. The inspection attendees also discussed what remedial activities and progress has occurred since the last Five-Year Review.

An inspection was then conducted of the IWOU groundwater extraction and treatment system, the volatile extraction system, the landfill cap and leachate collection system, landfill gas vents, landfill fence, general Site security, and the groundwater monitoring wells. The inspection team also visited the Upper Merion Reservoir to gain a better understanding of the proximity of the reservoir to the Site. The components of the groundwater treatment system and the volatile extraction treatment system appeared to be in good condition and well maintained (although this

could not be verified due to the fact that both systems were shut down at the time of the walk through). No significant issues were noted regarding either the groundwater extraction and treatment system or the landfill cap system. One minor issue was raised regarding the condition of the landfill gas vent risers. A number of the risers were apparently damaged during routine maintenance operations. An inspection of all the risers needs to be performed and any damaged risers need to be repaired or replaced. The landfill grass was cut within a week of the inspection. This allowed for a closer inspection of the cap conditions. It is typically maintained (mowed) two times per year.

Interviews

Mr. Joseph Bartlett, the Upper Merion Township Supervisor, was interviewed, by telephone, for this Five-Year Review. Mr. Bartlett stated that the Site, generally surrounded by industry, generates little to no interest in the community and that the Township does not have any issue with the Site at this time.

VII. Technical Assessment

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

The review of documents, ARARs, and the results of the Site inspection indicates that the remedies for both the IWOU and LOU are functioning as intended by the RODs. The primary components of the IWOU include the installation of recovery wells, a volatile extraction system, a groundwater treatment system, a vapor treatment system and the implementation of a comprehensive groundwater monitoring program.

Even though all groundwater cleanup standards have not yet been met, significant progress has been achieved since the IWOU remedy was first implemented. This is evident by the general overall reduction in Site-related contaminant concentrations in groundwater on and near the Site. A long term shutdown rebound test is currently on-going. The results of this shutdown/rebound test will provide information that could justify possible modification and optimization recommendations for the groundwater extraction and treatment system, and may also be used to re-evaluate clean-up goals at the Site.

The primary components of the LOU include the relocation and consolidation of waste; installation of a landfill cover system; installation of erosion control measures; installation of a leachate collection system; and implementing institutional controls to restrict activities that could interfere with the remedy. The success of this portion of the remedy is evident not only from the results of the groundwater monitoring program but also from the lack of leachate generation. No leachate has been generated from the LOU since 1998.

Institutional controls for the Site include a deed notice filed to notify any future Site owner(s) of the existence of Site contamination and the need for remedial action at the Site. Also, the Montgomery County Health Department regulations are relied upon to restrict the use of groundwater on nearby affected properties. These regulations require the issuance of a permit before any well is drilled and requires that the well be sampled for volatile organic compounds before the well can be used as a potable supply. If contaminant concentrations exceed safe drinking water levels, then a treatment system must be installed to reduce the contaminant concentrations to safe drinking water levels before it can be used as potable water supply. A fence with locked gates has been installed around the capped landfill to restrict any activities that could result in damage to the landfill remedial components.

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

Since the 1988 ROD was signed, some drinking water standards, toxicity values, and risk assessment procedures have been revised. As a result of these changes, some performance standards may need to be lowered in the future. However, the groundwater concentrations for a number of important COCs (such as benzene) still exceed the original standards outlined in the ROD.

Changes in Standards and To Be Considered

The MCLs and certain risk-based goals for a number of site-related COCs have changed since the ROD was signed in 1988. These changes include, but are not limited to the following:

COC	1988 ARAR (ug/L)	2008 ARAR (ug/L)
Arsenic	50	10
Cadmium	10	5
Lead	20	15
1,2-Dichloroethane	6.02 (background)	5
Trichloroethylene (TCE)	25.8 (background)	5

The cleanup values for the other Site-related COCs are listed in Table 4. For a number of these compounds there was no MCL available so alternative cleanup values were used including background groundwater concentrations. Current background concentrations of VOCs should be evaluated to determine whether the ROD values are still appropriate.

Changes in Exposure Pathways, Toxicity, and Other Contaminant Characteristics

Since the last Five-Year Review, EPA has identified vapor intrusion as a new pathway to be evaluated for sites with volatile contamination. A vapor intrusion evaluation is warranted for

those buildings located above or adjacent to the contaminated groundwater plume. Potentially impacted buildings include the facilities' office building, maintenance building, and any other building located within 100 feet of the plume.

EPA has become aware that sites with VOCs sometimes have 1,4-dioxane, a solvent stabilizer, as a contaminant as well. Analysis of this compound was not included in either the remedial investigation or the O&M sampling. The concern with 1,4-dioxane is that it is not removed by air stripping and carbon filtration, is water soluble, and can move ahead of a VOC groundwater plume. Sampling is recommended to confirm that this chemical is not of concern at the Site.

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

There have been changes in reference doses, cancer slope factors, and inhalation toxicity values. These will need to be evaluated more closely to determine if the existing cleanup values remain protective.

Technical Assessment Summary:

The groundwater remedy has been effective in reducing levels of contaminants in groundwater both on and off the Site property. The remedy implemented for the landfill has been effective in containing the waste, preventing direct contact with the waste, and eliminating leachate generation.

There have been changes to various MCLs, reference doses, cancer slope factors, risk assessment methodologies, and inhalation toxicity values since the original cleanup values were developed. Sampling conducted to date at the Site has not included analysis for 1,4-dioxane, nor have current background concentrations been evaluated. In accordance with the provisions of the 1988 Record of Decision a formal reevaluation of the groundwater cleanup goals should be performed. A vapor intrusion evaluation should also be performed to determine whether workers are at risk from groundwater contaminants located beneath and adjacent to buildings above the groundwater plume.

VIII. Issues

Table 5 - Five-Year Review Issues

Issue	Currently Affects Protectiveness (Y/N)	Affect Future Protectiveness (Y/N)
1. Groundwater cleanup values	N	Y
2. Vapor Intrusion	Y	Y
3. Damaged landfill vent risers.	N	N
4. 1,4-dioxane	Y	Y

IX. Recommendations and Follow-up Actions

Table 6 - Recommendations and Follow-up Actions

Issue	Recommendations/Follow-up Action	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness? (Y/N) Current	Future
1. Groundwater cleanup values	Perform reevaluation of groundwater cleanup levels per 1988 ROD	PRP	EPA	9/30/2010	N	Y
2. Vapor Intrusion	Perform a vapor intrusion evaluation	PRP	EPA	9/30/2010	Y	Y
3. Damaged landfill vent risers	Repair/replacement of damaged risers	PRP	EPA	3/31/2009	N	N
4. 1,4-dioxane	Sample groundwater for 1,4-dioxane	PRP	EPA	9/30/2009	Y	Y

X. Protectiveness Statement

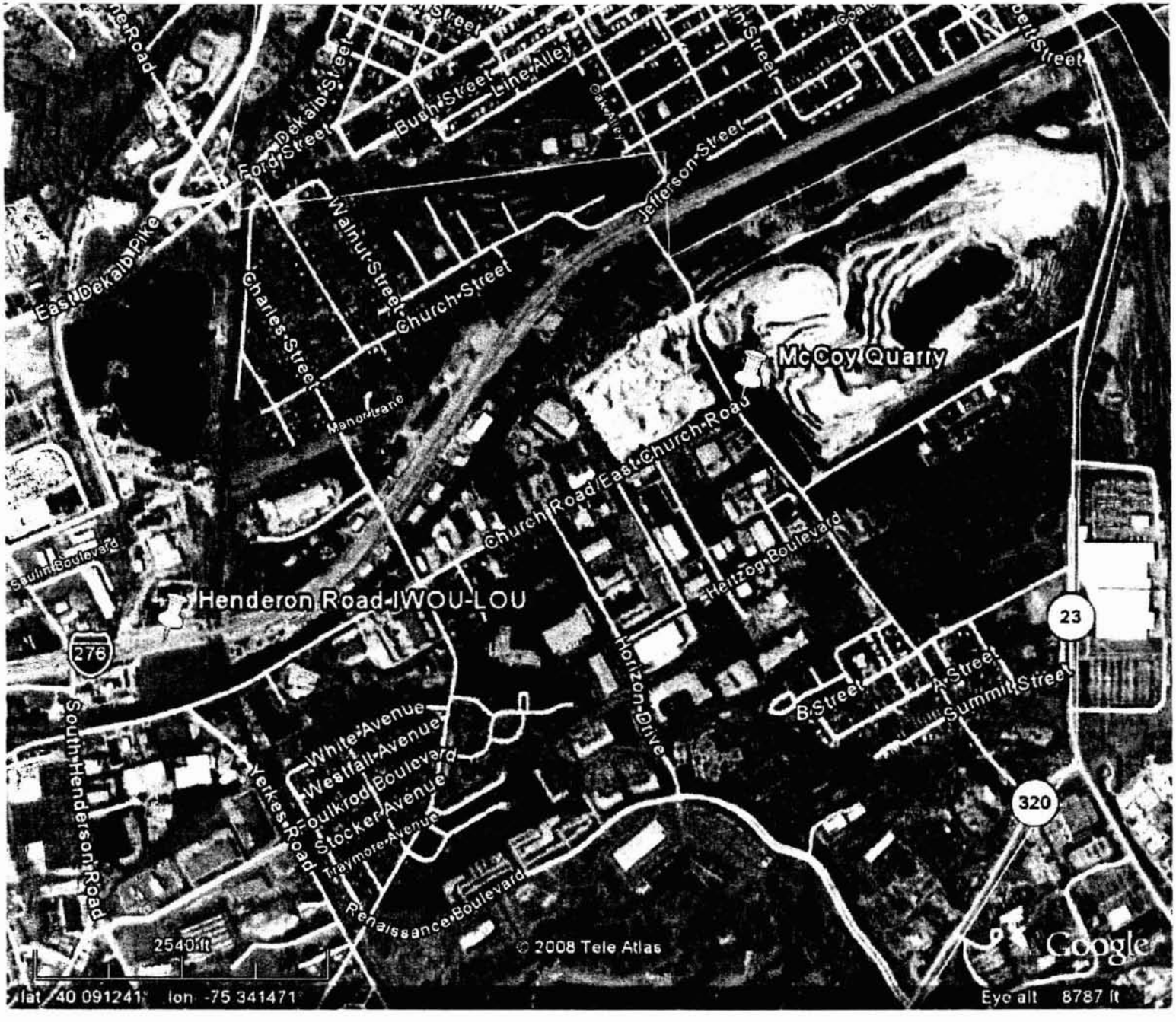
The remedial action associated with OU-1 (Injection Well Operable Unit), is expected to achieve protectiveness in the long term, but a protectiveness determination is being deferred at this time. A groundwater extraction and treatment system has been installed that has been successful in reducing the contaminants, but final standards have yet to be achieved. There have been a number of changes to MCLs and factors used in assessing risk since the original ROD was issued. In addition, sampling for 1,4-dioxane has not been conducted, nor have current

background concentrations been evaluated. As provided in the 1988 ROD, a formal reevaluation of the groundwater cleanup goals should be performed. Also, a vapor intrusion evaluation needs to be performed. It is expected that these actions will take approximately two years to implement, at which time a protectiveness determination will be made.

The remedial action at OU-2 (Landfill Operable Unit) is protective. The landfill has been capped and a leachate collection and treatment system has been installed, thereby reducing infiltration and the migration of contaminants. As a result of the Site inspection, the landfill gas vent risers need to be inspected and repaired, as necessary.

XI. Next Review

Upon completion of the groundwater cleanup goal reevaluation and the vapor intrusion evaluation, an addendum to this five-year review will be provided with a final protectiveness determination. The next Five-Year Review for the Henderson Road Superfund Site will be completed within five years from the date of the signature of this review.



Attachment 1 – Henderson Road Superfund Site Location

Attachment 2

Five-Year Review Inspection Checklist

I. SITE INFORMATION	
Site name: Henderson Road S.F. site	**Date of inspection:** 7/17/08
Location and Region: Upper Merion Twsp, PA	**EPA ID:** PAD 009862939
Agency, office, or company leading the five-year review: USEPA	**Weather/temperature:**

Remedy Includes: (Check all that apply)

- ✔ Landfill cover/containment
- Access controls
- Institutional controls
- ✔ Groundwater pump and treatment
- Surface water collection and treatment
- Other Vapor Extraction & Treatment
- Monitored natural attenuation
- Groundwater containment
- Vertical barrier walls

Attachments: Inspection team roster attached Site map attached

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** WALT HUNGARTER (Name) RT ENV. SERVICES (Title) 7/17/08 (Date)
   Interviewed (at site) at office by phone Phone no. _____
   Problems, suggestions; Report attached LANDFILL MOWED RECENTLY. GWTP IN SHUT-DOWN MODE CURRENTLY. PLANT WOULD BE READY TO START-UP, IF NECESSARY (AFTER SOME MAINTENANCE).

2. **O&M staff** _____ (Name) _____ (Title) _____ (Date)
   Interviewed at site at office by phone Phone no. _____
   Problems, suggestions; Report attached _____

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

Agency UPPER MERION TWSP
Contact JOE BARTLETT (Name) | TWSP SUPERVISOR (Title) | 7/24/08 (Date) | _____ (Phone no.)
Problems; suggestions; Report attached _____
NO PROBLEMS/ISSUES W/SITE.

Agency _____
Contact _____ (Name) | _____ (Title) | _____ (Date) | _____ (Phone no.)
Problems; suggestions; Report attached _____

Agency _____
Contact _____ (Name) | _____ (Title) | _____ (Date) | _____ (Phone no.)
Problems; suggestions; Report attached _____

Agency _____
Contact _____ (Name) | _____ (Title) | _____ (Date) | _____ (Phone no.)
Problems; suggestions; Report attached _____

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

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1.	**O&M Documents**			
	O&M manual	✓Readily available	✓Up to date	N/A
	As-built drawings	✓Readily available	✓Up to date	N/A
	Maintenance logs	✓Readily available	✓Up to date	N/A
	Remarks			
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**			
	Air discharge permit	✓Readily available	✓Up to date	N/A
	Effluent discharge	✓Readily available	✓Up to date	N/A
	Waste disposal, POTW	Readily available	Up to date	N/A
	Other permits	Readily available	Up to date	N/A
	Remarks			
5.	**Gas Generation Records**	✓Readily available	✓Up to date	N/A
	Remarks			
6.	**Settlement Monument Records**	Readily available	Up to date	✓N/A
	Remarks			
7.	**Groundwater Monitoring Records**	✓Readily available	✓Up to date	N/A
	Remarks			
8.	**Leachate Extraction Records**	Readily available	Up to date	✓N/A
	Remarks			
9.	**Discharge Compliance Records**			
	Air	✓Readily available	✓Up to date	N/A
	Water (effluent)	✓Readily available	✓Up to date	N/A
	Remarks			
10.	**Daily Access/Security Logs**	Readily available	Up to date	✓N/A
	Remarks			

IV. O&M COSTS

1. **O&M Organization**

State in-house — Contractor for State
PRP in-house — Contractor for PRP
Federal Facility in-house — Contractor for Federal Facility
Other _____

2. **O&M Cost Records**

Readily available — Up to date
Funding mechanism/agreement in place
Original O&M cost estimate _____ Breakdown attached

Total annual cost by year for review period if available

From _____ To _____ _____ Breakdown attached
Date Date Total cost

From _____ To _____ _____ Breakdown attached
Date Date Total cost

From _____ To _____ _____ Breakdown attached
Date Date Total cost

From _____ To _____ _____ Breakdown attached
Date Date Total cost

From _____ To _____ _____ Breakdown attached
Date Date Total cost

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

Describe costs and reasons: _____

V. ACCESS AND INSTITUTIONAL CONTROLS ✓ 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 _____ _____ _____ _____
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 _____
_____

3. **Land use changes off site** ✓ N/A
Remarks _____
_____

VI. GENERAL SITE CONDITIONS

A. Roads Applicable N/A

1. **Roads damaged** Location shown on site map ✓ Roads adequate N/A
Remarks _____
_____

B. Other Site Conditions

Remarks_____

_____

_____

_____

_____

_____

VII. LANDFILL COVERS ✓Applicable N/A

A. Landfill Surface

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

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

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

4. **Holes** Location shown on site map ✓Holes not evident
   Areal extent_____ Depth_____
   Remarks_____
   _____

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

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

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

8. **Wet Areas/Water Damage** — Wet areas/water damage not evident
   - Wet areas — Location shown on site map — Areal extent_____
   - Ponding — Location shown on site map — Areal extent_____
   - Seeps — Location shown on site map — Areal extent_____
   - ✓ Soft subgrade — Location shown on site map — Areal extent ~ 200 sf

   Remarks_____

9. **Slope Instability** — Slides — Location shown on site map — ✓ No evidence of slope instability
   Areal extent_____
   Remarks_____

B. Benches — Applicable — ✓ N/A

(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)

1. **Flows Bypass Bench** — Location shown on site map — N/A or okay
   Remarks_____

2. **Bench Breached** — Location shown on site map — N/A or okay
   Remarks_____

3. **Bench Overtopped** — Location shown on site map — N/A or okay
   Remarks_____

C. Letdown Channels — Applicable — ✓ N/A

(Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)

1. **Settlement** — Location shown on site map — No evidence of settlement
   Areal extent_____ Depth_____
   Remarks_____

2. **Material Degradation** — Location shown on site map — No evidence of degradation
   Material type_____ Areal extent_____
   Remarks_____

3. **Erosion** — Location shown on site map — No evidence of erosion
   Areal extent_____ Depth_____
   Remarks_____

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

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

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

D. Cover Penetrations ✓Applicable N/A

1. **Gas Vents** Active Passive
Properly secured/locked Functioning Routinely sampled Good condition
Evidence of leakage at penetration ✓Needs Maintenance
N/A
Remarks NUMEROUS VENTS NEED MINOR MAINTENANCE

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

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

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

5. **Settlement Monuments** Located Routinely surveyed ✓N/A
Remarks_____

E. Gas Collection and Treatment Applicable ✓N/A

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

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

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

F. Cover Drainage Layer Applicable ✓N/A

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

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

G. Detention/Sedimentation Ponds Applicable ✓N/A

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

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

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

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

H. Retaining Walls Applicable ✓N/A

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

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

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

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

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

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

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

VIII. VERTICAL BARRIER WALLS Applicable ✓N/A

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

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

IX. GROUNDWATER/SURFACE WATER REMEDIES ✓Applicable N/A

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

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

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

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

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

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

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

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

C. Treatment System Applicable N/A

1. **Treatment Train** (Check components that apply)
   - (Metals removal) Oil/water separation (Bioremediation)
   - (Air stripping) Carbon adsorbers
   - (Filters) CARBON
   - Additive (*e.g.*, chelation agent, flocculent) polymer, pH addition
   - Others
   - Good condition Needs Maintenance
   - Sampling ports properly marked and functional
   - Sampling/maintenance log displayed and up to date
   - Equipment properly identified
   - Quantity of groundwater treated annually 80-90 gpm, when operating
   - Quantity of surface water treated annually
   - Remarks GWTP was shutdown w/EPA approval in 2006 to observe rebound.

2. **Electrical Enclosures and Panels** (properly rated and functional)
   - N/A ✓Good condition Needs Maintenance
   - Remarks

3. **Tanks, Vaults, Storage Vessels**
   - N/A ✓Good condition Proper secondary containment Needs Maintenance
   - Remarks

4. **Discharge Structure and Appurtenances**
   - N/A ✓Good condition Needs Maintenance
   - Remarks

5. **Treatment Building(s)**
   - N/A ✓Good condition (esp. roof and doorways) Needs repair
   - Chemicals and equipment properly stored
   - Remarks

6. **Monitoring Wells** (pump and treatment remedy)
   - ✓Properly secured/locked ✓Functioning ✓Routinely sampled ✓Good condition
   - ✓All required wells located Needs Maintenance N/A
   - Remarks

D. Monitoring Data

1. Monitoring Data
   - ✓Is routinely submitted on time Is of acceptable quality

2. Monitoring data suggests:
   - ✓Groundwater plume is effectively contained ~✓Contaminant concentrations are declining

D. Monitored Natural Attenuation

1. **Monitoring Wells** (natural attenuation remedy)
   Properly secured/locked Functioning Routinely sampled Good condition
   All required wells located Needs Maintenance ✓N/A
   Remarks

X. OTHER REMEDIES

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

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

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

- LANDFILL CAP SYSTEM APPEARS TO BE SOUND AND IS PREVENTING/ MINIMIZING INFILTRATION.
- VOLATILE EXTRACTION SYSTEM CURRENTLY SHUT-DOWN (APPROVED) TO EVALUATE EFFECT.
- GW TREATMENT SYSTEM SYSTEM CURRENTLY SHUT-DOWN (APPROVED) TO EVALUATE EFFECT OF REBOUND IN MW.

B. Adequacy of O&M

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

O&M ACTIVITIES ARE MINIMAL & APPEAR TO BE ADEQUATE.

C. Early Indicators of Potential Remedy Problems

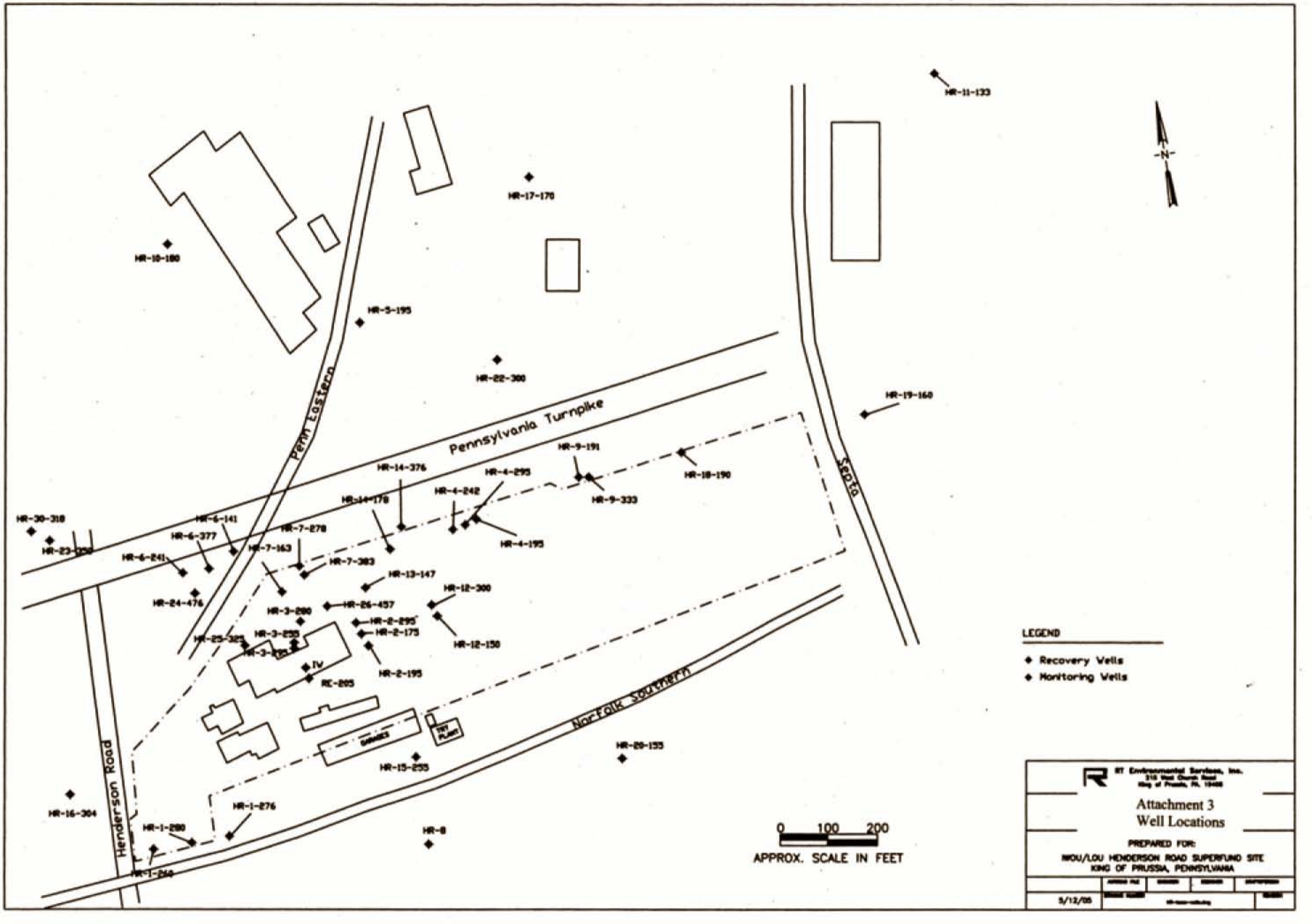
Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future.

O&M COSTS DOWN DUE TO SHUTDOWN OF GWTP AND VES.

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

RESULTS OF BOTH SHUTDOWN/REBOUND TESTS WILL BE EVALUATED WHEN FINISHED; CURRENT SCHEDULE IS FOR CONCLUSION OF TESTS IN DECEMBER 2007.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HR-19-160
Pennsylvania Turnpike
Penn Eastern
SEPTA
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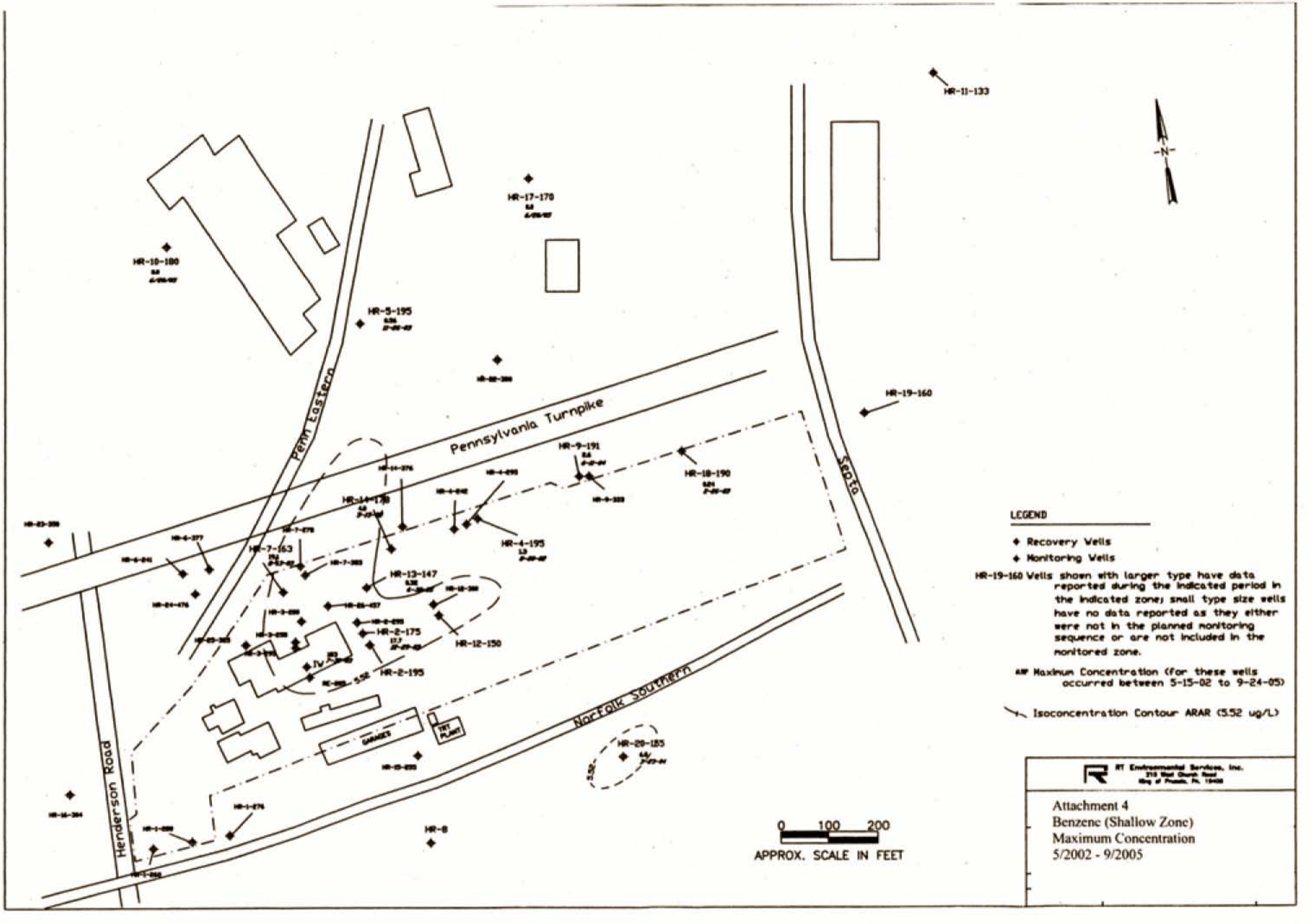
HR-4-293
HR-9-191
HR-18-190
HR-14-178
HR-4-242
HR-9-333
HR-4-195
HR-30-318
HR-23-259
HR-6-141
HR-6-377
HR-7-278
HR-7-163
HR-6-241
HR-7-383
HR-13-147
HR-24-476
HR-12-300
HR-26-457
HR-3-280
HR-2-295
HR-3-259
HR-2-175
HR-12-150
HR-25-325
HR-3-255
HR-2-195
IV
RE-205
Norfolk Southern
Henderson Road
HR-15-235
HR-20-155
HR-16-304
HR-1-276
HR-1-280
HR-8
HR-1-260
LEGEND
Recovery Wells
Monitoring Wells
0 100 200
APPROX. SCALE IN FEET
Attachment 3
Well Locations
PREPARED FOR:
MOU/LOU HENDERSON ROAD SUPERFUND SITE
KING OF PRUSSIA, PENNSYLVANIA
5/12/05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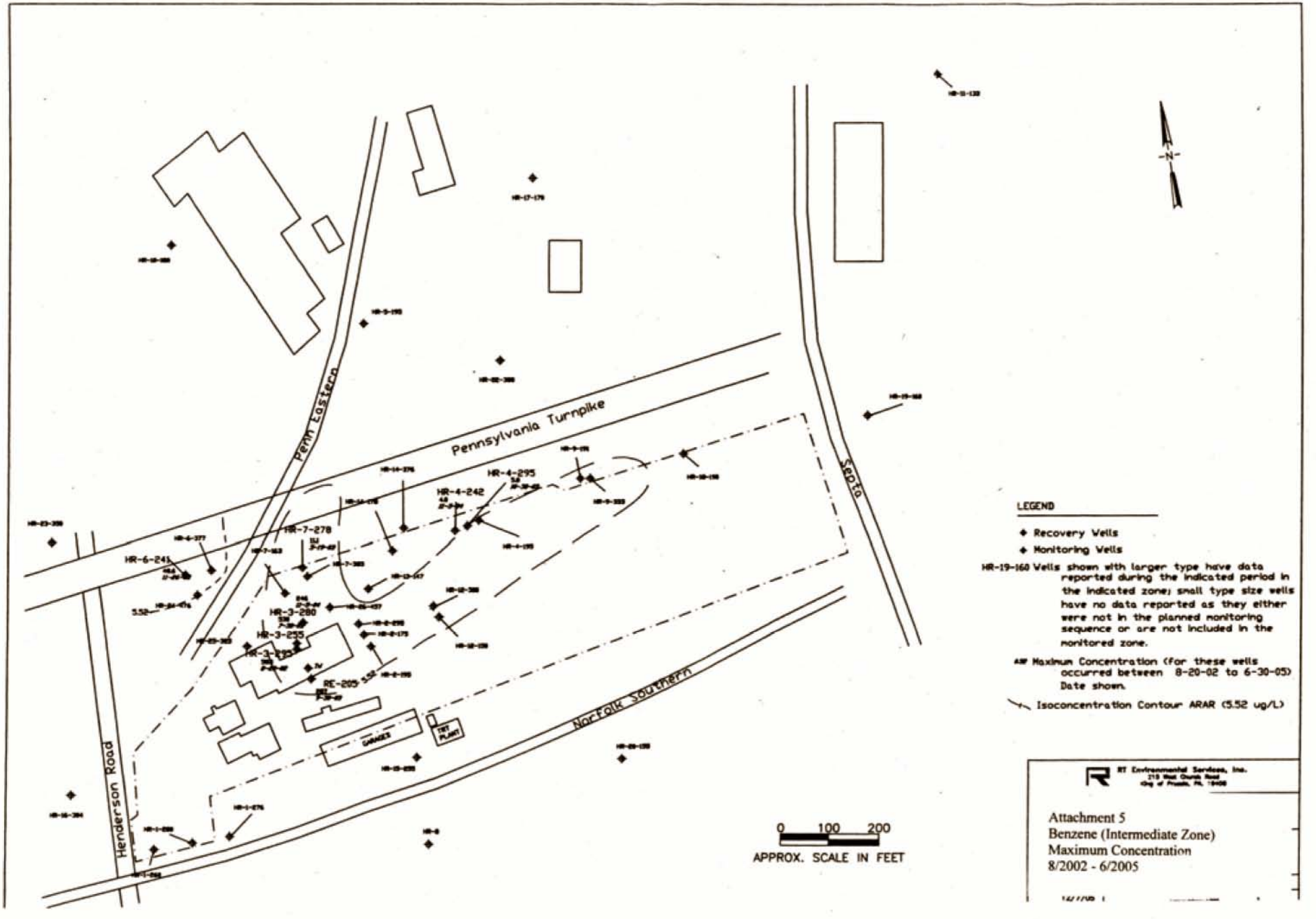
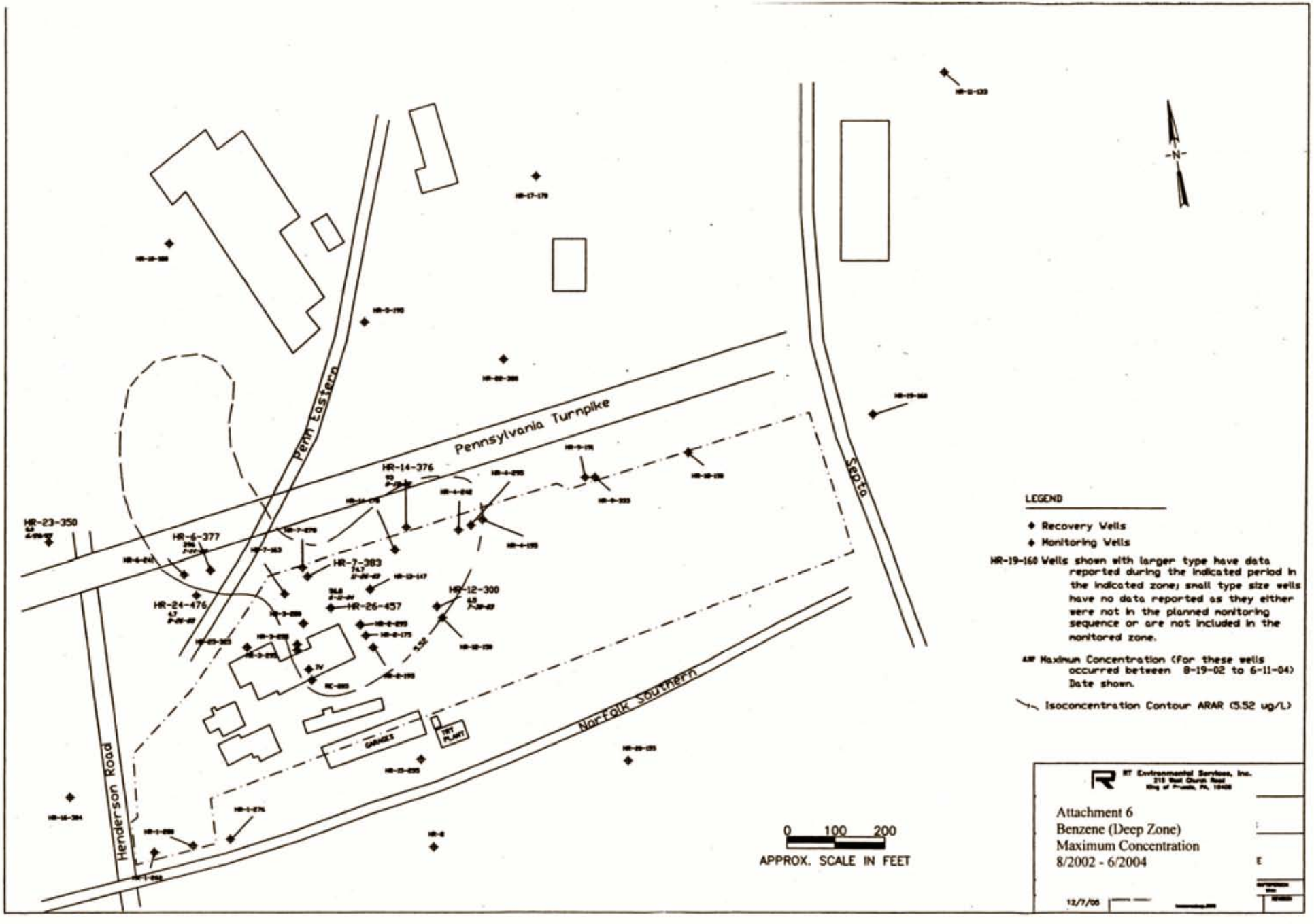
HR-17-178
HR-10-180
HR-5-195
HR-19-160
Penn Eastern
Pennsylvania Turnpike
Septa
HR-9-191
HR-18-190
HR-14-178
HR-4-195
HR-7-163
HR-13-147
HR-2-175
HR-12-150
HR-2-195
Henderson Road
Norfolk Southern
GARAGES
HR-29-185
HR-8
N
LEGEND
Recovery Wells
Monitoring Wells
HR-19-160 Wells shown with larger type have data reported during the indicated period in the indicated zone; small type size wells have no data reported as they either were not in the planned monitoring sequence or are not included in the monitored zone.
ARAR Maximum Concentration (for these wells occurred between 5-15-02 to 9-24-05)
Isoconcentration Contour ARAR (5.52 ug/L)
0 100 200
APPROX. SCALE IN FEET
RT Environmental Services, Inc.
Attachment 4
Benzene (Shallow Zone)
Maximum Concentration
5/2002 - 9/2005


Penn Eastern
Pennsylvania Turnpike
Septa
Norfolk Southern
Henderson Road
HR-4-295
HR-4-242
HR-7-278
HR-6-241
HR-3-280
HR-3-255
RE-205
GARAGES
TRT PLANT
N
LEGEND
Recovery Wells
Monitoring Wells
HR-19-160 Wells shown with larger type have data reported during the indicated period in the indicated zone; small type size wells have no data reported as they either were not in the planned monitoring sequence or are not included in the monitored zone.
Maximum Concentration (for these wells occurred between 8-20-02 to 6-30-05) Date shown.
Isoconcentration Contour ARAR (5.52 ug/L)
0 100 200
APPROX. SCALE IN FEET
RT Environmental Services, Inc.
Attachment 5
Benzene (Intermediate Zone)
Maximum Concentration
8/2002 - 6/2005


Penn Eastern
Pennsylvania Turnpike
Septa
Norfolk Southern
Henderson Road
HR-14-376
HR-23-350
HR-6-377
HR-7-383
HR-24-476
HR-26-457
HR-12-300
GARAGE
TRT PLANT
LEGEND
Recovery Wells
Monitoring Wells
HR-19-168 Wells shown with larger type have data reported during the indicated period in the indicated zone; small type size wells have no data reported as they either were not in the planned monitoring sequence or are not included in the monitored zone.
Maximum Concentration (For these wells occurred between 8-19-02 to 6-11-04) Date shown.
Isoconcentration Contour ARAR (5.52 ug/L)
0 100 200
APPROX. SCALE IN FEET
RT Environmental Services, Inc.
Attachment 6
Benzene (Deep Zone)
Maximum Concentration
8/2002 - 6/2004
12/7/06

Public Notice
U.S. EPA
Conducts Five-Year Review of Henderson Road Superfund Site

The United States Environmental Protection Agency, (EPA) Region 3, is conducting a Five-Year Review of the Henderson Road Superfund Site located in Montgomery County, Pennsylvania. The review consists of an evaluation of relevant documents, a physical inspection of the site, and a search to determine if any new regulations are applicable since the construction at the site was completed. This five-year review report will be available for public review at the location listed below or on-line at:

http://loggerhead.epa.gov/arweb/public/search_results.jsp?siteid= PAD009862939

U.S. EPA Region 3
Administrative Records Room
1650 Arch Street
Philadelphia, PA 19103
215-814-3157

Contacts:

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Attachment 7 – King of Prussia Courier Tear Sheet