THIRD FIVE-YEAR REVIEW REPORT FOR CROSSLEY FARM SUPERFUND SITE BERKS COUNTY, PENNSYLVANIA

September 2014

Prepared By:
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9/17/2014

Date

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LIST OF ABBREVIATONS

ARAR	Applicable or Relevant and Appropriate Requirement
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
COC	Contaminant of Concern
EPA	United States Environmental Protection Agency
EPIC	Environmental Photographic Interpretation Center
ESD	Explanation of Significant Differences
FYR	Five-Year Review
GPRA	Government Performance and Results Act
HI	Hazard Index
HSCA	Hazardous Site Cleanup Act
IC	Institutional Control
MCL	Maximum Contaminant Level
µg/L	Microgram per Liter
mg/L	Milligram per Liter
MSC	Medium Specific Concentration
NA	Not applicable
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
O&M	Operation and Maintenance
OU	Operable Unit
PADEP	Pennsylvania Department of Environmental Protection
PCE	Tetrachloroethylene
POET	Point of Entry Treatment
PRP	Potentially Responsible Party
RAO	Remedial Action Objective
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RPM	Remedial Project Manager
RSL	Regional Screening Level
SDWA	Safe Drinking Water Act
SWRAU	Sitewide Ready for Anticipated Use
TBC	To-Be-Considered
TCE	Trichloroethylene
VI	Vapor Intrusion
VOC	Volatile Organic Compound

EXECUTIVE SUMMARY

The Crossley Farm Superfund site (the Site) is located in a rural area in Hereford Township, Berks County, Pennsylvania. From 1927 to 2000, a dairy farm operated on site. From the mid-1950s to the mid-1970s, industrial and household waste was disposed of on site, contaminating soil and ground water with trichloroethylene (TCE) and other volatile organic compounds (VOCs). Cleanup at the 209-acre Site has included drum and soil removal, point-of-entry filters on local residential water supplies, ground water treatment, and vapor intrusion mitigation systems. EPA has issued three interim Records of Decision (RODs), one interim Explanation of Significant Differences (ESD) and one interim Amendment to the ground water Operable Unit (OU) 2 ROD (ROD Amendment). The three interim remedies include one for site drinking water (OU 1), one for ground water (OU2) and one for vapor intrusion (OU3). Since all the RODs for this site are only interim decision documents, EPA plans to select a final remedy or the Site in the future. The triggering action for this five-year review (FYR) was the signing of the previous FYR on September 18, 2009.

The OU1 remedy is protective of human health and the environment. Point-of-entry filtration systems prevent any potential exposure to contaminated drinking water.

The OU2 remedy is expected to be protective of human health and the environment upon completion. In the interim, remedial actions to date are beginning to address ground water concentrations that result in unacceptable risks.

The OU3 remedy is expected to be protective of human health and the environment when vapor mitigation systems to prevent hazardous vapors from entering and concentrating in homes have been completed.

A sitewide protectiveness statement is not included because the site has not achieved construction completion.

Government Performance and Results Act (GPRA) Measure Review
As part of this FYR, GPRA measures have also been reviewed. The GPRA measures and their status are listed below.

Environmental Indicators
Human Health: EPA is working to ensure that potential or actual human exposures are under control.
Ground Water Migration: EPA is working to ensure that potential or actual human exposures are under control.

Sitewide Ready for Anticipated Use (SWRAU)
The Site has not achieved Sitewide Ready for Anticipated Use (SWRAU) status.

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site Name: Crossley Farm		
EPA ID: PAD981740061		
Region: 3	**State:** PA	**City/County:** Hereford Township/Berks

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

REVIEW STATUS
Lead agency: EPA **If "Other Federal Agency" selected above, enter Agency name:** Click here to enter text.
Author name: Roy Schrock, with additional support provided by Skeo Solutions
Author affiliation: EPA Region 3
Review period: January 2014 – August 2014
Date of site inspection: February 19, 2014
Type of review: Statutory
Review number: 3
Triggering action date: 09/18/2009
Due date *(five years after triggering action date)*: 09/18/2014

FIVE-YEAR REVIEW SUMMARY FORM (CONTINUED)

Issues/Recommendations

Issues and Recommendations Identified in the Five-Year Review:

OU(s): OU1, OU2 and OU3	**Issue Category: Institutional Controls**			
	Issue: The 2008 OU-2 ROD Amendment requires implementation of additional ICs to protect the treatment plant, the extraction well system, the infiltration gallery, and the discharge systems to the Perkiomen Creek. The PADEP 512 Order protects the treatment plant, but there are no Institutional Controls in place for residential areas near the Crossley Farm property. However, both Hereford Township and Washington Township notify parties requesting a building permit of the potential need for a domestic well filtration system and a vapor intrusion mitigation system.			
	Recommendation: EPA will work with the townships that surround the site (Hereford and Washington Townships) to establish ordinances that will address vapor intrusion issues, restrict the use of groundwater impacted by the Site, and protect components of the treatment system located on private property (including extraction wells, underground piping, and discharge areas).			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**
No	Yes	EPA/State	EPA	09/01/2016

Protectiveness Statement(s)

Operable Unit:	*Protectiveness Determination:*	*Addendum Due Date (if applicable):*
OU1	Protective	Click here to enter date.

Protectiveness Statement:
The OU1 remedy is protective of human health and the environment. Point-of-entry filtration systems prevent any potential exposure to contaminated drinking water.

Operable Unit:	*Protectiveness Determination:*	*Addendum Due Date (if applicable):*
OU2	Will be Protective	Click here to enter date.

Protectiveness Statement:
The OU2 remedy is expected to be protective of human health and the environment upon completion. In the interim, remedial actions to date are beginning to address ground water concentrations that result in unacceptable risks.

Operable Unit:	*Protectiveness Determination:*	*Addendum Due Date (if applicable):*
OU3	Will be Protective	Click here to enter date.

Protectiveness Statement:
The OU3 remedy is expected to be protective of human health and the environment when vapor mitigation systems to prevent hazardous vapors from entering and concentrating in homes have been completed.

Third Five-Year Review Report
for
Crossley Farm Superfund Site

1.0 Introduction

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

The United States Environmental Protection Agency (EPA) prepares FYRs pursuant to the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Section 121 and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). CERCLA Section 121 states:

> If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each 5 years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.

The EPA interpreted this requirement further in the NCP, 40 Code of Federal Regulations (CFR) Section 300.430(f)(4)(ii), which states:

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

EPA conducted the FYR and prepared this report regarding the remedy implemented at the Crossley Farm Superfund site (the Site) in Hereford Township, Berks County, Pennsylvania. EPA with contractor support conducted this FYR from January to September2014. EPA is the lead agency for developing and implementing the remedy for the Superfund-financed cleanup at the Site. The Pennsylvania Department of Environmental Protection (PADEP), as the support agency representing the Commonwealth of Pennsylvania, has reviewed all supporting documentation and provided input to the EPA during the FYR process.

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

three operable units (OUs). All decision documents for the three operable units are interim decisions. This FYR report addresses all site OUs. OU1 is the residential point of entry treatment (POET) for residential water supplies. OU2 is sitewide ground water. OU3 is vapor intrusion. Since, these are interim actions; EPA will select a final sitewide remedy in a future Record of Decision (ROD).

2.0 Site Chronology

Table 1 lists the dates of important events for the Site.

Table 1: Chronology of Site Events

Event	Date
Local residents complained of odors in supply wells PADEP sampling identified well contamination and PADEP issued health advisory on ground water use	1983
EPA conducted preliminary assessment	Early 1984
EPA began OU1 removal action, installing point-of-entry carbon filters on residential home wells	December 1, 1986
EPA proposed the Site for listing on the National Priorities List (NPL)	July 29, 1991
EPA placed the Site on the NPL	October 14, 1992
Agency for Toxic Substances and Disease Registry completed preliminary public health assessment	February 1, 1993
EPA began OU1 remedial investigation/feasibility study (RI/FS)	September 27, 1994
EPA completed OU1 RI/FS EPA signed OU1 Record of Decision (ROD)	June 30, 1997
EPA began OU2 RI/FS	October 17, 1997
EPA began OU2 removal action removing drums buried in a pit	May 26, 1998
EPA completed OU2 removal action	October 30, 1998
EPA completed OU1 remedial design	June 30, 1999
EPA began OU1 remedial action	September 15, 1999
EPA completed OU1 remedial action installing point-of-entry carbon filters on residential home wells	January 15, 2000
EPA completed OU2 RI/FS EPA signed OU2 hot spot ROD	September 28, 2001
EPA began hot spot OU2 ground water remedial design	November 17, 2001
EPA completed hot spot OU2 ground water remedial design	May 30, 2004
EPA signed OU2 Explanation of Significant Differences (ESD) changing ground water treatment from air stripping to an advanced oxidation process	July 26, 2004
EPA signed the Site's first FYR	September 24, 2004
EPA signed OU1 ESD changing the frequency of well sampling in the vicinity of the Site from once every six months to once every year for homes with POET and two years for home wells without POET.	August 17, 2006
EPA began OU3 removal action to install vapor mitigation systems in two homes	November 30, 2006
EPA completed OU3 removal action	September 5, 2007
EPA began OU3 RI/FS	October 31, 2007
EPA signed OU2 ROD Amendment to focus ground water cleanup on containing the ground water plume	July 28, 2008
EPA entered into Consent Decree with Ruth Crossley and the estate of Harry Crossley	November 25, 2008

Event	Date
EPA entered into Consent Decree with Temrac Company, Inc.	March 26, 2009
EPA began OU2 valley plume ground water remedial action	September 8, 2009
EPA signed the Site's second FYR	September 18, 2009
EPA completed OU2 valley plume ground water remedial design	September 19, 2012
EPA completed OU3 RI/FS EPA signed OU3 ROD	September 24, 2012
EPA began operation of OU2 treatment facility	October 9, 2012
EPA began OU3 vapor intrusion remedial design	November 21, 2012
EPA began OU2 sitewide ground water remedial design	June 3, 2013
EPA began OU3 vapor intrusion remedial action	July 24, 2013
EPA completed OU3 vapor intrusion remedial design	September 13, 2013

3.0 Background

3.1 Physical Characteristics

The 209-acre Site is located in a rural area in Hereford Township, Berks County, Pennsylvania (Figure 1). Residential areas and farms surround the Site. The Site mainly consists of rolling farmland with the crest of Blackhead Hill near the middle of the farmland. The Site lies within the Reading Prong Section of the New England Physiographic Province. Contaminated ground water was detected at the deepest wells installed downgradient of the source area, which further suggests deep migration of contamination has occurred. Upward vertical gradients are expected at distances from the Site and nearer to the valley bottom. More details of the geology and Site Conceptual Model can be found in the Draft Hydrogeological Report, Crossley Farm Superfund Site, OU2, Berks County, Pennsylvania. CDM Smith. May 31, 2013.

3.2 Land and Resource Use

From 1927 to 2000, a dairy farm operated on the Site. Members of the Crossley family and local farmers renting the property operated Crossley Farm. In 2000, the dairy farm moved to another location. In 2007, a local farmer purchased the site property. The farmer currently grows corn and soybeans on the property. PADEP has placed a Hazardous Site Cleanup Act (HSCA) 512 Order on the Crossley Farm property, which prohibits any use of the property that would interfere with the remedy. The 2008 OU-2 ROD Amendment requires implementation of additional ICs to protect the treatment plant, the extraction well system, the infiltration gallery, and the discharge systems to the Perkiomen Creek. The PADEP 512 Order referenced above protects the treatment plant. EPA will work with the townships that surround the site (Hereford and Washington Townships) to establish ordinances that will address vapor intrusion issues, restrict the use of groundwater impacted by the Site, and protect components of the treatment system located on private property (including extraction wells, underground piping, and discharge areas).

3.3 History of Contamination

During the mid-1960s to the mid-1970s, a local plant (Bally Case and Cooler) reportedly sent drums with liquid waste to Crossley Farm for disposal. The plant likely used trichloroethylene

(TCE) and tetrachloroethylene (PCE) as a degreaser. Household trash was also disposed of at the Site. Waste disposal areas include a household dump, the quarry and a borrow pit area (Figure 2).

In 1983, local residents complained to PADEP about odors in private water supply wells. PADEP sampling identified TCE and PCE in local wells. PADEP issued a health advisory on ground water use in the area. EPA conducted a preliminary assessment of Crossley Farm in early 1984. The assessment concluded that insufficient information existed to identify the source of the contamination and suggested a regional ground water study. Further citizen complaints in August 1986 prompted additional rounds of sampling by EPA.

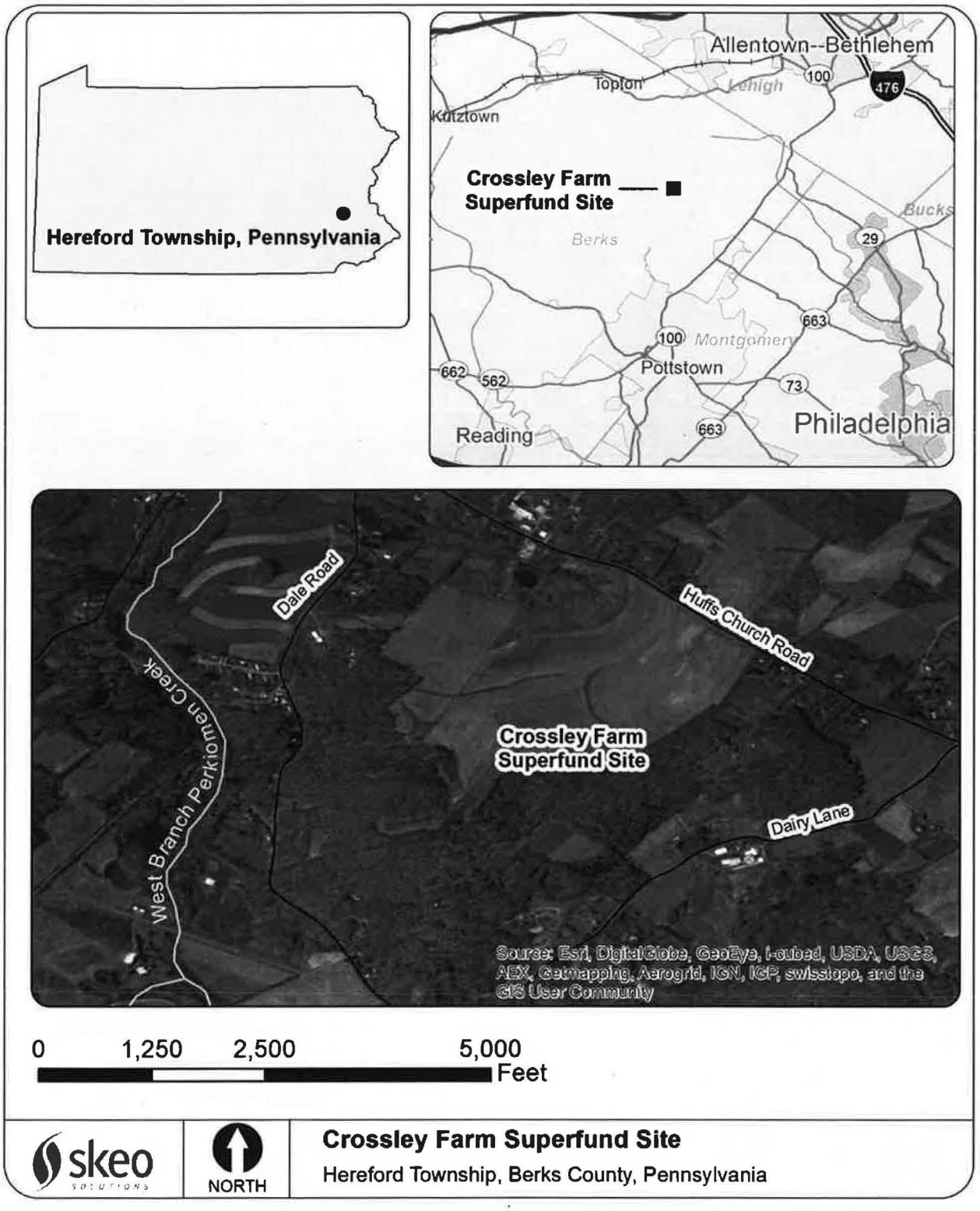
3.4 Initial Response

EPA started an emergency response action in December 1986. In January 1987, EPA began installing carbon filtration units on the most severely impacted private wells.

In the summer of 1998, EPA's emergency response program excavated and disposed off site 1,200 drums and 15,000 tons of contaminated soil from the Environmental Photographic Interpretation Center (EPIC) Pit. Following excavation, EPA collected subsurface soil samples from 23 locations across the floor and sidewalls of the drum removal excavation area to identify any remaining contamination. This FYR compares the maximum residual concentrations to EPA's May 2014 residential Regional Screening Levels (RSLs) for soil (Appendix D). Based on this comparison, all maximum concentrations were below residential RSLs for organic chemicals. In the case of metals, concentrations were below the residential RSL except for arsenic, cobalt, iron, manganese and thallium. Concentrations of these five metals were determined to be representative of natural background conditions and not related to the Site.

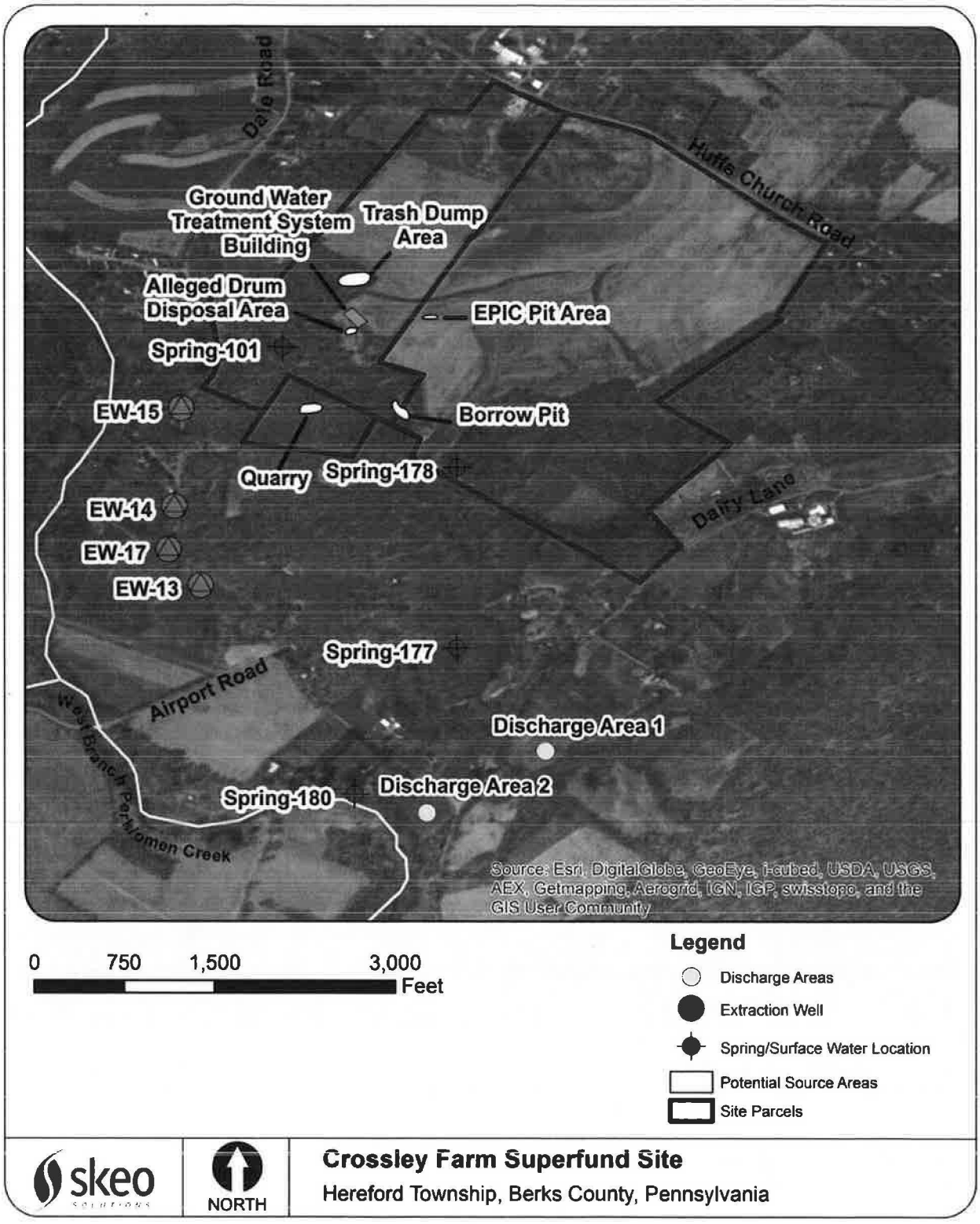
The initial response for Vapor Intrusion investigations began in November 2006. EPA completed a removal action to mitigate vapor intrusion of VOCs from the ground water into two residences. This contamination pathway was further investigated in a 2007 RI/FS.

Figure 1: Site Location Map



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

Figure 2: Detailed Site Map



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

3.5 Basis for Taking Action

EPA conducted the first regional hydrogeological investigation from 1987 to 1988. The study concluded that the source of the TCE in ground water was near the crest of Blackhead Hill. The abandoned quarry and the borrow pit area were cited as the presumed source areas. The investigation and additional sampling delineated a ground water plume extending about 10,000 feet downgradient southward from Blackhead Hill. EPA proposed the Site for listing on the National Priorities List (NPL) in 1991 and placed it on the NPL on October 14, 1992.

EPA conducted the Site's remedial investigation and feasibility study (RI/FS) from 1996 until 2001, which included the completion of a baseline risk assessment. The RI/FS identified several potential source areas, shown in Table 2.

Table 2: Potential Source Areas of Contamination

Trash Dump	Household and farm related trash
Quarry	Suspected unregulated disposal of solvent waste liquid
Borrow Pit Area	Suspected staging and storage area for drums of waste material
Alleged Drum Disposal Area	Identified by local residents as the location of buried drums; not identified as a source area by the RI
The EPIC Pit Area	Actual location of drums buried in 1980

The baseline risk assessment evaluated human exposures to ground water, surface water (including springs), sediments and soil. It also evaluated exposures to milk and fish. The human receptors evaluated included current and future residential children and adults, recreational receptors, and industrial and construction workers. The results of the risk assessment indicated that residential, industrial and construction worker exposures to ground water resulted in the highest cancer risks. The cancer risks were well above the upper bound of EPA's risk management range of 1×10^{-6} to 1×10^{-4} predominantly due to TCE. The risks from other pathways (milk, fish, soil and sediment) were less than 1×10^{-4}. The screening level ecological risk assessment did not identify any risks to exposed ecological populations.

Maximum noncancer risk for the residential child and residential adult exposures were driven by several contaminants in ground water including VOCs and iron, resulting in noncancer hazard indices (HIs) well above the threshold of 1.0. In addition, an HI exceeded 1.0 for a residential child in contact with test pit soil (around and under the trash dump) due to iron. Swimming and wading exposures to TCE in surface water at one spring location, SW10/Spring 180 (486 µg/L), also resulted in HIs greater than 1.0 for residential children and adults.

In September 2012, EPA completed the OU3 RI, which involved collecting additional data to support the evaluation of potential residential health risks associated with exposure to site-related VOCs via vapor intrusion from the Site's contaminated ground water plume. The vapor intrusion risk evaluation used multiple lines of evidence (e.g., shallow ground water, sub-slab vapor and indoor air samples). It concluded that there is a potential for vapor intrusion of site-related contaminants from contaminated ground water to indoor air to occur at the Site at concentrations that could pose an unacceptable risk to human health (unacceptable cancer risk and/or noncancer risk).

4.0 Remedial Actions

In accordance with CERCLA and the NCP, the overriding goals for any remedial action are protection of human health and the environment and compliance with applicable or relevant and appropriate requirements (ARARs). A number of remedial alternatives were considered for the Site, and final selection was made based on an evaluation of each alternative against nine evaluation criteria that are specified in Section 300.430(e)(9)(iii) of the NCP.

4.1 Remedy Selection

EPA issued the OU1 ROD on June 30, 1997, as an interim remedial action. The ROD provided point-of-entry ground water treatment systems to residents affected by contamination from the Site, with additional systems available as needed. EPA contractors tailored the point-of-entry systems specifically for each home. Homes with carbon filtration units also have an ultraviolet light for disinfection. Depending on contaminants identified at specific residences, additional components may be required in the filtration system (e.g., pH adjustment or water-softening unit). Cleanup goals identified in the OU1 ROD are listed in Table 3.

Table 3: Ground Water Contaminant of Concern (COC) Cleanup Goals for OU1

Ground Water COC	ROD Cleanup Goal (µg/L)
Methylene Chloride	5
PCE	5
TCE	5

EPA issued the OU2 interim ROD on September 28, 2001. Remedial action objectives (RAOs) are:

- To contain the contamination in the fractured bedrock aquifer at the Site.
- To reduce contamination in the aquifer and the surface water springs to MCLs or below.

The remedy includes a limited on-site ground water treatment remedial action for the highest concentration of contamination at the top of Blackhead Hill. Additionally, the remedy requires institutional controls to restrict use of contaminated ground water. Property owners are responsible for ground water POET systems in homes built after 2001. Cleanup goals identified in the OU2 ROD are shown in Table 4.

Table 4: Ground Water COC Cleanup Goals for the OU2 Hot Spot Area

Ground Water COC	ROD Cleanup Goal (µg/L)
Cis-1,2-dichloroethylene	70
PCE	5
TCE	5

EPA issued the OU2 interim Explanation of Significant Differences (ESD) on July 26, 2004, changing the ground water treatment remedy from an on-site plant using an air stripping process, which would only treat VOCs, to an on-site plant that will use an advanced oxidation process to break down volatile, semi-volatile and other organic compounds.

EPA issued the OU1 interim ESD on August 17, 2006, changing sampling of residential wells near the Site to once a year for homes with POET systems and to every two years for homes without POET systems instead of once every six months. PADEP now conducts the sampling.

On July 28, 2008, EPA issued an interim Amendment to the 2001 OU2 (ROD Amendment), focusing ground water remediation on contaminant of the plume that extends into the valley plume south of the Site rather than beginning with the hot-spot area described in the 2001 OU2 ROD. EPA determined a ROD Amendment was necessary to increase the scope and modify the objectives. The RAOs listed in the OU2 ROD Amendment are:

- Establish a hydraulic containment system that will intercept and cut-off VOC ground water contamination greater than 1000 µg/L TCE hereafter defined as the Valley Plume Area
- Prevent or minimize any further migration of the Valley Plume Area to protect the downgradient residential water supply and to reduce contamination in the aquifer and surface water springs downgradient of the hydraulic contaminant system.
- For the long term, restore the ground water downgradient of the Valley Plume Area to drinking water standards.
- For the long term, restore the surface water and springs to drinking water and aquatic water quality standards.

The goal of the cleanup is to contain the most highly contaminated portion of ground water. Cleanup goals identified in the OU2 ROD Amendment are shown in Table 5.

Table 5: Ground Water COC Cleanup Goals for the OU2 ROD Amendment

Ground Water COC	ROD Cleanup Goal (µg/L)
Carbon Tetrachloride	5
1,2-Dichloroethane	5
1,1-Dichloroethylene	7
Cis-1,2-Dichloroethylene	70
Methylene Chloride	5
PCE	5
Trans-1,2-dichloroethylene	100
1,1,2-Trichloroethane	5
TCE	5
Vinyl Chloride	2

In September 2012, EPA issued the OU3 ROD as an interim remedial action for vapor intrusion from contaminated ground water at the Site. 18 residences need remedial action. RAOs listed in the OU3 ROD are:

- Protect current and future residents from adverse health effects that may result from exposure to VOC-contaminated vapors within residences attributable to the-Site's ground water contamination plume.
- Prevent and/or minimize contaminant migration from subsurface vapor intrusion into residential indoor air.

EPA plans to issue a final ROD for the entire Site. The ROD will select a final remedy for cleanup of contaminated ground water and associated soil vapor.

4.2 Remedy Implementation

EPA settled with two responsible parties for the Site. One Consent Decree with Temrac Company, Inc., entered on March 26, 2009 and a second Consent Decree with Ruth Crossley and the Estate of Harry Crossley, entered on November 25, 2008.

OU1 Point-of-Entry Drinking Water Systems
EPA conducted the OU1 remedial design from September 1997 to June 1999. EPA contractors installed POET at affected residences between September 1999 and February 2001, when PADEP assumed responsibility for operation and maintenance (O&M) of the units. To date, EPA has installed 60 systems. Based on continued sampling results additional POET systems may be installed under the OU1 remedial action.

OU2 Ground Water
EPA began the Site's ground water remedial design in October 2007. EPA's construction of the ground water treatment plant began in June 2010. Operations began in October 2012. Ground water is extracted from four extraction wells (EW-13, 14, 15 and 17), treated at the water treatment plant and discharged at the two gallery discharge areas shown in Figure 2.

OU3 Vapor Intrusion
EPA conducted the OU3 remedial design from November 2012 to September 2013. EPA contractors began the remedial action, installing vapor mitigation systems at 18 residences in July 2014 and will complete it in fall 2014.

4.3 Operation and Maintenance (O&M)

OU1
PADEP assumed responsibility for O&M activities for the POET systems in February 2001, when installation of the systems was completed. PADEP conducts sampling on POET systems every year to identify any required maintenance and replaces the carbon in the tanks when necessary. PADEP also samples well water of residences that do not have POET systems every 2 years to identify any additional homes that may need systems.

OU2
Construction of the OU2 remedy to partially contain the most highly contaminated portion of the Valley Plume has been completed. The ground water treatment plant is operational. Ground water is being extracted, treated and discharged. The OU2 remedy to reduce contaminant concentrations across the entire Site at all locations has not yet started. However, certain areas and wells have seen significant reduction in concentrations. An O&M plan determining frequency of sampling events was prepared in May 2014.

OU3
EPA will complete the installation of vapor mitigation systems in fall 2014 and an O&M plan is forthcoming. EPA expects to conduct indoor air sampling in the mitigated homes in winter 2014-2015.

Table 6 shows annual O&M costs for OU2.

Table 6: OU2 Annual O&M Costs

Date Range	Total Cost
October 2013 to March 2014	$445,442.00
April 2014 to September 2014	$397,195.00

5.0 Progress Since the Last Five-Year Review

The protectiveness statement from the 2009 FYR for the Site stated:

The remedy implemented for OU1 at the Crossley Farm Site is protective of human health. Physical construction of the OU1 remedy is complete.

At the time of this Five Year Review, a total of 52 point of entry systems have been installed on residential wells impacted by site-related contaminants. PADEP will continue to conduct biennial sampling in the vicinity of the Site to identify if any additional residential wells have become impacted by site-related contamination and EPA will install [point-of-entry] systems on impacted wells. PADEP or EPA will test new residential wells, and, if treatment is necessary, the installation and maintenance of point of entry systems will be the responsibility of the homeowner.

The overall remedy at the Site will be protective of human health and the environment upon implementation of the interim OU2 ROD Amendment, a final site-wide OU2 ROD and the anticipated OU3 ROD. The protectiveness of these remedies will be evaluated in future Five Year Reviews after the remedies have been implemented.

The 2009 FYR included no issues and recommendations.

6.0 Five-Year Review Process

6.1 Administrative Components

EPA Region 3 initiated the FYR in January 2014 and scheduled its completion for September 2014. EPA remedial project manager (RPM) Roy Schrock led the EPA site review team, which also included EPA site hydrogeologist Kathy Davies, EPA site toxicologist, Nancy Rios-Jaffola, EPA Biological Technical Assistance Group member, Bruce Pluta, EPA site attorney Gail Wilson, EPA community involvement coordinator Trish Taylor and contractor support provided to EPA by Skeo Solutions. The review schedule established consisted of the following activities:

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

6.2 Community Involvement

In June 26, 2014, EPA published a public notice in the Boyertown Area Times newspaper announcing the commencement of the FYR process for the Site, providing contact information for Trish Taylor, taylor.trish@epa.gov and inviting community participation. No one contacted EPA as a result of the advertisement.

EPA will make the final FYR Report available to the public. EPA will place copies of the document in the designated site repository: Hereford Township Building, located at 3131 Seisholtzville Road in Macungie, Pennsylvania.

6.3 Document Review

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

ARARs Review

Ground Water ARARs
The decision documents selecting interim remedies for site ground water identify the MCLs established under the Safe Drinking Water Act (SDWA) as the contaminant-specific ARARs. The final remedy for sitewide ground water has not yet been selected. The Site's final sitewide ROD will include consideration of a complete list of site-specific chemicals. Based on the ARARs established for the interim and limited remedies, there have been no changes to the MCLs for the COCs (Table 7).

Table 7: Previous and Current ARARs for Ground Water COCs

COCs[a]	1997 OU1 ROD ARARs (µg/L)[b]	2001 OU2 ROD ARARs (µg/L)	2008 OU2 ROD Amendment ARARs (µg/L)	2014 MCLs[c] (µg/L)	ARAR Changes
Carbon tetrachloride	NA	NA	5	5	None
1,2-Dichloroethane	NA	NA	5	5	None
1,1-Dichloroethene	NA	NA	7	7	None
Cis-1,2-dichloroethylene	NA	70	70	70	None
Methylene chloride	5	NA	5	5	None
PCE	5	5	5	5	None
Trans-1,2-dichloroethylene	NA	NA	100	100	None
1,1,2-Trichloroethane	NA	NA	5	5	None
TCE	5	5	5	5	None
Vinyl chloride	NA	NA	2	2	None

Notes:
[a] COCs as identified in the 1997 OU1 ROD, the 2001 OU2 ROD and the 2008 ROD Amendment.
[b] ARARs identified in the 1997 ROD.
[c] EPA MCLs obtained from http://water.epa.gov/drink/contaminants (accessed -02/26/14).
NA – not applicable; the contaminant is not listed as a COC in the decision document.

Soil ARARs
Site decision documents did not identify any soil ARARs.

Surface Water ARARs
The 2008 ROD identifies Pennsylvania water quality standards as surface water ARARs. Effluent limitations and monitoring requirements for discharge from the ground water remediation system are shown in Table 8.

Table 8: Discharge Limitations

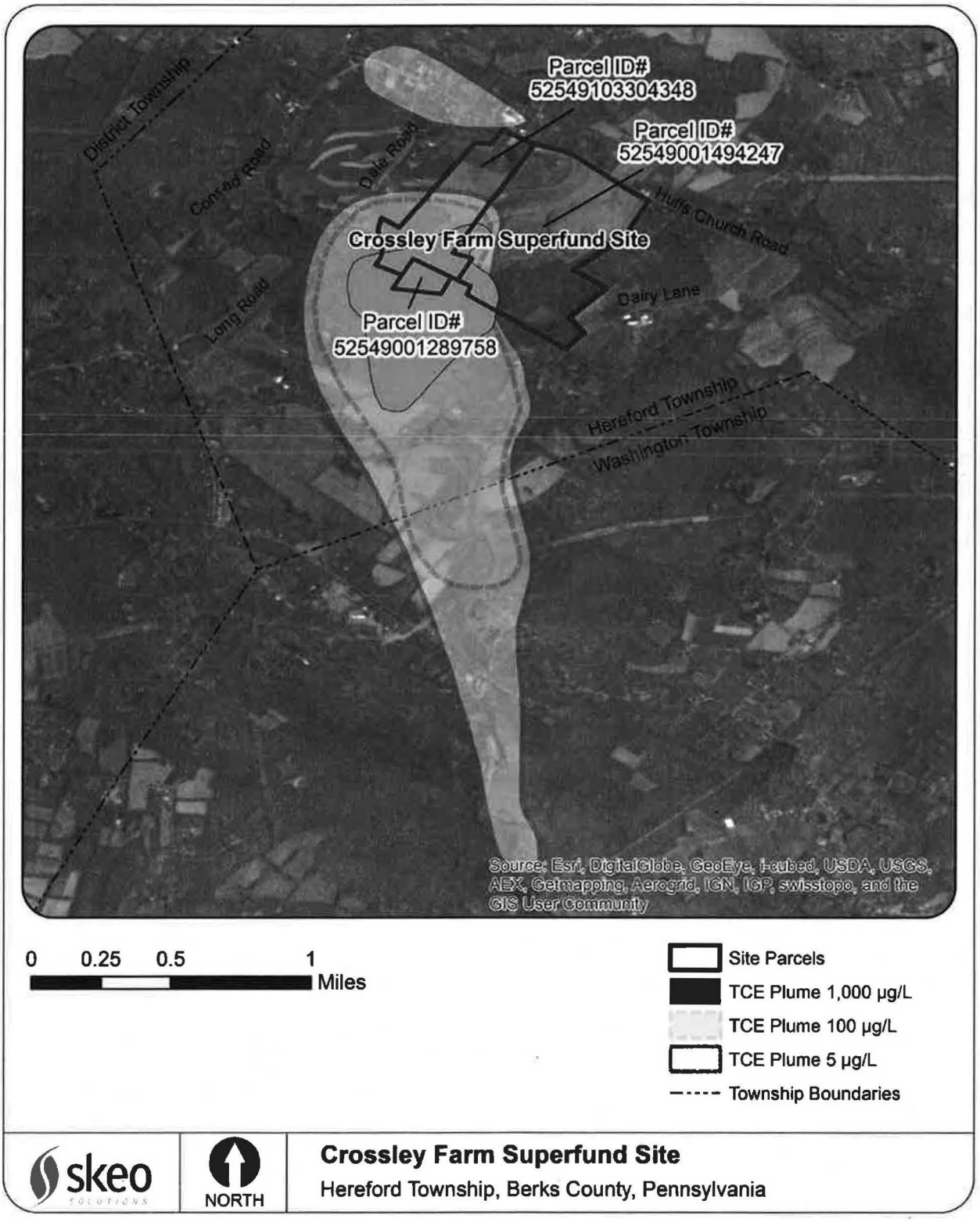
Discharge Parameter	Discharge Limitations					Monitoring Requirements	
	Mass Units (pounds per day)		Concentrations (milligrams per Liter, mg/L)				
	Average Monthly	Maximum Daily	Average Monthly	Maximum Daily	Instantaneous Maximum	Monitoring Frequency	Sample Type
Flow (million gallons per day)	Monitor & Report	Monitor & Report	XXX	XXX	XXX	Continuous	Measured
Total Suspended Solids	XXX	XXX	Monitor & Report	Monitor & Report	XXX	2 per month	Grab
Total Dissolved Solids	XXX	XXX	1,000	2,000	2,500	2 per month	Grab
Carbon Tetrachloride	XXX	XXX	0.0008	0.0012	0.0020	2 per month	Grab
Chloroform	XXX	XXX	0.0195	0.0304	0.0488	2 per month	Grab
1,2-Dichloroethane	XXX	XXX	0.0013	0.0020	0.0033	2 per month	Grab
1,1-Dichloroethylene	XXX	XXX	0.022	0.044	0.055	2 per month	Grab
PCE	XXX	XXX	0.0024	0.0037	0.0060	2 per month	Grab
1,1,2-Trichloroethane	XXX	XXX	0.0020	0.0031	0.0050	2 per month	Grab
TCE	XXX	XXX	0.0085	0.0133	0.0213	2 per month	Grab
Toluene	XXX	XXX	0.028	0.056	0.070	2 per month	Grab
Xylene	XXX	XXX	0.262	0.408	0.655	2 per month	Grab
Vinyl Chloride	XXX	XXX	0.0009	0.00013	0.000225	2 per month	Grab
Note: XXX – The criterion is not applicable for the parameter.							

Institutional Control Review

PADEP has placed a HSCA 512 Order on all parcels of the Crossley Farm property, which limits any use of the property that interferes with the remedies. The 2008 OU-2 ROD Amendment requires implementation of additional ICs to protect the treatment plant, the extraction well system, the infiltration gallery, and the discharge systems to the Perkiomen Creek. The PADEP 512 Order protects the treatment plant, but there are no Institutional Controls in place for residential areas near the Crossley Farm property. However, both Hereford Township and Washington Township notify parties requesting a building permit of the potential need for a domestic well filtration system and a vapor intrusion mitigation system.. EPA will work with the townships that surround the site (Hereford and Washington Townships) to establish ordinances that will address vapor intrusion issues, restrict the use of groundwater impacted by the Site, and protect components of the treatment system located on private property (including extraction wells, underground piping, and discharge areas).

The primary contaminants in ground water at the Site are chlorinated VOCs. TCE is the most prevalent ground water contaminant, and it has been used to define the extent of the plume. Figure 3 shows the farm property where the 512 Order is in place and the downgradient extent of the plume in privately owned residential properties where the ordinances to establish Institutional Controls are needed.

Figure 3: Institutional Control Base Map



Disclaimer: This map and any boundary lines within the map are approximate and subject to change. The map is not a survey. The map is for informational purposes only regarding EPA's response actions at the Site. This map was created using information from CDM Smith. Plume map from EPA's OU3 ROD.

6.4 Data Review

OU1 Point-of-Entry Carbon Filtration

PADEP sampled water at 54 homes with carbon filtration units in 2013. In each home, raw water before treatment, water between the two carbon tanks and water after the second tank is tested. Even though 60 units have been installed, not all systems have completed the first year of the operational and functional period and sometimes residents do not respond to requests for sampling.

Table 9 shows results from 2013 sampling of homes with point-of-entry carbon filtration units.

Table 9: Homes with Point-of-Entry Filtration Units 2013

	Non-detection	Detection
Treated Water	52	2
Water Between Carbon Tanks of Treatment Unit	42	12
Raw (Untreated) Water	23	31

Both detections in treated water were below state standards. One detection was 0.88 µg/L of trichlorofluoromethane. The statewide health standard medium specific concentration (MSC) for trichlorofluoromethane is 2,000 µg/L. The other detection in treated drinking water was 0.652 µg/l of trans-1,2-dichloroethene. The statewide health standard MSC for trans-1,2-dichloroethene is 100 µg/l. Some homes were not sampled during this event because the homeowners did not grant access. The carbon filtration units are operating as designed and reducing COCs to acceptable levels.

PADEP also tests wells in homes without carbon filtration units and surface water springs biannually. If contamination is identified, a point-of-entry system is installed, if appropriate

OU2 Ground Water

The ground water treatment plant has been operational since October 2012. EPA contractor CDM Smith collected baseline monitoring samples of ground water, spring and surface water between July and September 2012 before system start up. Data is reported in Appendix F. Additional sampling was conducted in March 2013 and June 2013. The primary contaminants in ground water at the Site are chlorinated VOCs. TCE is the most prevalent ground water contaminant, and it has been used to define the extent of the plume. Therefore, TCE is the contaminant discussed in the following sections.

Monitoring Wells

Appendix E shows TCE concentrations in the shallow, intermediate and deep ground water zones. Appendix F shows data from wells that had TCE concentrations equal to or greater than 100 µg/L. In general, the greatest concentrations of TCE were observed in the deep zone. The maximum concentrations detected in the shallow, intermediate and deep zones have been near the source areas (510,000 µg/L, 110,000 µg/L and 1,200,000 µg/L, respectively). The current

drinking water MCL for TCE is 5 µg/L. Current ground water pumping is intended to work toward containment of ground water contamination. An assessment of remedy performance is ongoing as additional data becomes available.

Springs and Surface Water

Contractors sample four springs and three surface water locations. In June 2013, TCE was detected in three of the four springs at concentrations of 73, 3.7 and 150 µg/L. TCE was not detected in the surface water locations. Interim remedial action decision documents have not identified cleanup goals or COCs in surface water, although the 2008 ROD identified Pennsylvania water quality standards as surface water ARARs. For TCE, the Pennsylvania water quality standards for fish and aquatic life are 450 µg/L for continuous concentrations and 2,300 µg/L for maximum concentration. For TCE for human health, the Pennsylvania water quality standard is 2.5 µg/L.[1]

Ground Water Treatment Plant Discharge

Treatment plant discharge is permitted by a State-issued National Pollutant Discharge Elimination System (NPDES) equivalent permit. The most recent permit issued is from 2013. parameters permitted include flow, pH, dissolved oxygen, temperature, total suspended solids, total dissolved solids, carbon tetrachloride, 1,1,2-trichloroethane, 1,2-dichloroethane, chloroform, 1,1-dichloroethylene, PCE, toluene, TCE, xylene and vinyl chloride.

Sampling conducted from October 26, 2012, through March 4, 2013, included biweekly sampling of a variety of chemicals after treatment. A summary of analytical results for the sampled chemicals during these sampling events is presented in Table 10. PCE and TCE were detected during more than one sampling event, however all detections were substantially less than the permit equivalent limits. These low detections indicate the beginning of carbon saturation and breakthrough in the carbon tanks. The carbon will be replaced the fall of 2014.

Table 10: Chemicals Sampled for under 2013 NPDES Equivalent Permit

Chemical	Summary of samples
Carbon Tetrachloride	Not detected.
1,1,2-Trichloroethane	Not detected.
1,2-Dichloroethane	Not detected.
Chloroform	Not detected
1,1-Dichloroethylene	Not detected
PCE	Detected below permit equivalent limit
Toluene	Not detected
TCE	Detected below permit equivalent limit
Xylene	Not detected
Vinyl Chloride	Not detected.

[1] Pennsylvania Water Quality Criteria for Toxic Substances (http://www.pacode.com/secure/data/025/chapter93/s93.8c.html)

6.5 Site Inspection

Site inspection participants met at the site ground water treatment plant on February 19, 2014. Participants included Roy Schrock (EPA RPM), Larry Smith (PADEP), James Romig and Jessica Bennett (CDM Smith), Kevin Kilmartin (Tetra Tech), and Johnny Zimmerman-Ward and Kirby Webster (Skeo Solutions). The weather was overcast with intermittent showers, about 30 degrees Fahrenheit. EPA RPM Mitch Cron was also on site with EPA contractor Clean Vapor to inspect vapor mitigation systems and assess additional homes where systems need to be installed. The site inspection checklist is included in Appendix B and site photographs are located in Appendix C.

Site inspection participants discussed the current status of the Site's property ownership and future plans for the Site. The source area and location of the ground water treatment plant are owned privately. PADEP has placed a HSCA 512 Order on the Crossley Farm property, which limits any use of the property, which interferes with the remedies

Site inspection participants toured the ground water treatment plant (OU2). Ground water is pumped from four extraction wells along Dale Road to contain the ground water TCE plume. The plant aims to pump at 120 gallons per minute (gpm). At the time of the inspection, only three of the extraction wells along Dale Road were operating at a rate of 67 gpm. One extraction well, Well EW-15, was off-line due to its effect on a residential well. In August 2014, the residential well was replaced and Well EW-15 was restarted. Now the ground water treatment system pumps at the optimum rate of 120 gallons per minute. Treated ground water discharges at two discharge areas under an NPDES permit equivalent. Site inspection participants did not identify any issues.

Site inspection participants examined a home with a point-of-entry carbon filtration unit for drinking water (OU1) and a vapor mitigation system (OU3). PADEP tests homes in the area that do not have carbon filtration for drinking water biannually to identify any new water well contamination. Because of the area's complex hydrogeology, contamination could migrate and impact wells previously unaffected by site contamination. Participants did not identify any issues with the point-of-entry carbon filtration or vapor mitigation systems.

EPA RPM Roy Schrock and Johnny Zimmerman-Ward and Kirby Webster from Skeo Solutions visited the site repository, located at the Hereford Township Building, 3131 Seisholtzville Road, in Macungie, Pennsylvania. The site repository is up to date with site administrative files.

6.6 Interviews

The FYR process included interviews with parties affected by the Site, including the regulatory agencies involved in site activities or aware of the Site. The purpose was to document the perceived status of the Site and any perceived problems or successes with the phases of the remedy implemented to date. All of the interviews took place after the site inspection via email. The interviews are summarized below.

Larry Smith: Mr. Smith is the PADEP representative overseeing the Site. He believes that ground water cleanup is progressing as would be expected. Additionally, sufficient vapor investigations have been performed. There was a complaint about an extraction well affecting a private water supply well. This extraction well has since been shut down. The residential well will be redrilled deeper and the extraction well will resume. PADEP is not aware of any changes in laws that would affect the protectiveness of the Site's remedy. Mr. Smith aware that instructional controls need to be supported by enforceable ordinances or regulation, but is satisfied that any new construction is monitored by the townships with the support of EPA and PADEP. PADEP has no additional suggestions or recommendations on the Site's management or operation.

Kevin Kilmartin: Mr. Kilmartin manages O&M activities for OU1 for EPA contractor Tetra Tech. He believes that O&M for OU1 continues to perform effectively. The Site's residents receive rapid and responsive service. Monitoring data indicate that the filtration systems are working well and are protective of human health. Frequency of sampling the systems has been optimized, which reduced costs while maintaining protection of human health.

James Romig: Mr. Romig manages O&M activities for OU2 for EPA contractor CDM Smith. He believes that the ground water treatment system is operating as intended by decision documents to capture/control the plume. Remediation of the source area will also be necessary to meet RAOs presented in the 2001 ROD and 2008 ROD Amendment. Contaminants in treated ground water meet PADEP NPDES guidelines consistently. Because the ground water treatment system began functioning in October 2012, insufficient contaminant monitoring data are available to capture sitewide trends. There is a part-time on-site O&M presence and the Project Engineer remotely monitors the system on a daily basis.

7.0 Technical Assessment

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

The remedy is functioning as intended by interim decision documents. EPA has not yet determined a sitewide remedy for the Site. The interim remedy for OU1 actively cleans up drinking water to safe standards and protects human health for residential homes using ground water as a source of drinking water. The sampling schedule has been optimized and there are no other opportunities for optimization. The remedy for OU2 is operational and working toward containing the most highly contaminated portion of ground water.

Construction of the remedy for OU3 will be finished in fall 2014. Confirmation indoor air samples will be taken the winter of 2014-2015. At the time of its completion, this remedy is protective of human health and the environment. Vapor mitigation systems mitigate any potentially hazardous vapors that are entering homes.

PADEP has placed a HSCA 512 Order on the Crossley Farm property, which limits any use of the property that interferes with the remedies. Institutional controls are required in EPA decision documents, but no ordinances are in place for residential properties. However, both Hereford

Township and Washington Township notify parties requesting a building permit of the potential need for a domestic well filtration system and a vapor intrusion mitigation system.

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

Exposure assumptions, interim cleanup levels and RAOs remain valid. The toxicity factors for TCE used in the baseline risk assessment have become more stringent, meaning TCE risks would be higher than originally calculated. However, this would not affect site cleanup goals or RAOs; interim cleanup goals rely on the MCLs, which have not changed since remedy selection.

Since the 2009 FYR, the OU3 vapor intrusion investigation has addressed an exposure pathway not addressed by the OU1 ROD or OU2 ROD. Based on multiple lines of evidence, EPA determined that 18 residences needed vapor intrusion mitigation to ensure protection of human health.
This FYR compared residual soil concentrations from the 1998 drum and soil removal to EPA's May 2014 residential RSLs for soil (Appendix D). Based on this comparison, all maximum concentrations were below residential RSLs for all organic chemicals. In the case of metals, the concentrations were below the residential RSL except for arsenic, cobalt, iron, manganese and thallium; however, concentrations of these five metals were determined to be representative of natural background conditions and not related to the Site.

The chemical 1,4-dioxane has been sampled for at this Site. The 2013 NPDES sampling included 1,4-dioxane for the ground water analytical suite; all concentrations were below detection levels, confirming that 1,4-dioxane is not a ground water COC at the Site.

For ecological risk, the most significant change in the risk assessment process is that it now recognizes the potential importance of the exposure at the ground water and surface water interface and the methods to measure and assess this potential route of exposure.

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

No additional information has come to light that could call into question the protectiveness of the remedy.

7.4 Technical Assessment Summary

EPA has not yet determined a sitewide remedy for the Site. The interim remedy for OU1 actively cleans up drinking water to safe standards and protects human health for residential homes using ground water as a source of drinking water. The interim remedy for OU2 is working toward containing the contaminated ground water plume. The interim remedy for OU3 remedy of vapor mitigation systems protects human health and the environment by preventing the buildup of hazardous vapors in homes.

PADEP has placed a HSCA 512 Order on all parcels of the Crossley Farm property, which limits any use of the property that interferes with the remedies. The 2008 OU-2 ROD Amendment requires implementation of additional ICs to protect the treatment plant, the extraction well system, the infiltration gallery, and the discharge systems to the Perkiomen Creek. The PADEP 512 Order protects the treatment plant, but there are no Institutional Controls in place for residential areas near the Crossley Farm property. EPA will work with the townships that surround the site (Hereford and Washington Townships) to establish ordinances that will address vapor intrusion issues, restrict the use of groundwater impacted by the Site, and protect components of the treatment system located on private property (including extraction wells, underground piping, and discharge areas).

Exposure assumptions, interim cleanup levels and RAOs remain valid. The toxicity factors for TCE used in the baseline risk assessment have become more stringent, meaning TCE risks would be higher than originally calculated. However, this would not affect site cleanup goals or RAOs; interim cleanup goals rely on the MCLs, which have not changed since remedy selection.

8.0 Issues

Table 11 summarizes the current site issues.

Table 11: Current Site Issues

Issue	Affects Current Protectiveness?	Affects Future Protectiveness?
Additional institutional controls are necessary to protect the extraction well system, the infiltration gallery, and the discharge systems to the Perkiomen Creek; and for residential areas near the Crossley Farm property	No	Yes

9.0 Recommendations and Follow-up Actions

Table 12 provides recommendations to address the current site issues.

Table 12: Recommendations to Address Current Site Issues

Issue	Recommendation / Follow-Up Action	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness?	
					Current	Future
Additional institutional controls are necessary to protect the extraction well system, the infiltration gallery, and the discharge systems to the Perkiomen Creek; and for residential areas near the Crossley Farm property	EPA will work with the townships that surround the site (Hereford and Washington Townships) to establish ordinances that will address vapor intrusion issues, restrict the use of groundwater impacted by the Site, and protect components of the treatment system located on private property (including extraction wells, underground piping, and discharge areas).	EPA/State	EPA	09/01/2016	No	Yes

10.0 Protectiveness Statements

The OU1 remedy is protective of human health and the environment. Point-of-entry filtration systems prevent any potential exposure to contaminated drinking water.

The OU2 remedy is expected to be protective of human health and the environment upon completion. In the interim, remedial actions to date are beginning to address ground water concentrations that result in unacceptable risks.

The OU3 remedy is expected to be protective of human health and the environment when vapor mitigation systems to prevent hazardous vapors from entering and concentrating in homes have been completed.

11.0 Next Review

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

Appendix A: List of Documents Reviewed

Draft Engineering Report for Groundwater Treatment System, Crossley Farm Superfund Site, OU2, Hereford Township, Berks County, Pennsylvania. CDM Smith. December 19, 2013.

Draft Hydrogeological Report, Crossley Farm Superfund Site, OU2, Berks County, Pennsylvania. CDM Smith. May 31, 2013.

Explanation of Significant Differences for OU1. Crossley Farm Superfund Site, Hereford Township, Berks County, Pennsylvania. August 17, 2006.

Explanation of Significant Differences for OU2. Crossley Farm Superfund Site, Berks County, Pennsylvania. July 26, 2004.

Record of Decision Amendment. Operable Unit 2 – Groundwater. Crossley Farm Superfund Site, Hereford and Washington Townships, Berks County, Pennsylvania. July 2008.

Record of Decision for OU1 Interim Action Crossley Farm Superfund Site, Huff's Church, Berks County, Pennsylvania. June 30, 1997.

Record of Decision for OU2 Interim Action Crossley Farm Superfund Site, Huff's Church, Berks County, Pennsylvania. September 28, 2001.

Record of Decision for OU3 Interim Action Crossley Farm Superfund Site, Huff's Church, Berks County, Pennsylvania. September 2012.

Regional Hydrogeologic Investigation. Town of Hereford Site, Berks County, Pennsylvania. August 15, 1988.

Remedial Investigation for Operable Unit 3 (Vapor Intrusion). Crossley Farm Site, Hereford Township, Berks County, Pennsylvania. May 2012.

Remedial Investigation Report for Crossley Farm Site. Hereford Township, Berks County, Pennsylvania. Volume 1-3. Tetra Tech NUS, Inc. July 2001.

Second Five-Year Review Report. Crossley Farm Superfund Site, Hereford Township, Berks County, Pennsylvania. September 2009.

Sub-Slab Vapor Intrusion and Indoor Air Investigation Report for Crossley Farm Site, Hereford Township, Berks County, Pennsylvania. Tetra Tech NUS, Inc. August 2006.

Appendix B: Site Inspection Checklist

FIVE-YEAR REVIEW SITE INSPECTION CHECKLIST	
I. SITE INFORMATION	
Site name: Crossley Farm	**Date of inspection: 2/19/2014**
Location and Region: Hereford Township, PA/Region 3	**EPA ID: PAD981740061**
Agency, office, or company leading the five-year review: Region 3	**Weather/temperature: rainy 30s**
Remedy Includes: (Check all that apply) ☐ Landfill cover/containment ☐ Access controls ☒ Institutional controls ☒ Groundwater pump and treatment ☐ Surface water collection and treatment ☒ Other Domestic well filtration and vapor intrusion mitigation	☐ 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 OU1** Kevin Kilmartin (Name) ____ (Title) (Date) Interviewed ☐ at site ☐ at office ☐ by phone Phone no. ____ Problems, suggestions; ☐ Report attached	
2. **O&M OU2** James Romig (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 PADEP
Contact Larry Smith _____ 02/28/2014 _____
Name Title Date Phone No.
Problems; suggestions; ☐

Agency _____
Contact _____Name _____ _____ _____
Title Date Phone No.
Problems; suggestions; ☐ Report attached _____

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone No.
Problems; suggestions; ☐ Report attached _____

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone No.
Problems; suggestions; ☐ Report attached _____

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone No.
Problems; suggestions; ☐ Report attached _____

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

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: OU3 does not yet have O&M plans.

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: Effluent discharge permit is equivalent to an NPDES.			
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
	☒ EPA contractor	

2. **O&M Cost Records**

☒ Readily available ☒ Up to date

☐ Funding mechanism/agreement in place ☐ Unavailable

Original O&M cost estimate _____ ☐ Breakdown attached

Total annual cost by year for review period if available

From 10/01/2013	To 03/30/2014	$445,442.00	☐ Breakdown attached
Date	Date	Total cost	
From 04/012014	To 09/30/2014	$397,195.00	☐ Breakdown attached
Date	Date	Total cost	

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

Describe costs and reasons: _____

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

A. Fencing

1. **Fencing damaged** ☐ Location shown on site map ☐ Gates secured ☒ N/A

Remarks: _____

B. Other Access Restrictions

1. **Signs and other security measures** ☐ Location shown on site map ☒ N/A

Remarks: _____

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

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

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

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

Frequency _____

Responsible party/agency _____

Contact _____ _____ mm/dd/yyyy _____

Name Title Date Phone no.

Reporting is up-to-date ☐ Yes ☐ No ☒ N/A

Reports are verified by the lead agency ☐ Yes ☐ No ☒ N/A

Specific requirements in deed or decision documents have been met ☐ Yes ☒ No ☐ N/A

Violations have been reported ☐ Yes ☒ No ☐ N/A

Other problems or suggestions: ☐ Report attached

2. **Adequacy** ☐ ICs are adequate ☒ ICs are inadequate ☐ N/A

Additional institutional controls are necessary to protect the extraction well system, the infiltration gallery, and the discharge systems to the Perkiomen Creek; and for residential areas near the Crossley Farm property

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. 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: EW 15 was down during the site inspection. While it is running, it causes a neighbor's well to go dry. After a new, deeper well is driven for the neighbor, EW 15 will be turned back on.

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) _____

☐ Others _____

☒ Good condition ☐ Needs Maintenance

☒ Sampling ports properly marked and functional

☒ Sampling/maintenance log displayed and up to date

☒ Equipment properly identified

☐ Quantity of groundwater treated annually _____

☐ Quantity of surface water treated annually _____

Remarks: _____

2. **Electrical Enclosures and Panels** (properly rated and functional)

☐ N/A ☒ Good condition ☐ Needs Maintenance

Remarks: _____

3. **Tanks, Vaults, Storage Vessels**

☐ N/A ☒ Good condition ☒ Proper secondary containment ☐ Needs Maintenance

Remarks: _____

4. **Discharge Structure and Appurtenances**

☐ N/A ☒ Good condition ☐ Needs Maintenance

Remarks: _____

5. **Treatment Building(s)**

☐ N/A ☒ Good condition (esp. roof and doorways) ☐ Needs repair

☒ Chemicals and equipment properly stored

Remarks: _____

6. **Monitoring Wells** (pump and treatment remedy)

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☒ Good condition

☐ All required wells located ☐ Needs Maintenance ☐ N/A

Remarks: _____

D. Monitoring Data

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

E. 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:

VIII. OTHER REMEDIES

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

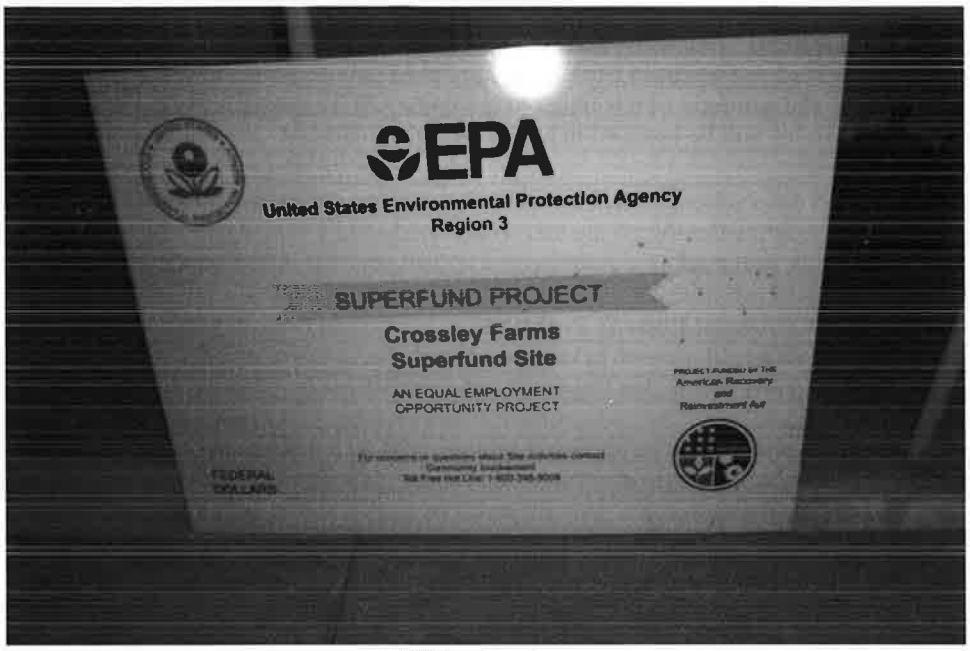
IX. OVERALL OBSERVATIONS

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.). OU1 systems are working effectively and monitored by PADEP. The OU2 pump-and-treat system went online in October 2012 and has been working at around 65 gallons per minute. EW 15 will be added back to the system once the domestic well is replaced (pumping EW 15 caused a domestic well to go dry). OU3 vapor intrusion systems will be installed in homes by August 2014.
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. OU1 residential wells with treatment systems are sampled annually. Other residential wells are sampled every other year. O&M activities for OU2 and OU3 have not yet started.
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. Institutional controls will need to be implemented to restrict well placement, require vapor intrusion systems on new construction where necessary, and restrict inappropriate land uses on the Site.
D.	**Opportunities for Optimization**
	Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy. An O&M Plan needs to be established.

Site Inspection Participants:
Mitch Cron, EPA
Roy Schrock, EPA
Larry Smith, PADEP
Jessica Bennett, CDM Smith
James Romig, CDM Smith
Kevin Kilmartin, Tetra Tech
Kirby Webster, Skeo Solutions
Johnny Zimmerman-Ward, Skeo Solutions

Appendix C: Photographs from Site Inspection Visit

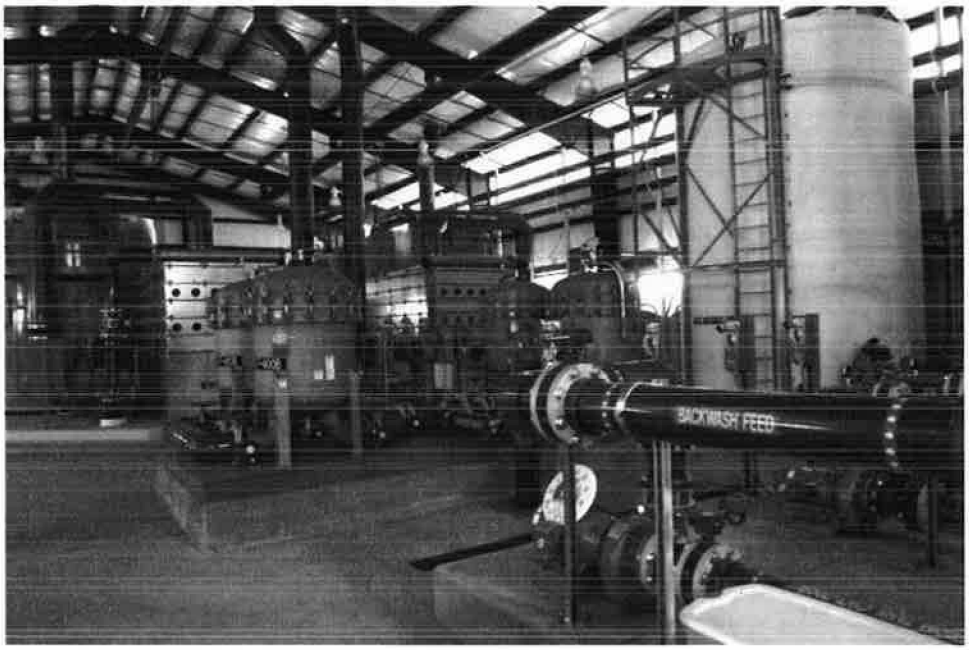


EPA site sign

Site from Huff's Church Road

OU2 pump-and-treat system building

OU2 pump-and-treat system

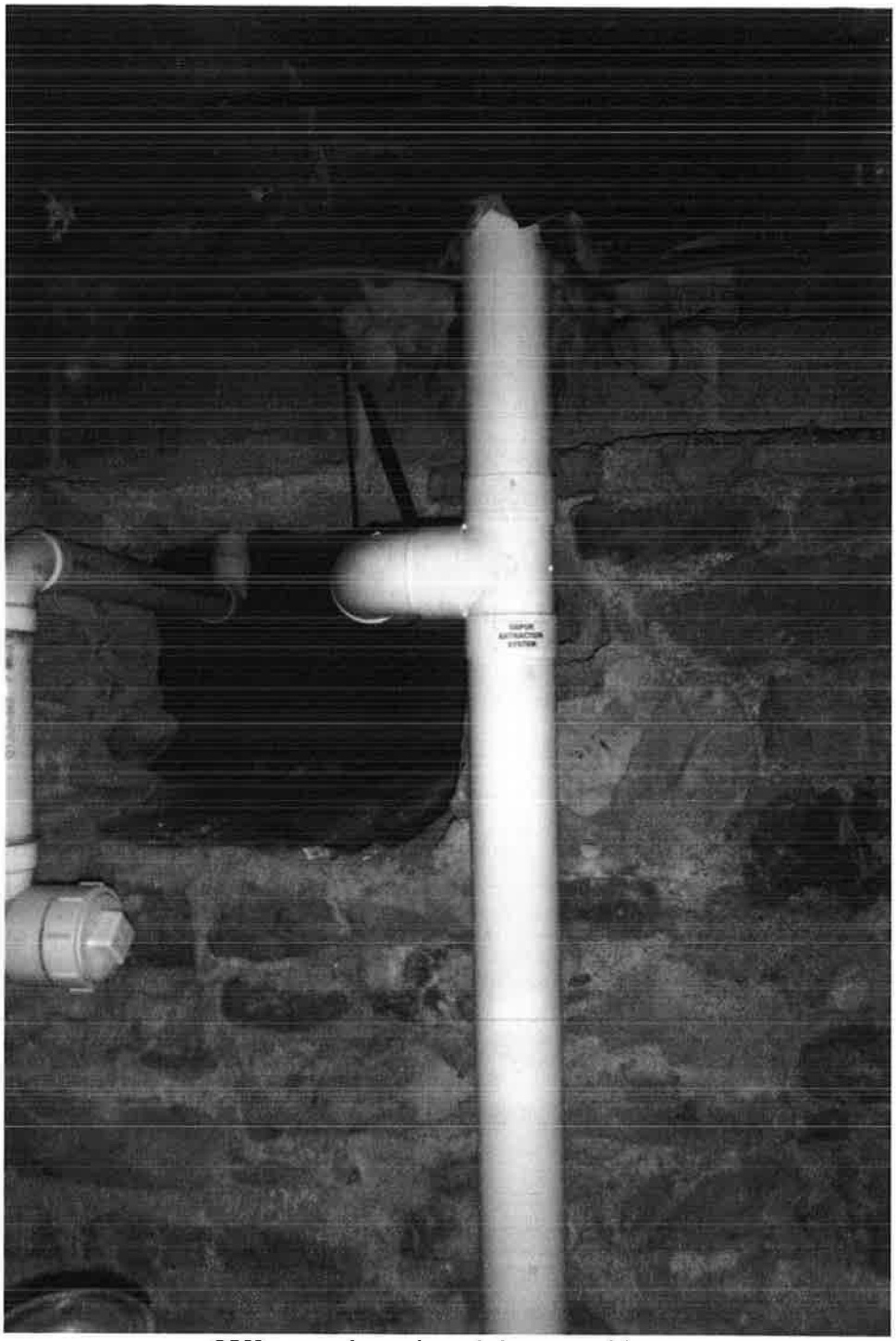


OU2 pump-and-treat system

OU2 pump-and-treat system

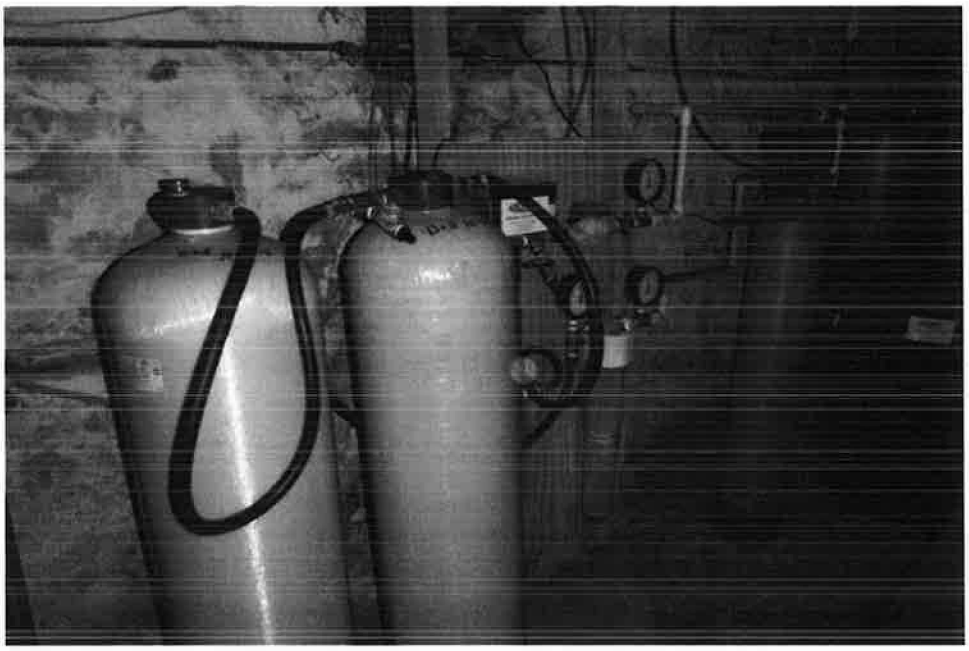
OU2 extraction well 15

Gallery area 1 (discharge area 1) with wetland planting along creek

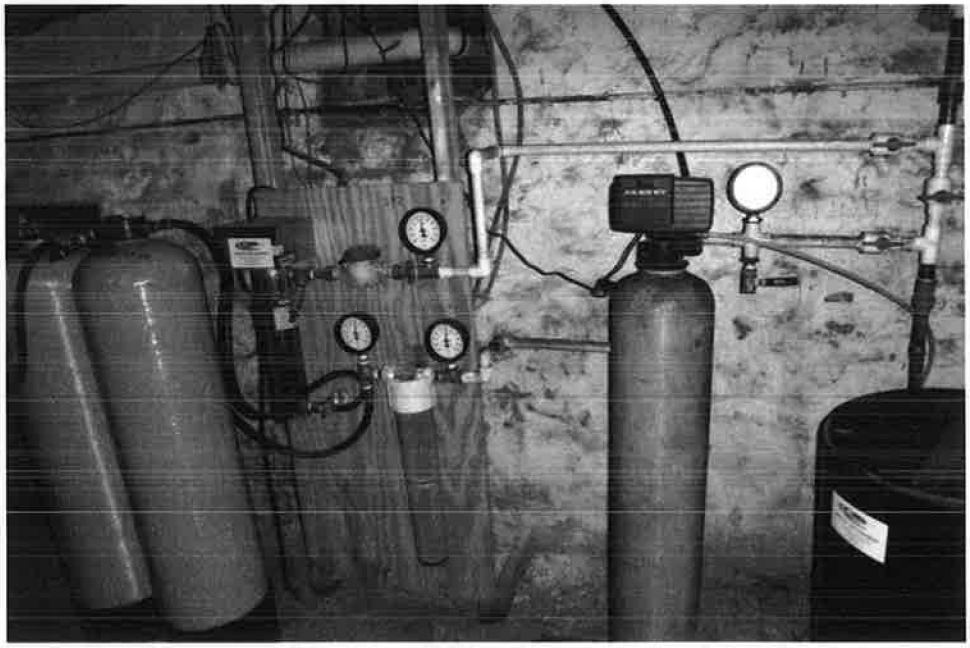


OU3 vapor intrusion piping at residence

OU3 vapor intrusion piping with vacuum gauge



OU1 residence domestic well filtration system



OU1 residence well filtration system and panel

Appendix D: Risk Screening Evaluation of Confirmation Data Collected from the EPIC Pit Area

Table D-1 May 2014 RSLs and Maximum Detections

COMPOUND	EPA RSL residential[a] (mg/kg)	Maximum Detection[b] (mg/kg)
Inorganics		
Aluminum	77,000	31,600
Antimony	31	2.9
Arsenic	0.67	***7.1***[c]
Barium	15,000	127
Beryllium	160	3.1
Cadmium	70	0.89
Calcium	Essential nutrient	1,200
Chromium	120,000[c]	209
Cobalt	23	***128***[c]
Copper	3,100	35.2
Iron	55,000	***79,400***[c]
Lead	400	35.4
Magnesium	Essential nutrient	10,800
Manganese	1,800	***2,050***[c]
Mercury	9.4	ND
Nickel	1,500	29.5
Potassium	Essential nutrient	1,450
Selenium	390	1.9
Silver	390	ND
Sodium	Essential nutrient	199
Thallium	0.78	***4.6***[c]
Vanadium	390	157
Zinc	23,000	143
Cyanide	21	1.4
Organics		
Acetone	6.1E+04	0.1
Methylene Chloride	57	0.007
1,2-Dichloroethene (total)	160	0.35
1,1,2-Trichloroethane	1.10	0.002
TCE	0.94	0.160
PCE	24	0.018
2-Butanone	27,000	0.021
4-Methyl-2-Pentanone	5,300	<0.012
Benzene	1.2	0.001
Xylene	580	0.002
Styrene	6,000	0.003

EPA's May 2014 RSL for soil based on a 1 x 10^{-6} cancer risk or noncancer hazard quotient of 1.0 (http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/index.htm, updated May 2014); the lower of the two values was used.

b. Maximum detections for the organics were converted from µg/mg to mg/kg in order to compare to RSLs.

c. Site's 2001 RI indicated that metals were not co-located with the hotspots of TCE and the even distribution of the metals across the Site suggests they are associated with natural background conditions; the RSL for trivalent chromium (Chromium III) was used since chromium III predominates over hexavalent chromium (chromium VI) under natural conditions chromium.

J = estimated value

U = below detection limit

B = analyte found in associated laboratory blank well as in sample

Blank cell = below detection in all samples

E = concentration exceeds calibration range of instrument

Blank = sample was not analyzed.

Bold italics = concentration exceeds RSL

Table D-2: Confirmation Data Collected from the EPIC Pit Area - Inorganic Results (Page 1 of 2)

COMPOUND	SB-001	SB-001D	SB-002	SB-003	SB-004	SB-005	SB-006	SB-007	SB-008	SB-009	SB-010	SB-011	SB-012
Inorganics (mg/kg)													
Aluminum	23,800	24,000	26,000	31,600	20,100	15,000	15,200	28,400	17,000	22,500	12,800	14,300	19,400
Antimony	2.9	2.6	1.5	1.1 U	1.1 U	1.2	1.7	1.7	1.2 U	1.5	1.0 U	1.5	1.4
Arsenic	4.4	4.4	4.8	4	4.6	2.5	4.3	3.2	6.4	7.1	5.7	3	3.5
Barium	117	114	127	124	103	86.4	43	83.7	51.8	46.2	33.6	68.8	77.8
Beryllium	0.73	0.97	1.1	2	1.3	0.56	0.88	1.3	0.37	0.67	0.65	0.68	1.1
Cadmium	0.51	0.64	0.71	0.22 U	0.22 U	0.21	0.44	0.86	0.89	0.48	0.26	0.38	0.37
Calcium	942	948	1200	804	971	823	527	831	732	947	587	523	781
Chromium	167	209	62.7	84	57.9	40.3	67.2	50.9	42.9	48.4	13.6	54	51.9
Cobalt	74.1	128	31.3	31.9	33.5	29.5	16.3	26.7	9.7	6	4.2	23.1	38.6
Copper	1.2	0.76 U	29.5	28.2	21.6	15.6	8.3	25.7	17.7	29	13.6	18.4	17.6
Iron	35,500	44,800	47,100	49,000	40,100	32,000	40,800	40,900	17,500	41,400	24,500	38,100	48,600
Lead	24.9	35.4	11.1	5	7.7	6.3	4.1	6.2	12.7	9.2	4.7	6	5.5
Magnesium	3,560	4,130	3,230	10,800	3,600	1,660	517	3,410	605	630	552	864	1,320
Manganese	1470	2,050	841	590	730	534	119	435	103	62.2	141	772	1,090
Mercury	0.12 U	0.12 U	0.11 U	0.11 U	0.11 U	0.11 U	0.10 U	0.10 U	0.11 U	0.12 U	0.10 U	0.10 U	0.11 U
Nickel	19.2	19.9	18	29.5	14.6	9.6	4.1	14.8	8.5	8.3	3.7	6.5	8.6
Potassium	726	428	1,090	1,160	831	697	230	1,050	407	605	585	450	486
Selenium	1.3 U	1.3 U	1.1 U	1.1 U	1.1 U	1.0 U	0.99 U	1.0 U	1.2 U	1.3 U	1.0 U	1.0 U	1.1 U
Silver	0.51 U	0.51 U	0.44 U	0.44 U	0.44 U	0.41 U	0.40 U	0.42 U	0.48 U	0.52 U	0.41 U	0.40 U	0.43 U
Sodium	139	137	131	107	111	91.7	76.2	126	199	101	105	96.5	106
Thallium	3.6	4.6	1.4	0.82	0.44 U	0.6	1.2	0.92	0.48 U	1.9	0.41 U	1.2	0.43 U
Vanadium	102	122	93	94.6	87	72.5	88.2	79.6	85.5	129	31.6	91.7	93
Zinc	45.6	52.3	69.1	143	66.6	33.4	26.3	61.4	28.4	30.4	20.6	24.9	33.6
Cyanide	0.25 U	0.25 U	0.22 U	0.22 U	0.22 U	0.21 U	0.20 U	0.21 U	0.24 U	0.26 U	0.21 U	0.21 U	0.21 U

J = estimated value
U = below detection limit
B = analyte found in associated laboratory blank well as in sample
Blank cell = below detection in all samples
E = concentration exceeds calibration range of instrument
Blank = sample was not analyzed.
Bold italics = concentration exceeds RSL

Table D-2: Confirmation Data Collected from the EPIC Pit Area - Inorganic Results (Page 2 of 2)

COMPOUND	SB-013	SB-013-D	SB-014	SB-015	SB-016	SB-017	SB-018	SB-019	SB-020	SB-021	SB-022	SB-023
Inorganics (mg/kg)												
Aluminum	2,2400	27,200	23,700	7,610	11,700	17,200	19,100	20,500	8,940	19,200	16,500	
Antimony	1.0 U	1.9	1.0 U	1.1	1.1	2.1	1.5	2.3	1.7	1.9	1.9	
Arsenic	4.8	5.5	2.6	3.2	3.2	3.3	4.1	5.2	3.9	3.7	4.2	
Barium	83.2	85.1	91.5	22.6	34.0	71.6	79.5	68.8	30.4	115	105	
Beryllium	2.9	3.1	0.91	0.20 U	0.65	1.2	1.3	0.9	0.22 U	1.5	1.3	
Cadmium	0.51	0.65	0.26	0.20 U	0.20 U	0.22 U	0.49	0.24 U	0.22 U	0.39	0.46	
Calcium	934	940	415	448	492	408	545	504	553	287	196	
Chromium	61.5	63.4	34.5	14.7	24.1	61.5	63.9	105	16.9	48.9	59.2	
Cobalt	63.5	54.6	8	8.3	12.1	41.7	18.1	25.2	2.9	46.9	41.4	
Copper	20.8	21.3	24	12.6	13.4	35.0	35.2	24.8	11.2	33.1	33.3	
Iron	72,000	79,400	31,500	4,460	28,000	53,100	58,100	53,500	2,290	43,700	48,700	
Lead	11.2	11.9	2.5	3.9	5.6	7.6	6	8.4	5.4	6	5	
Magnesium	1430	1530	3850	256	717	744	1350	1090	300	1370	1140	
Manganese	635	606	171	150	215	390	213	563	28.3	403	923	
Mercury	0.10 U	0.10 U	0.11 U	0.10 U	0.10 U	0.11 U	0.10 U	0.12 U	0.11 U	0.10 U	0.10 U	
Nickel	7.1	8.6	9.0	4.1	4.5	8.2	11	6.5	4.4	11.8	10.5	
Potassium	429	465	1450	192	923	531	979	681	143	1020	964	
Selenium	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.9	1.0 U	1.5	1.1 U	1.0 U	1.0 U	
Silver	0.41 U	0.40 U	0.42 U	0.40 U	0.41 U	0.44 U	0.41 U	0.49 U	0.44 U	0.40 U	0.40 U	
Sodium	86.7	100	101	119	91.0	89.7	87.9	103	89.6	80.1	82.6	
Thallium	0.41 U	0.54	0.77	0.40 U	0.93	1.2	1.8	0.84	1.4	1.7	2	
Vanadium	152	157	47.6	34.8	47.5	110	131	126	38.2	88.1	102	
Zinc	58.1	65	46.2	12.7	17.3	31.7	44.1	37.7	11.2	49.6	40.5	
Cyanide	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	1.4	0.21 U	0.24 U	0.22 U	0.51	0.21 U	

J = estimated value
U = below detection limit
B = analyte found in associated laboratory blank well as in sample
Blank cell = below detection in all samples
E = concentration exceeds calibration range of instrument
Blank = sample was not analyzed.
Bold italics = concentration exceeds RSL

Table D-3: Confirmation Data Collected from the EPIC Pit Area - Organic Results

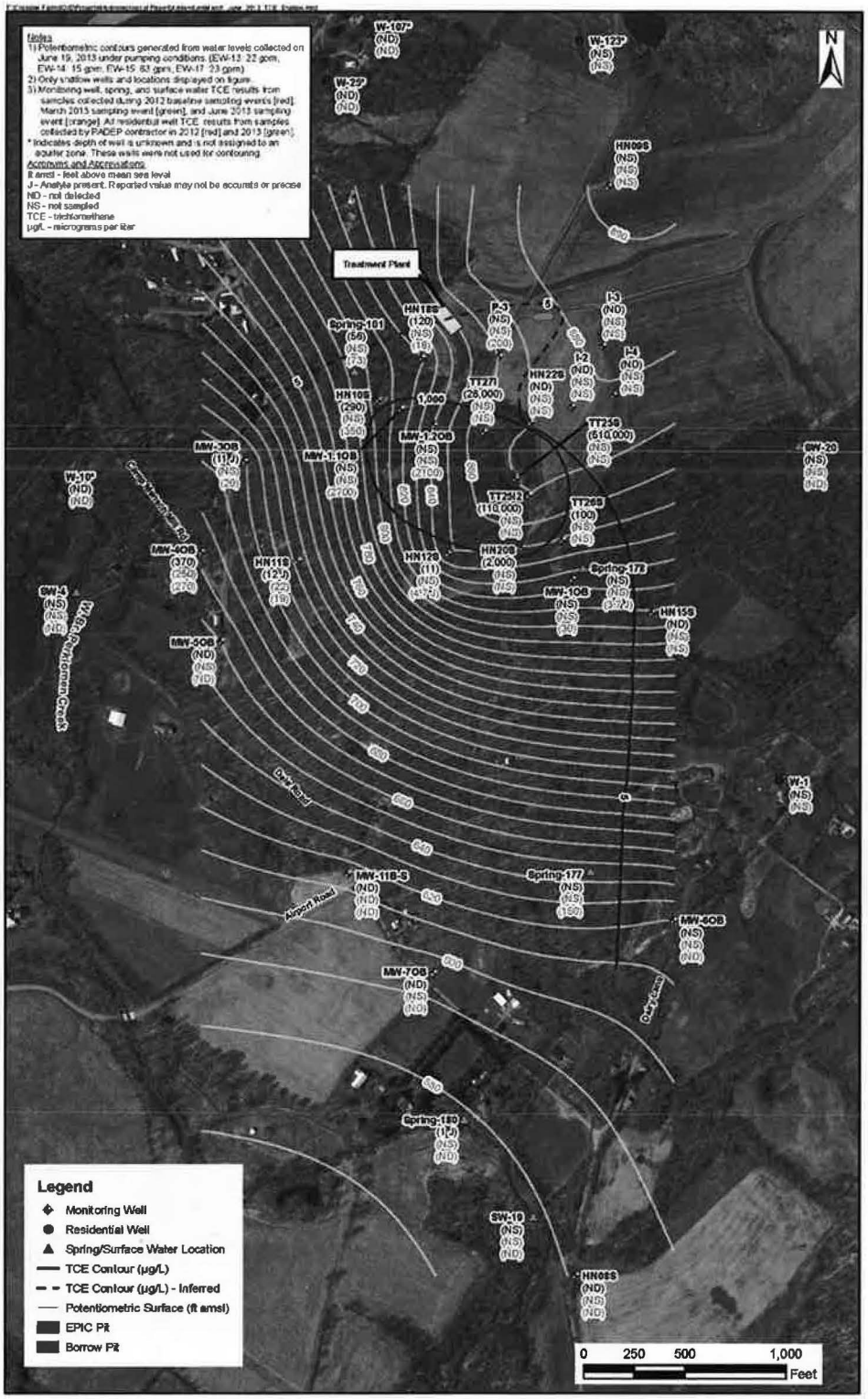
COMPOUND	SB-001	SB-001D	SB-002	SB-003	SB-004	SB-005	SB-006	SB-007	SB-008	SB-009	SB-010	SB-011	SB-012
Organics (µg/kg)													
Acetone	6 BJ	7 BJ	6 BJ	6 BJ	5 BJ	5 BJ	5 BJ	6 BJ	5 BJ	10 BJ	100 B	9 BJ	6 BJ
Methylene Chloride	<14U	2 J	<13U	<12U	<11U	<12U	<12U	<12U	1 J		7 J	1 J	<12U
1,2-Dichloroethene (total)	<14U	<14U	<13U	<12U	<11U	<12U	1 J	78	84	9 J	350 E	2 J	<12U
1,1,2-Trichloroethane	<14U	<14U	<13U	<12U	<11U	<12U	<12U	<12U	<11U	<12U	2 J	<12U	<12U
Trichloroethene	<14U	<14U	2 J	2 J	8 J	4 J	<12U	39	160	<12U	78	<12U	<12U
Tetrachloroethene	<14U	<14U	<13U	<12U	<11U	<12U	<12U	7 J	18	<12U	5 J	<12U	<12U
2-Butanone	<14U	<14U	<13U	<12U	<11U	<12U	<12U	<12U	<11U	<12U	21 B	<12U	<12U
4-Methyl-2-Pentanone	<14U	<14U	<13U	<12U	<11U	<12U	<12U	<12U	<11U	<12U	<12U	<12U	<12U
Benzene	<14U	<14U	<13U	<12U	<11U	<12U	<12U	<12U	<11U	<12U	<12U	<12U	<12U
Xylene	<14U	<14U	<13U	<12U	<11U	<12U	<12U	<12U	<11U	<12U	<12U	<12U	<12U
Styrene	<14U	<14U	<13U	<12U	<11U	<12U	<12U	<12U	<11U	3 J	<12U	<12U	<12U

COMPOUND	SB-013	SB-013-D	SB-014	SB-015	SB-016	SB-017	SB-018	SB-019	SB-020	SB-021	SB-022	SB-023
Organics (µg/kg)												
Acetone	8 BJ	6 BJ	7 BJ	9 BJ	6 BJ	4 BJ	8 JB	10 BJ	15 B	7 JB	10 JB	8 JB
Methylene Chloride	<14U	3 BJ	3 BJ	2 BJ	3 BJ	2 BJ	3 JB	3 BJ	2 JB	2 JB	3 JB	2 JB
1,2-Dichloroethene (total)	<14U	<14U	<12U	6 J	<12U	<12U	<13U	<13U	6 J	<12U	<12U	<12U
1,1,2-Trichloroethane	<14U	<14U	<12U	<12U	<12U	<12U	<13U	<13U	<12U	<12U	<12U	<12U
Trichloroethene	<14U	<14U	<12U	<12U	<12U	<12U	36	<13U	73	3 J	8 J	<12U
Tetrachloroethene	<14U	<14U	<12U	<12U	<12U	<12U	7 J	<13U	<12U	<12U	<12U	<12U
2-Butanone	<14U	<14U	<12U	<12U	<12U	<12U	<13U	<13U	<12U	<12U	<12U	<12U
4-Methyl-2-Pentanone	<14U	<14U	<12U	<12U	<12U	<12U	<13U	<13U	<12U	<12U	<12U	<12U
Benzene	<14U	<14U	<12U	<12U	<12U	<12U	1 J	<13U	<12U	<12U	<12U	<12U
Xylene	<14U	<14U	<12U	<12U	<12U	<12U	<13U	<13U	<12U	<12U	2 J	<12U
Styrene	<14U	<14U	<12U	<12U	<12U	<12U	<13U	<13U	<12U	<12U	<12U	<12U

J = estimated value
U = below detection limit
B = analyte found in associated laboratory blank well as in sample
Blank cell = below detection in all samples
E = concentration exceeds calibration range of instrument
Blank = sample was not analyzed.
Bold italics = concentration exceeds RSL

Appendix E: Ground Water Sampling Maps

Larger versions of these maps are available in CDM Smith's Draft Hydrogeological Report, Crossley Farm Superfund Site, OU2, Berks County, Pennsylvania, May 31, 2013.

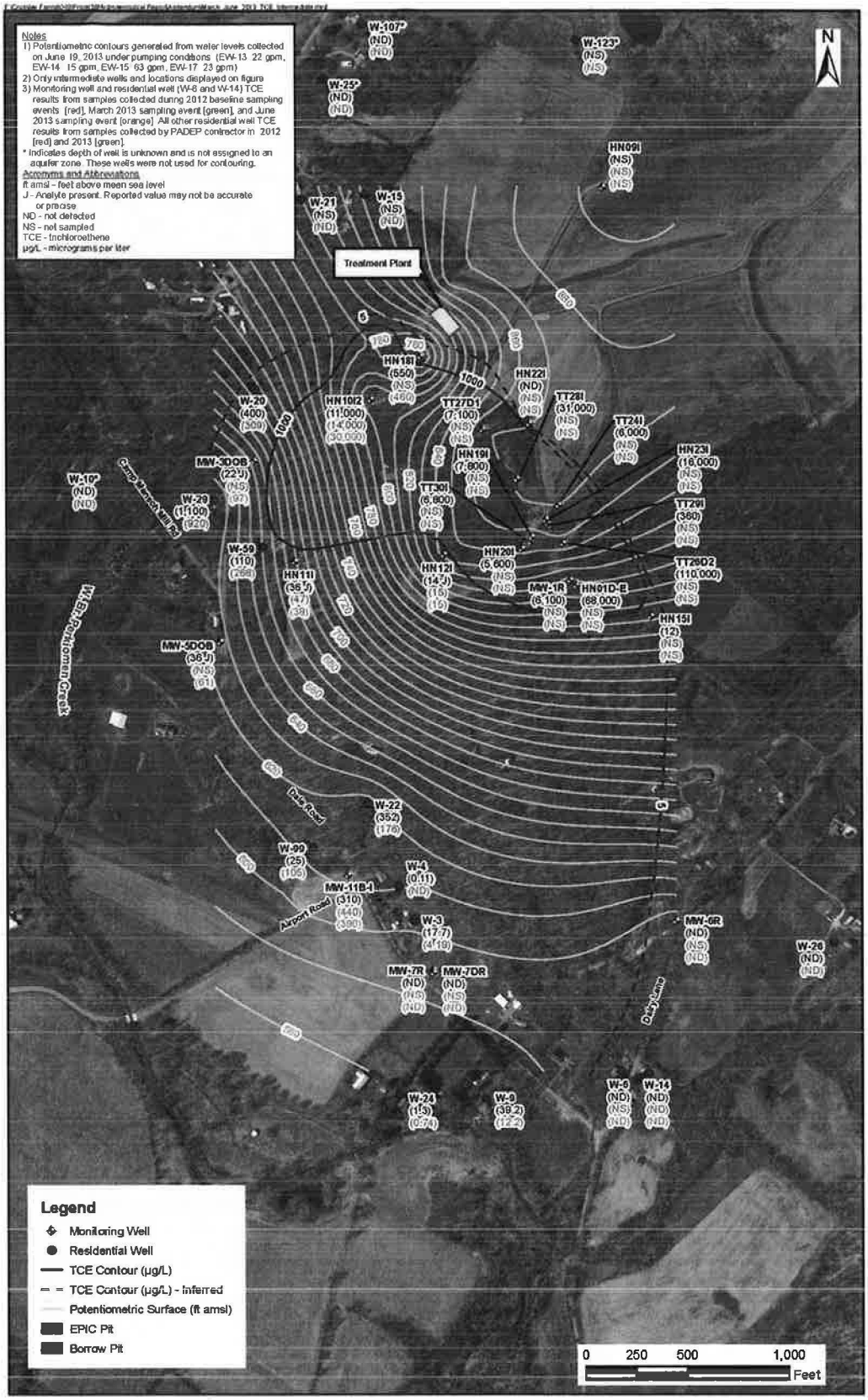


CDM Smith

Crossley Farm Superfund Site
Berks County, Pennsylvania

DRAFT

Figure 1
2012 - 2013 TCE Results
Shallow Zone

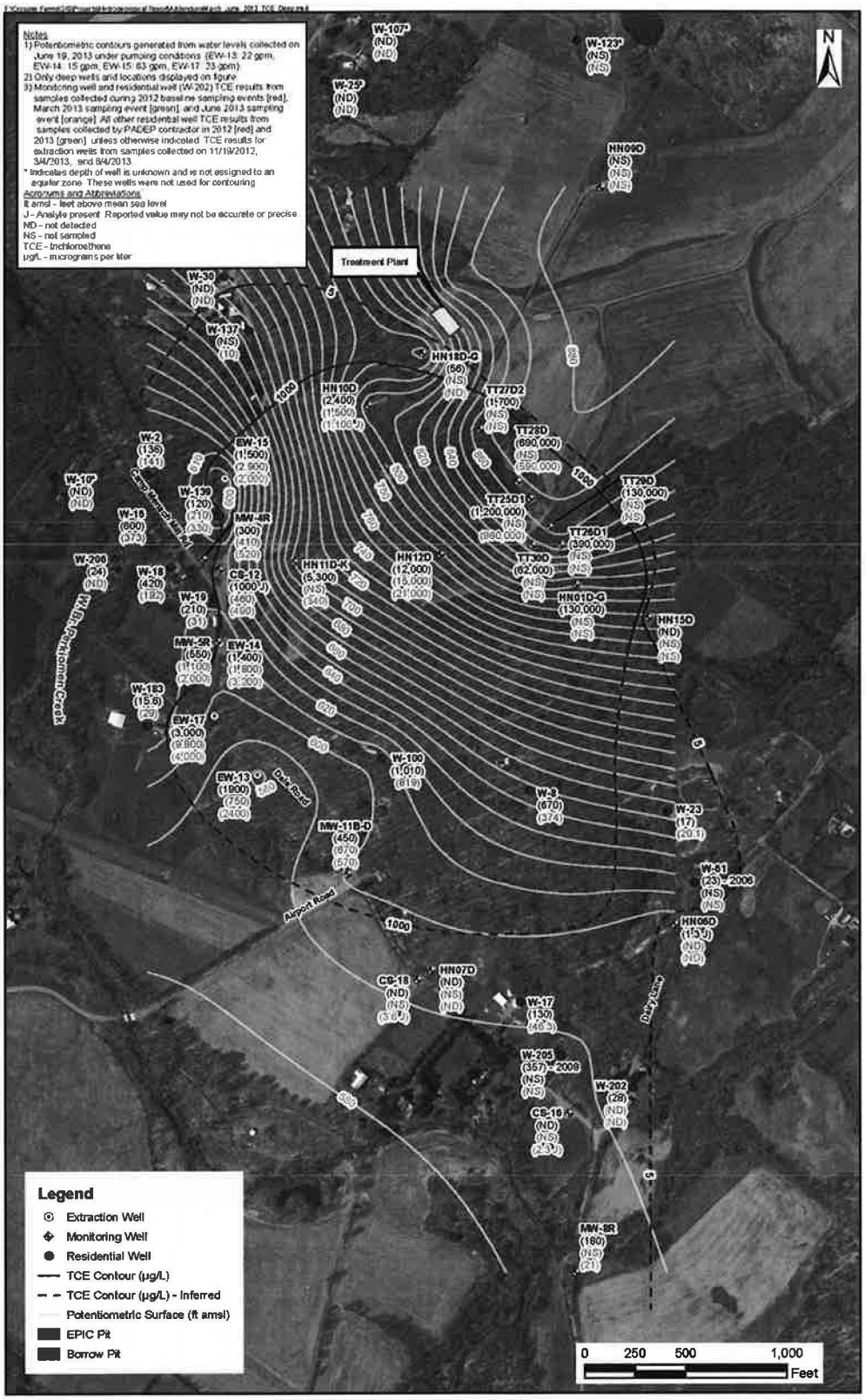


CDM Smith

Crossley Farm Superfund Site
Berks County, Pennsylvania

DRAFT

Figure 2
2012 - 2013 TCE Results
Intermediate Zone



CDM Smith

Crossley Farm Superfund Site
Berks County, Pennsylvania

DRAFT

Figure 3
2012 - 2013 TCE Results
Deep Zone

Appendix F: Table F-1 Ground Water Sampling Data (µg/L)

Analyte	EW-12-RA-00	MW-11B-I-RA-00	MW-5R-RA-00	MW-11B-D-RA-00	MW-4OB-RA-00	HN10DA-RA-00	HN10D-RA-00	MW-4R-RA-00
	7/30/2012	8/1/2012	8/1/2012	8/1/2012	8/2/2012	8/2/2012	8/2/2012	8/2/2012
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachlorcethane	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	0.32 J	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone (Mek)	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-Pentanone (Mibk)	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide	ND	0.24 J	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND	ND	ND	ND	ND
Cis-1,2-Dichloroethene	26 J	0.47 J	27	2 J	1.4 J	34	35	5.1
Cyclohexane	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND
Isopropylbenzene	ND	ND	ND	ND	ND	ND	ND	ND
M,P-Xylene (Sum Of Isomers)	ND	ND	ND	ND	ND	ND	ND	ND
Methyl Acetate	ND	ND	ND	ND	ND	ND	ND	ND
Methyl Tert-Butyl Ether	ND	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride	ND	ND	ND	ND	ND	ND	ND	ND
O-Xylene	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	20 J	4.5 J	13	6	4.9 J	7.1 J	10	2.1 J
Toluene	ND	ND	ND	ND	ND	ND	ND	ND
Trans-1,2-Dichloroethene	2.2 J	ND	ND	ND	ND	0.5 J	0.7 J	0.27 J
Trichloroethene	1000 J	310	550	450	370	2500	2400	300
Trichlorofluoromethane	14 J	2 J	8.2	2.4 J	3.1 J	0.88 J	1.2 J	2.4 J
Vinyl Chloride	0.32 J	ND	ND	ND	ND	0.64 J	0.76 J	ND

Notes:
N - Normal field sample ND - Analyte not detected
FD - Field duplicate sample J - Estimated value

Analyte	HN10I1-RA-00	HN12D-RA-00	W-139-RA-00	HN10I2A-RA-00	HN10I2-RA-00	EW-12P-RA-00	EW-06-RA-00	EW-06A-RA-00
	8/2/2012	8/2/2012	8/2/2012	8/2/2012	8/2/2012	8/17/2012	9/12/2012	9/12/2012
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	2.3 J	ND	ND	ND	ND	1.7 J	ND
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone (Mek)	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-Pentanone (Mibk)	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide	ND	ND	1.2 J	ND	ND	ND	ND	ND
Carbon Tetrachloride	0.95 J	3.9 J	ND	2.9 J	3.1 J	ND	2.4 J	ND
Chlorobenzene	ND	ND	ND	ND	ND	ND	0.73 J	ND
Chloroform	ND	ND	ND	ND	ND	ND	ND	ND
Cis-1,2-Dichloroethene	1.7 J	15 J	30	29 J	27 J	29	100	ND
Cyclohexane	ND	ND	ND	ND	ND	0.74 J	ND	ND
Dichlorodifluoromethane	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND
Isopropylbenzene	ND	ND	ND	ND	ND	ND	ND	ND
M,P-Xylene (Sum Of Isomers)	ND	ND	0.67 J	ND	ND	ND	ND	ND
Methyl Acetate	ND	ND	ND	ND	ND	ND	ND	ND
Methyl Tert-Butyl Ether	ND	ND	0.5 J	ND	ND	ND	ND	ND
Methylene Chloride	ND	ND	ND	ND	ND	ND	ND	ND
O-Xylene	ND	ND	0.51 J	ND	ND	ND	ND	ND
Tetrachloroethene	38	440	2.3 J	120	130	9.4	3100 J	3100 J
Toluene	ND	ND	ND	ND	ND	ND	ND	ND
Trans-1,2-Dichloroethene	ND	ND	0.87 J	ND	2.3 J	0.2 J	1.6 J	ND
Trichloroethene	2100	12000	120	11000	11000	930	62000	63000
Trichlorofluoromethane	31	210	ND	110	110	9.9	130	830 J
Vinyl Chloride	ND	ND	0.32 J	ND	ND	0.3 J	ND	ND

Notes:
N - Normal field sample ND - Analyte not detected
FD - Field duplicate sample J - Estimated value

Analyte	HN18D-E-RA-00	HN11D-K-RA-00	HN11D-J-RA-00	HN11D-H-RA-00	HN11D-G-RA-00	HN11D-F-RA-00	HN11D-E-RA-00	HN01D-G-RA-00
	9/12/2012	9/12/2012	9/12/2012	9/12/2012	9/12/2012	9/12/2012	9/12/2012	9/13/2012
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	0.89 J	ND	ND	ND	ND	ND	2.6 J
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	ND	0.59 J	ND	ND	ND	ND	ND	0.7 J
2-Butanone (Mek)	2.2 J	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-Pentanone (Mibk)	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	ND	ND	ND	ND	ND	ND	3.7 J	ND
Benzene	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide	1.3 J	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	ND	ND	ND	ND	ND	ND	ND	5
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	0.97 J
Chloroform	ND	1 J	ND	ND	ND	ND	ND	2.7 J
Cis-1,2-Dichloroethene	92	14	ND	ND	ND	ND	ND	11
Cyclohexane	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND
Isopropylbenzene	ND	ND	ND	ND	ND	ND	ND	ND
M,P-Xylene (Sum Of Isomers)	ND	ND	ND	ND	ND	ND	ND	ND
Methyl Acetate	ND	ND	ND	ND	ND	ND	ND	ND
Methyl Tert-Butyl Ether	ND	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride	ND	ND	ND	ND	ND	ND	ND	ND
O-Xylene	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	4.4 J	53	5.9 J	5.2 J	4.5 J	5.1 J	4.2 J	4800 J
Toluene	ND	ND	ND	ND	ND	ND	ND	ND
Trans-1,2-Dichloroethene	1.1 J	0.79 J	ND	ND	ND	ND	ND	1.4 J
Trichloroethene	260	5300	320	340	270	340	1200	130000
Trichlorofluoromethane	ND	31	ND	3.3 J	2.4 J	2.9 J	1.9 J	200
Vinyl Chloride	ND	ND	ND	ND	ND	ND	ND	ND

Notes:
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ND - Analyte not detected
J - Estimated value

Analyte	HN01D-F-RA-00	HN01D-E-RA-00	HN01DA-E-RA-00	MW-8R-RA-00	HN18I-RA-00	HN18S-RA-00	TT26S-RA-00	TT27S-RA-00
	9/13/2012	9/13/2012	9/13/2012	9/14/2012	9/14/2012	9/14/2012	9/17/2012	9/17/2012
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	2.4 J	ND	2.2 J	ND	ND	ND	ND	ND
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	0.61 J	ND	0.58 J	ND	ND	ND	ND	ND
2-Butanone (Mek)	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-Pentanone (Mibk)	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	3.7 J	ND	ND	ND	ND	ND	ND	ND
Benzene	ND	ND	0.54 J	ND	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	2.9 J	ND	3.2 J	ND	ND	ND	ND	0.43 J
Chlorobenzene	0.77 J	ND	0.35 J	ND	ND	ND	ND	ND
Chloroform	2.7 J	ND	2.6 J	ND	ND	ND	ND	ND
Cis-1,2-Dichloroethene	12	ND	17	0.89 J	31	5.9	5.6	ND
Cyclohexane	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND
Isopropylbenzene	ND	ND	ND	ND	ND	ND	ND	ND
M,P-Xylene (Sum Of Isomers)	ND	ND	ND	ND	ND	ND	ND	ND
Methyl Acetate	ND	ND	ND	ND	ND	ND	ND	ND
Methyl Tert-Butyl Ether	ND	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride	ND	ND	ND	ND	ND	ND	ND	ND
O-Xylene	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	3100 J	490 J	2500 J	6.2	11	3 J	5.5	67
Toluene	ND	ND	ND	ND	ND	ND	ND	ND
Trans-1,2-Dichloroethene	1.5 J	ND	1.1 J	ND	0.79 J	ND	ND	ND
Trichloroethene	97000	68000	92000	180	550	120	100	1200 J
Trichlorofluoromethane	160	190 J	140	3.4 J	24	9.9	1.2 J	13
Vinyl Chloride	ND	ND	ND	ND	ND	ND	ND	ND

Notes:
N - Normal field sample ND - Analyte not detected
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Analyte	HN10S-RA-00	TT27D2-RA-00	TT27D2-A-RA-00	TT26D1-RA-00	HN20S-RA-00	HN20S-A-RA-00	HN20I-RA-00	TT25I1-RA-00
	9/17/2012	9/17/2012	9/17/2012	9/18/2012	9/18/2012	9/18/2012	9/18/2012	9/18/2012
1,1,1-Trichloroethane	ND	ND	ND	4.1 J	ND	ND	ND	0.46 J
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND	43	ND	ND	0.46 J	2.1 J
1,1-Dichloroethane	ND	ND	ND	2.1 J	ND	ND	ND	ND
1,1-Dichloroethene	ND	ND	ND	13	ND	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND	0.41 J	ND	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	19	ND	ND	ND	0.4 J
2-Butanone (Mek)	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-Pentanone (Mibk)	ND	ND	ND	24	ND	ND	ND	ND
Acetone	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	ND	ND	ND	0.61 J	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide	ND	ND	ND	1.9 J	ND	ND	ND	ND
Carbon Tetrachloride	ND	ND	ND	67	0.55 J	0.51 J	1.5 J	7.6
Chlorobenzene	ND	ND	ND	14	ND	ND	ND	1.6 J
Chloroform	ND	ND	ND	24	ND	ND	ND	ND
Cis-1,2-Dichloroethene	ND	31	29	320 J	0.77 J	0.74 J	2.2 J	15
Cyclohexane	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	18	ND	ND	ND	ND
Isopropylbenzene	ND	ND	ND	5.8	ND	ND	ND	ND
M,P-Xylene (Sum Of Isomers)	ND	ND	ND	77	ND	ND	ND	ND
Methyl Acetate	ND	ND	ND	ND	ND	ND	ND	ND
Methyl Tert-Butyl Ether	ND	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride	ND	ND	ND	93	ND	ND	ND	ND
O-Xylene	ND	ND	ND	39	ND	ND	ND	ND
Tetrachloroethene	4.1 J	4.5 J	4.2 J	7600 J	150	150	390	4100
Toluene	ND	ND	ND	1800 J	ND	ND	ND	ND
Trans-1,2-Dichloroethene	ND	ND	ND	26	ND	ND	ND	1.3 J
Trichloroethene	290	1700	1700	390000	2000	1900	5600	32000
Trichlorofluoromethane	3.8 J	ND	ND	5200 J	17	19	51	410 J
Vinyl Chloride	ND	ND	ND	5.9	ND	ND	ND	ND

Notes:
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Analyte	HN19I-RA-00	TT27D1-RA-00	TT27D1-A-RA-00	TT26I-RA-00	MW-1R-RA-00	TT24I-RA-00	TT27I-RA-00	TT26D2-RA-00
	9/18/2012	9/19/2012	9/19/2012	9/19/2012	9/19/2012	9/19/2012	9/20/2012	9/20/2012
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	0.52 J	1.3 J	1.3 J	1.4 J	1.2 J	0.56 J	2.8 J	ND
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	0.35 J	ND
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	0.42 J	0.53 J	ND	ND	ND
2-Butanone (Mek)	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-Pentanone (Mibk)	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	ND	ND	ND	0.65 J	ND
Carbon Disulfide	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	2.2 J	1.2 J	1.2 J	7	1.3 J	2 J	9.1	ND
Chlorobenzene	ND	ND	ND	1 J	0.37 J	ND	0.7 J	ND
Chloroform	ND	1.5 J	ND	1.4 J	ND	ND	3 J	ND
Cis-1,2-Dichloroethene	3.2 J	6.6	6.4	7.1	120	1.6 J	8.9	ND
Cyclohexane	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND
Isopropylbenzene	ND	ND	ND	ND	ND	ND	ND	ND
M,P-Xylene (Sum Of Isomers)	ND	ND	ND	ND	ND	ND	ND	ND
Methyl Acetate	ND	ND	ND	ND	4.8 J	ND	ND	ND
Methyl Tert-Butyl Ether	ND	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride	ND	ND	ND	ND	ND	ND	ND	ND
O-Xylene	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	630	31	30	1200	230 J	350	470 J	ND
Toluene	ND	ND	ND	ND	ND	ND	ND	ND
Trans-1,2-Dichloroethene	ND	0.91 J	0.59 J	0.88 J	0.66 J	ND	1.9 J	ND
Trichloroethene	7800	7100	7200	20000	6100	6000	26000	110000
Trichlorofluoromethane	81	82	81	340 J	79	72	420 J	1700 J
Vinyl Chloride	ND	ND	ND	ND	ND	ND	ND	ND

Notes:
N - Normal field sample
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ND - Analyte not detected
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Analyte	TT26D2-A-RA-00	HN23I-RA-00	TT25I2-RA-00	TT25D2-RA-00	TT25S-RA-00	TT25D1-RA-00	EW-03-110-RA-00	EW-03-130-RA-00
	9/20/2012	9/20/2012	9/20/2012	9/20/2012	9/20/2012	9/20/2012	9/25/2012	9/25/2012
1,1,1-Trichloroethane	ND	ND	1.5 J	2.5 J	ND	19	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	1.9 J	ND	ND
1,1,2-Trichloroethane	ND	1.1 J	6.4	18	ND	150	ND	ND
1,1-Dichloroethane	ND	ND	0.42 J	0.5 J	ND	9.1	ND	ND
1,1-Dichloroethene	ND	ND	3.7 J	6.9	ND	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND	ND	ND	1.2 J	ND	ND
1,2-Dichloroethane	ND	ND	2 J	5.2	ND	57	ND	ND
2-Butanone (Mek)	ND	ND	1.9 J	2.1 J	ND	ND	ND	ND
4-Methyl-2-Pentanone (Mibk)	ND	ND	ND	ND	ND	120	ND	ND
Acetone	ND	ND	ND	ND	ND	27	ND	ND
Benzene	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	ND	ND	4.7 J	ND	ND
Carbon Disulfide	ND	ND	ND	0.58 J	ND	10	ND	ND
Carbon Tetrachloride	ND	6.7	17	45	ND	260 J	ND	ND
Chlorobenzene	ND	0.91 J	7.7	14	ND	39	ND	ND
Chloroform	ND	ND	5.5	9.5	ND	83	ND	ND
Cis-1,2-Dichloroethene	ND	4.4 J	26	59	ND	820 J	2.6 J	3 J
Cyclohexane	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	ND	ND	ND	ND	ND	0.77 J	ND	ND
Ethylbenzene	ND	ND	12	26	ND	68	ND	ND
Isopropylbenzene	ND	ND	7	12	ND	18	ND	ND
M,P-Xylene (Sum Of Isomers)	ND	ND	43	110	ND	350 J	ND	ND
Methyl Acetate	ND	ND	ND	ND	ND	ND	ND	ND
Methyl Tert-Butyl Ether	ND	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride	ND	ND	ND	21	ND	31000 J	ND	ND
O-Xylene	ND	0.5 J	23	53	ND	150	ND	ND
Tetrachloroethene	ND	990 J	6300	10000 J	ND	14000 J	13 J	14 J
Toluene	ND	ND	86	210 J	ND	4400 J	ND	ND
Trans-1,2-Dichloroethene	ND	0.88 J	5.6	8.9	ND	110	ND	ND
Trichloroethene	110000	16000	110000	240000	510000	1200000	360	360
Trichlorofluoromethane	1900 J	160	1200 J	2800 J	7800 J	17000 J	5.1 J	5.1 J
Vinyl Chloride	ND	ND	ND	ND	ND	13	ND	ND

Notes:
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Analyte	EW-04-250-A-RA-00	EW-04-250-RA-00	EW-04-277-RA-00	EW-05-107-RA-00	EW-05-127-RA-00	EW-01-48-RA-00	EW-01-60-RA-00	EW-02-302-RA-00
	9/25/2012	9/25/2012	9/25/2012	9/25/2012	9/25/2012	9/26/2012	9/26/2012	9/26/2012
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone (Mek)	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-Pentanone (Mibk)	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND	ND	ND	ND	ND
Cis-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND
Cyclohexane	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND
Isopropylbenzene	ND	ND	ND	ND	ND	ND	ND	ND
M,P-Xylene (Sum Of Isomers)	ND	ND	ND	ND	ND	ND	ND	ND
Methyl Acetate	ND	ND	ND	ND	ND	ND	ND	ND
Methyl Tert-Butyl Ether	ND	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride	ND	ND	ND	ND	ND	ND	ND	ND
O-Xylene	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	2700 J	2900 J	2.1 J	210 J	210 J	1800	1500 J	7100 J
Toluene	ND	ND	ND	ND	ND	ND	ND	ND
Trans-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	130000	130000	110	6700	6800	31000	30000	690000
Trichlorofluoromethane	1900 J	2000 J	1.5 J	85 J	88 J	770 J	810 J	11000 J
Vinyl Chloride	ND	ND	ND	ND	ND	ND	ND	ND

Notes:
N - Normal field sample ND - Analyte not detected
FD - Field duplicate sample J - Estimated value

Analyte	EW-06-210-RA-00	EW-06-210-A-RA-00
	9/26/2012	9/26/2012
1,1,1-Trichloroethane	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND
1,1,2-Trichloroethane	ND	ND
1,1-Dichloroethane	ND	ND
1,1-Dichloroethene	ND	ND
1,2-Dichlorobenzene	ND	ND
1,2-Dichloroethane	ND	ND
2-Butanone (Mek)	ND	ND
4-Methyl-2-Pentanone (Mibk)	ND	ND
Acetone	ND	ND
Benzene	ND	ND
Bromodichloromethane	ND	ND
Carbon Disulfide	ND	ND
Carbon Tetrachloride	ND	ND
Chlorobenzene	ND	ND
Chloroform	ND	ND
Cis-1,2-Dichloroethene	94 J	ND
Cyclohexane	ND	ND
Dichlorodifluoromethane	ND	ND
Ethylbenzene	ND	ND
Isopropylbenzene	ND	ND
M,P-Xylene (Sum Of Isomers)	ND	ND
Methyl Acetate	ND	ND
Methyl Tert-Butyl Ether	ND	ND
Methylene Chloride	ND	ND
O-Xylene	ND	ND
Tetrachloroethene	300 J	300 J
Toluene	ND	ND
Trans-1,2-Dichloroethene	ND	ND
Trichloroethene	11000	11000
Trichlorofluoromethane	180 J	ND
Vinyl Chloride	ND	ND

Notes:
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FD - Field duplicate sample
ND - Analyte not detected
J - Estimated value