THIRD FIVE-YEAR REVIEW REPORT

For

Malvern TCE Superfund Site

East Whiteland Township

Chester County, PA

September 2015

PREPARED BY:

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

Approved by: Date:

Cecil Rodrigues, Director 9/25/2015
Hazardous Site Clean-up Division

Table of Contents

Tables

Figures

List of Acronyms

AAI	Active Air Injection
AISB	Accelerated In Situ Bioremediation
AO	Administrative Order
CD	Consent Decree
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
CSDG	Chemclene Site Defense Group
EPA	Environmental Protection Agency
ESD	Explanation of Significant Difference
FDA	Former Disposal Area
FFS	Focused Feasibility Study
MA	Mounded Area
MCL	Maximum Contaminant Level
MCLG	Maximum Contaminant Level Goals
MEC	Methylene Chloride
MPA	Main Plant Area
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
OBG	O'Brien & Gere
OSL	Open Screen Length
OU	Operable Unit
PADEP	Pennsylvania Department of Environmental Protection
PPB	Parts Per Billion
PCE	Perchloroethylene (aka tetrachloroethene)
PDI	Pre-Design Investigation
PRP	Potentially Responsible Party
RA	Remedial Action
RAOs	Remedial Action Objectives
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facilities Investigation
RI	Remedial Investigation
ROD	Record of Decision
RPM	Remedial Project Manager
SCS	Soil Cleanup Standards
SVE	Soil Vapor Extraction
1,1,1TCA	1,1,1 Trichloroethane
TCE	Trichloroethene
UAO	Unilateral Administrative Order
Ug/l	Micrograms per liter
UST	Underground Storage Tank
VOC	Volatile Organic Contaminants

Executive Summary

All portions of the remedy for the Malvern TCE Superfund Site in East Whiteland Township, Chester County, Pennsylvania have been constructed. The trigger for this five year review was the date the second five year review for the Site was signed, September 30, 2010.

The assessment during this five-year review found that the remedies are operating as designed in accordance with the requirements of the Record of Decision (ROD), dated November 1997, the ROD Amendment, signed March 2005 and the Explanation of Significant Difference (ESD), dated July 2009 and the ESD dated February 2012. Immediate threats have been addressed and the Site is protective of human health and the environment in the short term. Institutional controls relating to groundwater under both the Main Plant Area (MPA) and Former Disposal Area/Mounded Area (FDA/MA), as well as soils under the MPA Cap have been put in place in accordance with the 1997 ROD and the July 2006 Consent Decree. Operation and maintenance of the cap and the accelerated in situ bioremediation (AISB) System is on-going, as is long term monitoring of site groundwater in both the FDA/MA and MPA areas to determine when the cleanup goals as set forth in the decision documents are met. Long term protectiveness will be achieved when these groundwater performance standards have been met. This Five Year Review identified several outstanding issues with remedies at the site including that additional monitoring locations are required to the north, south and west of the current MPA well network and in the area of CC-14 in the FDA/MA to clarify the extent of volatile organic contaminants (VOC) contamination and complete the conceptual site model (CSM). Sub surface soil sampling is warranted to better define the extent and concentration of residual VOCs in sub surface soils remaining above the FDA/MA soil clean-up standards and determine if additional remediation is required to achieve FDA/MA GW RAOs. A FFS is recommended to evaluate soil and groundwater alternatives that are more likely to achieve the groundwater performance standard. Three dimensional visualization software is recommended to assist with the evaluation.

The building deconstruction and removal remedy for OU1 was completed in 2000 in accordance with the Site decision documents.

Construction of the OU2 Cap was completed in 2005 and has been functioning as designed with routine operation and maintenance. Construction of the OU2 groundwater remedy (an AISB treatment system) was completed in the July 2010. The AISB system sampling results have been encouraging and the system appears to be functioning as designed and intended by the decision documents. The AISB treatment system has achieved a significant reduction of the total TCE source area mass, however concentrations remain well above performance standards. Additional monitoring location(s) are required in the MPA to clarify the extent of VOC contamination and complete the CSM consistent with EPA's May 2014 Groundwater Remedy Completion Strategy. In late 2009 and early 2010, vapor intrusion (VI) samples were collected from residential dwellings near the MPA portion of the site. The findings indicated that VI was not occurring at these properties.

The OU3 residential water supply remedy was completed in 2001 in accordance with the Site decision documents.

Construction of the OU4 Soil Vapor Extraction (SVE) System soil remedy and the OU4 groundwater remedy (monitored natural attenuation or MNA) were completed in 2005, and these remedies have been functioning as designed with routine operation and maintenance. The SVE system in the FDA/MA was very successful in removing over 11,800 lbs. of VOC mass. Various optimization efforts have been ongoing since 2006 to increase the mass removal of VOCs in areas of the SVE system where some well screens are blinded by lenses of perched groundwater and an increased persistent water table. Based on those efforts, a general consensus has been established that the SVE system has reached the limits of its effectiveness given the current Site conditions in the FDA/MA. The objective of the SVE system was to reduce the VOC mass in subsurface soil to allow for natural attenuation processes to effectively restore FDA/MA groundwater to groundwater performance standards. It does not appear that sufficient VOC mass was removed to meet the groundwater clean-up objectives. Sub surface soil sampling is warranted to better define the extent and concentration of residual VOCs in sub surface soils remaining above the FDA/MA soil clean-up standards and determine if additional remediation is required to achieve FDA/MA GW RAOs. A FFS is recommended to evaluate soil and groundwater alternatives that are more likely to achieve the groundwater performance standard. Three dimensional visualization software is recommended to assist with the evaluation.

TCE concentrations have remained stable in monitoring well CC-14 since the implementation of the remedial action in 2005. OBG on behalf of the CSDG submitted a plan in June 2015, which was subsequently approved by EPA, to install two new wells in the area of CC-14. Sampling of the new wells will be incorporated into the semi-annual sampling plan to assess the location of additional wells in that area of the FDA/MA necessary to complete the CSM.

GPRA Measure Review

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

Environmental Indicators

Human Health: HEUC, Human Exposure Under Control.
Groundwater Migration: GMID, Insufficient Data to Determine Groundwater Migration Control Status

Sitewide RAU: The Site is Site-Wide Ready for Anticipated Use (SWRAU). SWRAU was documented in a September 30, 2010 Memo.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site Name: Malvern TCE Superfund Site		
EPA ID: PAD014353445		
Region: 3	**State:** PA	**City/County:** East Whiteland Twp., Chester County
SITE STATUS		
NPL Status: Final		
Multiple OUs? Yes	**Has the site achieved construction completion?** Yes	
REVIEW STATUS		
Lead agency: EPA **If "Other Federal Agency" was selected above, enter Agency name:**		
Author name (Federal or State Project Manager): Charlie Root		
Author affiliation: EPA, RPM		
Review period: 11/14/2014 – 07/13/2015		
Date of site inspection: May 7, 2015		
Type of review: Statutory		
Review number: 3		
Triggering action date: 09/30/2010		
Due date *(five years after triggering action date)*: 09/30/2015		

Five-Year Review Summary Form (continued)

Issues/Recommendations

OU(s) without Issues/Recommendations Identified in the Five-Year Review:
OUs: 1 - MPA Building Deconstruction and Removal, and 3 - Residential Water Supply

Issues and Recommendations Identified in the Five-Year Review:

OUs: 2	**Issue Category:** Monitoring			
	Issue: The CSM is incomplete, and the extent of the groundwater plume in the MPA has not been fully delineated.			
	Recommendation: Fully delineate plume in MPA plume through installation and monitoring of additional wells.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**
N	Y	PRP	EPA/PADEP	09/30/2016

Issues and Recommendations Identified in the Five-Year Review:

OUs: 4	**Issue Category:** Remedy Performance			
	Issue: FDA/MA soils not completely treated by soil vapor extraction system.			
	Recommendation: Determine if residual VOC contamination in soils will allow MNA to achieve performance standards in a reasonable time frame and prepare an FFS. Three dimensional visualization software is recommended to assist with the evaluation.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**
N	Y	PRP	EPA/PADEP	09/30/2017

Issues and Recommendations Identified in the Five-Year Review:

OUs: 4	**Issue Category:** Monitoring			
	Issue: The CSM is incomplete, and the extent of the groundwater plume in the FDA/MA near CC-14 has not been fully delineated.			
	Recommendation: Delineate plume in FDA/MA in area of well CC-14 through installation and monitoring of additional monitoring wells.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**
N	Y	PRP	EPA/PADEP	03/30/2016

Five-Year Review Summary Form (continued)

Protectiveness Statement(s)

Operable Unit: 1	*Protectiveness Determination:*	*Addendum Due Date (if applicable):*
MPA Building Deconstruction and Removal	Protective	

Protectiveness Statement: The assessment during this five-year review found that the building deconstruction and removal remedy was completed in accordance with the Site decision documents and is protective of human health and the environment.

Operable Unit: 2	*Protectiveness Determination:*	*Addendum Due Date (if applicable):*
Main Plant Area	Short-term Protective	

Protectiveness Statement: The assessment during this five-year review found that the Main Plant Area cap and AISB treatment system remedies are operating as designed in accordance with the Site decision documents and are protective of human health and the environment in the short-term. Long-term protectiveness is expected to be achieved when groundwater performance standards have been met.

Operable Unit: 3	*Protectiveness Determination:*	*Addendum Due Date (if applicable):*
Residential Water Supply	Protective	

Protectiveness Statement: The assessment during this five-year review found that the residential water supply remedy was completed in accordance with the Site decision documents and is protective of human health and the environment.

Operable Unit: 4	*Protectiveness Determination:*	*Addendum Due Date (if applicable):*
Former Disposal Area/Mounded Area	Short-term Protective	

Protectiveness Statement: The assessment during this five-year review found that the Former Disposal Area/Mounded Area SVE System and MNA remedies are operating as designed in accordance with the Site decision documents and are protective of human health and the environment in the short-term. Long-term protectiveness is expected to be achieved when groundwater performance standards have been met.

Five-Year Review Summary Form (continued)

Sitewide Protectiveness Statement	
Protectiveness Determination: **Short-term Protective**	*Addendum Due Date (if applicable):*
Protectiveness Statement: The assessment during this five-year review found that the remedies are operating as designed in accordance with the requirements of the Record of Decision (ROD), dated November 1997, the ROD Amendment, signed March 2005 and the Explanation of Significant Difference (ESD), dated July 2009 and the ESD dated February 2012. The Site is protective of human health and the environment in the short term. Immediate threats have been addressed and the remedies are protective. Long term protectiveness is expected to be achieved when groundwater performance standards have been met throughout the Site.	

Five-Year Review Report
For
Malvern TCE Superfund Site
Malvern Township, Pennsylvania

I. Introduction

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

The Environmental Protection Agency (EPA) is preparing this Five-Year Review report pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). CERCLA § 121(c), as amended, 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 five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.*

The Agency interpreted this requirement further in the NCP; 40 Code of Federal Regulations (CFR) § 300.403(f)(4)(ii) states:

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

EPA conducted the five-year review of the remedial actions implemented at the Malvern TCE Superfund Site in Malvern, Pennsylvania. This review was conducted by the Remedial Project Manager (RPM) for the Site from November 2014 through August 2015. This report documents the results of the review. The trigger for this statutory five year review was the signature date of the second five-year review, September 30, 2010. The five-year review is required because hazardous substances or pollutants and contaminants remain at the Site above levels that allow for unlimited use and unrestricted exposure. The Site consists of four operable units ("OUs"). This five-year review Report addresses all site OUs.

II. Site Chronology

Table 1: Chronology of Site Events

Event	Date
Site operated as a solvent reclamation facility.	1952-1992
Sludge from the distillation process stopped being disposed of in the surrounding woods known as the Former Disposal Area.	1976
Soil and groundwater contamination are detected and affected residential wells placed on carbon filters by Chemclene.	1980
Chemclene takes several measures to clean-up the Site, which was overseen by the Pennsylvania Department of Environmental Protection (PADEP).	1982-1987
The Malvern TCE Site is formally added to National Priorities List.	September 1983
Chemclene signs Corrective Action Order with EPA to continue clean-up.	1987
After Chemclene fails to carry out the agreement established in 1987, the Site was referred to the EPA's Superfund program.	1993
EPA assumes control of carbon filter maintenance activities and periodic sampling after it was determined that Chemclene was not following the proper sampling and change out procedures.	February 1995
RI/FS Field Work complete.	May 30, 1996
ROD is signed.	November 26, 1997
EPA issues Chemclene a Unilateral Administrative Order for Remedial Action to be taken at the Site including, structure removal, tank removal (USTs), and closure of main building.	April 28, 1998
An Administrative Order on Consent for early Remedial Design is issued to Potentially Responsible Parties (PRPs).	June 25, 1999
Remedial Action Work Plan submitted by Chemclene is approved by EPA.	August 6, 1999
Fire occurs at Chemclene facility, which destroys buildings in the MPA. Work Plan activities are delayed.	August 12, 1999
Due to the fire, new circumstances required an amendment to the work plan EPA approves the amendment submitted by Chemclene.	November 1999
35 PRPs sign the Consent Decree to carry out the full clean-up (Chemclene Site Defense Group [CSDG] is formed) .	December 1999
Supplying public water to homes impacted by contaminated groundwater begins with home inspections.	February 2000

Event	Date
RA Report for connection of residents to public water supply accepted by EPA.	May 2001
Pre-Design Investigation completed and report submitted with additional detailed information on the volume and extent of the soil contamination was provided by CSDG, and SVE is proposed in FFS.	May 2002
EPA presents proposal to change the soil remedy for the FDA/MA from soil excavation to SVE.	September 2004
ROD Amendment signed.	March 2005
Construction of MPA Cap and FDA/MA SVE system begins.	May 2005
RA Report for Construction of MPA Cap and FDA/MA SVE system.	March 2006
MPA groundwater AISB Pilot Study conducted.	2003-2009
EPA issues ESD for AISB Treatment in MPA.	July 2009
MPA AISB treatment system construction begins.	Oct. 2009
MPA AISB system begins operation.	March 2010
Preliminary Close-Out Report signed.	July 23, 2010
SVE Active Air Injection Pilot implemented in FDA/MA	June/July 2011
EPA issues ESD to add 1,4 dioxane and vinyl chloride as COCs and cumulative risk performance standard	February 29, 2012
Monitoring well GW-19 installed	June 2013
SVE Pulsed Operation/Closeout Plan implemented in FDA/MA	July thru September 2014
Extraction and injection well rehabilitation in MPA AISB System.	July-August, 2014, and Feb. 2015

III. Background

Physical Characteristics

The Malvern TCE Superfund Site is located in East Whiteland Township, Chester County, Pennsylvania. The Site includes a five acre parcel of land and several adjacent properties under which contaminated groundwater flows from the Site. The five acre parcel is owned by the Chemclene Corporation and is located along the southeast side of Bacton Hill. A Transcontinental natural gas pipeline right-of-way extends along the southern boundary of the Chemclene property, with residential and undeveloped areas bordering the property to the west, north and east (Figure 1).

The Chemclene property consists of a main plant area (MPA) connected to the former disposal area (FDA) by a narrow meadow corridor. The FDA is approximately 1,900 feet southwest of the MPA, and consisted of two unlined earthen pits, approximately 30 feet wide, 50 feet long, and 15 feet deep. A mounded area (MA), approximately 8 feet by 150 feet, used for further disposal, is located on the western edge of the FDA (Figure 2).

Land and Resource Use

The predominant land uses in East Whiteland Township are open space, single-family residences and agriculture. However, agriculture and open space areas have decreased rapidly as the area is being converted to residential and commercial uses. The Chemclene property is currently zoned commercial however, all commercial activities ceased with the beginning of remediation in May 2005. East Whiteland Township owns a parcel of land immediately to the east of the Chemclene MPA, with residential properties and undeveloped land bordering the Site to the north and west. A Transcontinental natural gas pipeline right-of-way extends along the southern boundary of the Chemclene property. The future land use for the Site and surrounding properties is expected to be a mix of open space, commercial and residential.

History of Contamination

Information available to EPA indicates that from 1952 until approximately 1992, Chemclene sold and reclaimed industrial cleaning solvents, including trichloroethene (TCE); 1,1,1-trichloroethane (1,1,1-TCA); perchloroethylene (PCE, also called tetrachloroethene); and methylene chloride (MEC) at the Site. These solvents were used by local industries for degreasing metal parts and other cleaning purposes. Chemclene used a distillation process to remove impurities from the chlorinated solvents and the distilled solvents were then sold, or returned to the customer for reuse. Chemclene conducted its solvent reclamation operations at the MPA. The end products of processing waste solvents are the reclaimed solvents and chlorinated still bottoms. In the past, drums containing the still bottom sludges were buried in the FDA and MA, approximately 1,900 feet southwest of the main plant. For many years, these excavated areas were filled with discarded drums, derelict equipment, assorted rubbish, and excavated soil. This disposal practice reportedly ceased in approximately August 1975. It was secured by an 8-foot high chain link fence.

In the spring of 1980, TCE was detected in groundwater from several wells in the vicinity of the Site. At this time, Chemclene began sampling domestic wells in the immediate vicinity of the Site. Sampling of private domestic wells and on-site monitoring wells by Pennsylvania's Department of Environmental Resources (PADER), now known as the Pennsylvania Department of Environmental Protection (PADEP), and Chemclene, in June 1980 and July 1981, revealed contamination of the underlying aquifer with chlorinated ethenes and related compounds. The Site was listed on the National Priorities List (NPL) in September 1983 after TCE was detected in wells at concentrations up to 12,600 micrograms per liter (ug/l), far exceeding the Maximum Contaminant Level (MCL) of 5.0 ug/l. The contaminated home wells were located south of the FDA, with several located in the Hillbrook Circle residential development (Figure 5).

Initial Response

Beginning in 1980, Chemclene furnished activated carbon filter units to 20 residential wells within the Hillbrook Circle Development and conducted periodic sampling of home wells in accordance with its Domestic Well Management Plan until November 1994.

In addition to the installation of carbon filters, Chemclene conducted removal actions following the detection of soil and groundwater contamination in 1980. Debris and approximately 300 drums were removed from the FDA excavations in a prolonged remedial effort from 1981 to 1984. Soils underlying the FDA were excavated to a depth of 15 feet and transported for disposal at a Resource Conservation and Recovery Act (RCRA) permitted disposal facility.

Four underground storage tanks were removed from the MPA in 1986. Soil samples collected from below the excavation grade of the tanks exhibited highly elevated concentrations of TCE, PCE, and 1,1,1-TCA. In addition, elevated levels of volatile organic contaminants (VOCs) were detected in soil gas samples collected outside the distillation building in the MPA. These contaminant levels are believed to be related to past practices of discharging contaminated condensate from the recycling distillation process directly onto the ground surface.

In 1987, Chemclene as an operating facility, entered into a RCRA Corrective Action Order with the EPA. A RCRA Facilities Investigation (RFI) Work Plan was approved for the Site in 1989. Additional drums were removed from the MA in late 1990. However, in July 1992, Chemclene withdrew its RCRA Part B Application as a treatment, storage, and/or disposal facility, did not fully implement the RFI Work Plan, stopped accepting used solvents for reclamation and halted its distillation process. As a result of Chemclene's failure to complete the RFI and implement interim corrective measures, EPA placed the Site under the Comprehensive Environmental Response and Liability Act (CERCLA) remedial program, in November 1993.

In February 1995, EPA assumed control of maintenance activities of the carbon filter units and periodic sampling of the home wells, after it was determined that Chemclene was not following the procedures outlined in its Domestic Well Management Plan. In August 1995, several of the filter systems were upgraded by EPA in response to analytical results from residential well samples that showed contamination was passing through the existing filters into the water.

A Remedial Investigation of the Site, including the FDA/MA, was completed in January 1997 (1997 RI) and a Feasibility Study in June 1997 (1997 FS). The Proposed Remedial Action Plan (PRAP) for the Site was published in June 1997. The 1997 ROD, presenting the selected remedial action for the Site, was issued in November 1997. The ROD called for: 1) a water supply for residences affected, or potentially affected by the Site; 2) MPA building demolition and tank removal; 3) a low permeability, flexible cap for the MPA soils, 3) extraction and treatment of MPA groundwater, 4) excavation and off Site disposal of FDA/MA soils and 5) monitored natural attenuation for the FDA/MA groundwater.

On August 6, 1999, EPA approved a Remedial Action work plan pursuant to an Administrative Order (AO) issued by EPA to Chemclene. The work plan addressed implementation by Chemclene of portions of the 1997 ROD including Sections X.B.3 Structure Removal, X.B.4 Tank Removal (Underground Storage Tanks), X.B.5 Main Building and X.B.6 Closure of Main Building.

On August 12, 1999, a fire severely damaged the MPA of the Site and the structures that still remained on the Site became extremely hazardous. EPA emergency personnel responded and an emergency response contractor removed hazardous material and debris from the premises. Subsequent to the fire the work plan pursuant to the AO was amended to include soil sampling in the area of former MPA buildings.

In September 2000, Chemclene submitted the Remedial Action Report (RA Report) documenting the actions taken by Chemclene and findings of the soil sampling completed pursuant to the AO. EPA accepted the RA report on September 21, 2001.

Pursuant to a Remedial Design/Remedial Action Consent Decree (RD/RA CD) entered in Federal Court in December 1999, a group of potentially responsible parties referred to as the Chemclene Site Defense Group (CSDG) agreed to implement the remedial design/remedial action for the Site as set forth in the 1997 ROD. The Chemclene owner/operator agreed to not engage in any activities pertaining to handling, storage, release, disposal, processing, and/or sale of any hazardous substances or waste materials on the Site. To allow for a detailed final comprehensive design of the remedy called for in the 1997 ROD, Golder Associates, on behalf of the CSDG, conducted a Pre-Design Investigation (PDI) for the Site beginning in Fall 2000 and continuing through Spring 2002, which included further examination of the FDA/MA Soils, along with other areas and media. Golder Associates, submitted the Pre-Design Investigation to EPA in 2002.

During the course of conducting the PDI, it became apparent that subsurface conditions in the FDA/MA soils differed considerably from what was described in the EPA Feasibility Study and ROD. Specifically, the PDI revealed high levels of contaminants occurring at depths up to 35 feet, while the 1997 data indicated high subsurface soil contamination at a depth of only 10-12 feet. This discrepancy greatly increased the volume of soil to be excavated, and raised serious implementation concerns, including increased area of disturbance and increased truck traffic in close proximity to surrounding residential properties.

Consequently, Golder Associates, on behalf of the CSDG, proposed to EPA an on-site Soil Vapor Extraction (SVE) pilot study to confirm the effectiveness of SVE as an alternative for the removal of VOCs from impacted soils within the FDA/MA.

An SVE pilot study was conducted between November 2001 and January 2002 and the results were presented to EPA at a meeting on March 5, 2002. During that meeting, EPA requested that the CSDG prepare and submit a Focused Feasibility Study (FFS) that formally evaluated an alternative soil remedy for FDA/MA soils based on SVE and compare that alternative remedy to the EPA 1997 ROD remedy in accordance with the nine NCP criteria. The FFS was submitted to EPA along with the PDI Report in May 2002. Based on this investigation, and following public comment, EPA issued an amendment to the 1997 ROD which changed the selected FDA/MA soil remedy from excavation, treatment, and disposal to SVE. EPA signed the ROD amendment in March 2005.

Golder Associates, on behalf of the CSDG, submitted the final design for construction of the MPA cap, FDA/MA SVE system and the monitored natural attenuation of FDA/MA groundwater in September, 2004. EPA approved the final design on September 21, 2004.

The 1997 ROD calls for the extraction and treatment of groundwater via air stripping followed by carbon adsorption and reinjection of the treated water as the remedy for the MPA groundwater. In December 2002, Golder Associates submitted an in situ bioremediation pilot study work plan to demonstrate the feasibility of that technology. The pilot would treat the contaminated groundwater in the MPA with enhanced, naturally occurring bacteria, which would be re-injected back into the groundwater plume. Field tests for the pilot began in December 2003 and continued through October 2009.

Efforts to complete the conceptual Site model for the MPA groundwater by installing additional monitoring wells on-Site in the MPA, as well as installation of monitoring wells off-Site on adjacent residential properties, were completed in 2008 with the exception of one well. Installation of this well (GW-19) was completed in June 2013 after attaining access from the residential property owner.

In July 2009, EPA issued an Explanation of Significant Differences (ESD) relating to the MPA groundwater remedy. The July 2009 ESD modified the MPA groundwater remedy to allow for the treatment of the groundwater in situ, via Accelerated In Situ Bioremediation (AISB) treatment, while retaining the extraction and reinjection portions of the remedy. The remedy change created a bio-recirculation system, whereby amendments and other approved supplements are added to the extracted groundwater, as necessary, prior to reinjection to sustain the in situ treatment.

In February 2012, EPA issued a second ESD for the Site relating to both the FDA/MA and MPA groundwater remedies adding vinyl chloride and 1,4 dioxane as contaminants of concern, as well as a cumulative risk performance standard for both.

Basis for Action

The basis for action at the Site is unacceptable risks to current, or future groundwater users, future on-site residents, and current/future on-site worker from soils and groundwater in the MPA and FDA/MA contaminated by volatile organic compounds, including TCE, PCE, 1,1 DCE, 1,1 DCA, 1,1,1 TCA, methylene chloride, vinyl chloride and 1,4 dioxane. EPA established clean-up standards for soils in the FDA/MA, which can be found on page 60 of the 1997 ROD; soils in the MPA, which can be found on page 54 of the 1997 ROD; and clean-up standards for groundwater, which can be found on pages 56 and 62 of the 1997 ROD and the February 2012 ESD.

IV. Remedial Actions

Remedial Action Objectives

The remedial action objective (RAO) relating to the water supply portion of the remedy is to prevent ingestion and inhalation of contaminants in groundwater at residences affected or potentially affected by the Site. The RAOs for the MPA soils are to prevent direct contact with contaminated soils and to reduce the potential for continued migration of the contaminants to groundwater. For the MPA groundwater, the RAOs are to restore groundwater to beneficial use through removal and treatment to clean-up standards of contaminated groundwater. FDA/MA RAOs for soils and groundwater are to reduce the potential for continued migration of contaminants in soil to the groundwater and to reduce concentrations of contaminants in groundwater to Groundwater performance standards, respectively.

Remedy Selection/Remedy Implementation

The following is a summary of the construction activities associated with each major component of the selected remedy as called for in the 1997 ROD, as modified by the March 2005 ROD Amendment and the July 2009 ESD:

- **Operable Unit 1 MPA Building Deconstruction and Removal**

  On August 6, 1999, EPA approved a Remedial Action work plan pursuant to an AO issued by EPA to Chemclene. The work plan addressed implementation by Chemclene of portions of the 1997 ROD including Sections X.B.3 Structure Removal, X.B.4 Tank Removal (Underground Storage Tanks), X.B.5 Main Building and X.B.6 Closure of Main Building. After a major MPA fire on August 12, 1999, the structures that still remained on the Site became extremely hazardous and an EPA emergency response contractor removed the fire debris from the premises. A Unilateral Administrative Order was also issued for the removal action to Chemclene. Removal action work to stabilize the remaining buildings and to perform post fire sampling was divided between EPA and Chemclene. The work completed by Chemclene pursuant to the AO and removal order is summarized in the September 2000 Remedial Action Report, which was accepted by EPA on September 21, 2001.

Concurrent with the construction of the MPA cap (see below) remaining structures were demolished to the level of the supporting concrete slabs and additional waste material including drums, tanks, fire extinguishers, and cylinders were properly disposed. This portion of the selected remedy was completed and was documented in the Remedial Action Report by EPA on May 2, 2006.

- **Operable Unit 2 Main Plant Area**

Soils: To prevent direct contact with contaminated soils in the MPA and to reduce the potential for continued migration of contaminants to the groundwater, EPA chose to cap this portion of the Site in the 1997 ROD. Between May 2005 and May 2006, O'Brien & Gere (OBG) on behalf of CSDG, completed the construction of the required MPA cap. As discussed above under Operable Unit 1, the remaining structures, tanks and debris were removed in May 2005 by OBG in accordance to the 1997 ROD in order to implement the MPA cap remedy. The Remedial Action Report for this portion of the remedy was accepted by EPA on May 2, 2006. Operation and Maintenance of the MPA cap and fencing are ongoing.

Groundwater: The 1997 ROD required the extraction and treatment of groundwater via air stripping followed by carbon adsorption and reinjection of the treated water in the MPA. The July 2009 ESD modified the MPA groundwater remedy to allow for the treatment of the groundwater in situ, via AISB treatment, while retaining the extraction and reinjection portions of the remedy. The remedial design for the MPA groundwater AISB remedy was submitted by OBG on behalf of the CSDG in July 2009. The final remedial design was approved by EPA in September 2009. OBG mobilized to begin construction on October 19, 2009. The construction consisted of the installation of five new injection wells and the retrofitting of two existing wells for a total of seven injection wells. Four existing wells were modified for extraction purposes and one new extraction well was installed (Figure 7). Each well was fitted with an access manhole to allow for below grade access.

A pre-manufactured 640 square foot building system was assembled on the Cap to act as the AISB Treatment building (Figure 3). The building resembles a horse barn to better blend in with the surrounding residential community. The AISB System, including a 500 gallon equalization tank and pump, tanks and associated metering equipment for the automated addition of sodium lactate, nutrients and pH adjustment (sodium carbonate), a nitrogen blanketing system for the equalization tank with associated venting system and a programmable logic control (PLC) system to control the overall system operations was installed in the building. The system is currently operating as designed and performance monitoring of the AISB system is being implemented in accordance with the final remedial design sampling and analysis plan. See page 18 Data Review for a discussion of the sampling results.

- **Operable Unit 3 Residential Water supply**

In accordance with the 1997 ROD, a waterline was installed to prevent ingestion and inhalation of contaminants in groundwater at residences affected or potentially affected by the Site. In January 2000, contractors for the Philadelphia Suburban Water Company extended existing water mains with approximately 550 feet of six inch ductile iron pipe along with the necessary valves and valve boxes. The main was extended to provide service to 50 residential properties along Conestoga Road, Phoenixville Pike and the Hill Brook Circle development. Connection of the residential properties to the newly extended water mains began in February 2000. Exterior and interior connection work for properties, and well abandonment of 33 residential wells continued through August 2000. The rerouting of piping and the installation of back flow preventers was completed on properties which were permitted to keep their well for exterior non-potable purposes. The existing carbon filtration units at 19 residences were removed as part of the action as well. Property restoration work continued through Spring 2001. Physical construction was completed in May 2001. The Remedial Action Report for this portion of the remedy was submitted by demaximis, inc. on behalf of the CSDG on July 30, 2001.

- **Operable Unit 4 Former Disposal Area/Mounded Area**

Soils: The 1997 ROD called for excavation and off-Site disposal of FDA/MA soils. Additional soil data revealed extensive contamination to a depth of 35 feet. As a result, a pilot study was conducted on-Site between November 2001 and January 2002 by Golder Associates to evaluate the effectiveness of SVE. Following the submittal and acceptance of a FFS regarding SVE in May 2002, EPA solicited public comments on the proposed change. The ROD was amended in March 2005 to reflect this change in the remedy.

Between May 2005 and May 2006, OBG on behalf of CSDG, completed the construction of the required SVE System. During the construction of the remedy in the FDA/MA, approximately 143 cubic yards of PCB impacted soils were excavated to two feet below final grade and disposed of off-site. The excavation was backfilled and graded with clean fill to final grade. The SVE system includes 55 vapor extraction points which are manifolded together in six header boxes. The system includes two converted ocean cargo boxes and three carbon units and their associated piping and valves on a reinforced concrete pad which is surrounded by security fencing. One sea box houses the blowers, moisture separator, roof-top heat exchanger and associated valves, piping, instruments and gauges. The other sea box houses the motor controls and programmable logic computer (Figure 4). In addition, monitoring well CC-11 was abandoned and replaced with monitoring well CC-11R as part of the FDA/MA construction (Figure 5). The Remedial Action Report for this portion of the remedy was accepted by EPA on May 2, 2006.

Groundwater: The 1997 ROD calls for a Monitored Natural Attenuation program to monitor naturally occurring reduction of contaminant concentrations in groundwater in the FDA/MA to Groundwater performance standards. This portion of the selected remedy is currently being implemented by OBG on behalf of the CSDG. See Data Review on page 18 for discussion of sampling results.

Institutional Controls

The 1997 ROD called for institutional controls relating to groundwater under both the MPA and FDA/MA, as well as soils under the MPA Cap. Pursuant to the Owner/Operator Consent Decree entered in Federal Court in July 2006, the Owner/Operator responsible parties, agreed to implement the Institutional Controls for the Site as set forth in the 1997 ROD. An Environmental Protection Easement and Declaration of Restrictive Covenants as well as Notices of Use Restrictions have been put in place to prevent disturbance of the cap and the installation of wells for potable use, or which would have an adverse hydraulic effect on the treatment systems at the Site in accordance with the 1997 ROD and the July 2006 Consent Decree. The 1997 ROD also called for the prevention of consumption of contaminated groundwater that has migrated off-site beyond the FDA/MA, or MPA, and prevent any new hydraulically adverse pumping that would affect the treatment systems in place at the Site. These ROD requirements are currently met by the Chester County Health Department (CCHD) implementing its regulations that require a permit for any new supply wells prior to installation. The CCHD regulations also require sampling of any new well installed in the vicinity of the Site to demonstrate that it meets the drinking water standards before permission from the CCHD is granted to use the new well for drinking purposes.

System Operation/Operation and Maintenance

Since the second five year review, OBG on behalf of the CSDG has operated and maintained the MPA cap, the MPA AISB groundwater treatment system, FDA/MA SVE system, associated fencing at both portions of the Site, as well as the access roads for the Site. Only routine maintenance has been necessary for the access roads, fences and MPA cap since September 2010.

Potential site impacts from climate change including increased frequency and intensity of precipitation events, etc., have been assessed, and the performance of the remedy is currently not at risk due to the expected effects of climate change in the region and near the site.

FDA/MA SVE system

Shortly after SVE system start up in 2005, significant rain events raised groundwater levels in the vicinity of the Site. The increased rainfall also increased lenses of perched water in the area of the SVE system, blinding some SVE system extraction well open screen intervals, limiting the total open screen length of the system. Several steps have been taken to try to optimize the ability of the system to remove VOC mass in the areas of well screen blinding with perched or elevated groundwater. These efforts have included a Temporary Surface Infiltration Study from November 2006 through January 2007, which studied the effects an impermeable cover might have on perched water in the FDA/MA area. A Vacuum Step-up Test was conducted from January 12 through January 26, 2007. An Air Inlet Well Study was conducted from February 2 through March 12, 2007 followed by a Vacuum Step-Down Test from March 13 through March 27, 2007. Short Term and Long Term Radius of Influence Studies were conducted in April 2007 and July 2007, respectively.

A Focused Air Inlet Well Study (FAIS) was conducted from April through August 2007. Seven SVE extraction points were used for extraction and the remaining 48 extraction points were configured as air inlets. The total well open screen length generally improved during the FAIS with decreasing seasonal groundwater levels and lower SVE System vacuum.

After completion of the FAIS, 24 air inlets were converted to SVE extraction points and operated at a reduced vacuum. A total of 29 out of 31 extraction points remained open and operational through February, 2008, followed by a period of seasonally higher groundwater levels from April 2008 to June 2008, during which time 17 of 29 SVE extraction points remained open. In February 2008, variable vacuum controls were installed on 20 select points for individual SVE vacuum reductions in response to groundwater upwelling. The variable controls allowed for an overall SVE vacuum system increase while decreasing the vacuum on 20 select extraction points, which resulted in an overall increase of mass removal rates. The use of the variable vacuum controls began in July 2008 to correspond with the installation of eight new air inlet points and three new SVE extraction points. The new air inlet points were installed to improve air flow in the unsaturated soil zone and reduce the upwelling effect in surrounding SVE wells in specific portions of the treatment area. The new SVE extraction points were installed to increase the overall VOC mass flux removal rates in those areas as well. Mass removal increased significantly in these areas following installation of the new extraction points and the use of the variable vacuum controls.

In follow-up to the 2010 Five Year Review recommendation, an Active Air Injection (AAI) Pilot Test was conducted in June/July 2011. The goals of the pilot test were to evaluate the asymptotic trends in VOC mass removal that had been observed in some areas and to evaluate the effectiveness of Active Air Injection coupled with the existing SVE System in achieving a sustained increase in mass removal at the site. The test included the installation of two new air injection wells (AI-9 and AI-10), baseline performance monitoring, a pressure step-test, and post-pilot monitoring. O'Brien & Gere worked directly with USEPA and USACE during the development of the Work Plan, field implementation, and real-time field data analysis of the AAI Pilot Test. AAI coupled with the existing SVE System did not have a sustained effect in enhancing the VOC mass removal from the site. The effect of AAI was limited to a brief increase in VOC mass removal immediately after increasing the pressure to the AAI wells. The AAI Pilot Test also provided additional evidence that mass removal from the Site is diffusion-limited.

In November/December 2013, the USEPA approved a work plan submitted by O'Brien & Gere on behalf of the CSDG to proceed with a pulsed operation program at the Site predicated on sufficient open screen length in the SVE extraction wells. The purpose of the pulsed or cyclic operation program was to determine if additional mass removal of VOCs could be realized via the pulsed operation of the system or if the SVE system had reached its effective limit to remove VOC mass. Water levels improved sufficiently to begin pulsed operation on July 14, 2014. The first operational period resulted in a rapid decrease in well headspace VOC concentration, but no PID rebound was observed during the following non-operational period. After consultation with USEPA and USACE on September 4, 2014, operations at the Site were transitioned from pulsed operation to post-pulsed operation monitoring, with the SVE System remaining in the non-operational mode. At the request of the USEPA, O'Brien & Gere continued to collect well headspace PID measurements to further assess shutdown period VOC trends through June 2015.

In February 2015 O'Brien and Gere on behalf of the CSDG submitted the draft Fourth Soil Vapor Extraction Performance Report which included system data from October 2010 through October 2014 and presented conclusions and recommendations regarding the pulsed operations program and the effectiveness of the SVE system. The major conclusions presented included:

1) The total VOC mass removed by the SVE System from start-up in December 2005 through October 2014 is approximately 11,861 lbs, with roughly 11,700 lbs. of VOCs removed in the first six years of operation and less than 200 lbs. removed in the last two years.
2) The SVE System mass flux in all well areas has been asymptotic since December 2011.
3) Neither the AAI Pilot Test nor Pulsed Operation resulted in a sustained increase in mass flux.
4) The SVE System is no longer an enhanced mass-removal operation and its application has reached the limit of the technology.

O'Brien and Gere on behalf of the CSDG recommended termination of the pulsed operation testing and to proceed with final SVE system shutdown plans including preparation of a shutdown verification soil sampling work plan. EPA, PADEP and SVE experts with the USACE have reviewed the draft Fourth Soil Vapor Extraction Performance Reports conclusions and recommendations and provided comments and concerns regarding the recommendations and conclusions. The most significant concern raised was that while there is general agreement that the SVE system has reached the limits of its effectiveness given the current Site conditions in the FDA/MA, the objective of the SVE system was to reduce the VOC mass in subsurface soil enough to allow for natural attenuation processes to effectively restore FDA/MA groundwater to Groundwater performance standards. SVE system extraction points which were converted to overburden monitoring wells, have had recent sampling results for total VOC concentrations greater than 1,000 ppb. Although the SVE system was very successful in removing over 11,000 lbs of VOCs, it is unclear whether sufficient VOC mass was removed to meet the groundwater clean-up objective, or if consideration of another remediation technology might be warranted. Sub surface soil sampling may be warranted to better define the extent and concentration of residual VOCs in sub surface soils. Resolution of the EPA concerns is pending.

AISB groundwater treatment system

The MPA AISB groundwater treatment system has been operating as designed since March 2010 and performance monitoring of the AISB system is being implemented in accordance with the revised final remedial design sampling and analysis plan. The AISB groundwater treatment will be operated and maintained until groundwater clean-up standards in the 1997 ROD and 2012 ESD have been met.

After lengthy negotiations to gain access, monitoring well GW-19 was installed in the municipal right of way of a residential property in June 2013. The well was called for in the final approved Remedial Design in 2005 to determine the extent of VOC contamination in groundwater north of the MPA. The well has been sampled twice a year since it was installed. While the addition of GW-19 and the sampling data it provides has enhanced the CSM, further monitoring location(s) are required to the north of the MPA to clarify the extent of VOC contamination and complete the CSM.

Performance indicators used to monitor AISB system performance are system flow and distribution of organic acids. Total system flow was observed during the first two operational years at rates consistently greater than 100,000 gal /month. However, during operational years 3 and 4 (2012-2013) a decline in system flow was observed. During this time flow was consistently less than 100,000 gal per month, and often less than 75,000 gal / month. Similarly during this time, organic acid distribution to the MPA declined and the reductive dechlorination of parent compounds slowed resulting in rebounding VOC concentrations. Declining flow, along with reduced organic acid distribution, was an indication that system performance was declining.

In order to determine the possible cause(s) of the reduced system flow and declining organic acid distribution two investigations were conducted. A microcosm study was conducted on extraction well GW-10 to assess the bacterial population and function as a result of the depletion of electron donor. The study was initiated in December 2013 and completed in May 2014. The study found that bacteria were still active in GW-10 and bioaugmentation was unnecessary and that the absence of appreciable trace minerals in groundwater had become a limiting factor to the in situ reductive dechlorination process. Additional trace minerals have been added to the amendments to the extracted groundwater prior to reinjection to address the problem.

Additionally, in an attempt to determine the cause of reduced system flow, an optical televiewer inspection of system wells, GW-10, GW-18 and -07 was performed in December 2013. The televiewer revealed build-up of dark bio-material on the well screens (Figure 8.) As a result of the finding that the well screens were clogged with bio-material build-up, a well rehabilitation test was performed on extraction well GW-10 in July 2014. Based on the success of the GW-10 rehabilitation procedure the remaining extraction wells were rehabilitated in August 2014 (GW-8, GW-12A, GW-18). System injection wells were rehabilitated in February and March 2015 (IW-1, IW-2, IW-3, IW-4, IW-5, GW-9). As a result of the well rehabilitation efforts, the total system flow increased significantly. Total system flow has returned to levels achieved during the first two years of operation. (Figure 9.) Additionally, a plan to routinely inspect, and if necessary, rehabilitate AISB system extraction and injection wells has been implemented.

V. Progress Since Last Five-Year Review

This is the third Five-Year Review for the Malvern TCE Superfund Site. The second Five-Year Review for the Site which was issued on September 30, 2010 contained the following protectiveness statement: *The assessment during this five-year review found that the remedies are operating as designed in accordance with the requirements of the Record of Decision (ROD), dated November 1997, the ROD Amendment, signed March 2005 and the Explanation of Significant Difference (ESD), dated July 2009. The Site is protective of human health and the environment. The most* *immediate risk of exposure to contaminated groundwater was eliminated by the connection of residents to the public water supply, which was completed in May 2001. The Main Plant Area (MPA), and the Former Disposal Area/Mounded Area (FDA/MA) soil remedies' construction, including the MPA cap and Soil Vapor Extraction system (SVE), respectively were completed in 2005. The MPA groundwater Accelerated In-situ Bioremediation System (AISB) construction was completed in March 2010, as documented in the July 23, 2010 Preliminary Close Out Report. The FDA/MA groundwater remedy is monitored natural attenuation (MNA) and sampling has been conducted since 2005 to monitor the progress in reaching groundwater clean up goals. Natural attenuation processes appear to be reducing the levels of contamination in FDA/MA groundwater. Operation and maintenance of the SVE system, cap and AISB System is on going, as is long term monitoring to determine when the cleanup goals as set forth in the decision documents are met. Institutional controls relating to groundwater under both the MPA and FDA/MA, as well as soils under the MPA Cap have been put in place in accordance with the 1997 ROD and the July 2006 Consent Decree. Additionally, CCHD regulations require a permit for any new supply wells prior to installation. The CCHD regulations also require sampling of any new well installed to demonstrate that it meets the drinking water standards before permission from the CCHD is granted to use the new well for drinking purposes.*

The Issues and Recommendations identified in the 2010 third Five-Year Review are as follows:

Table 2: Issues and Recommendations from 2010 Five-Year Review

Issue	Recommendations and Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness (Y/N)	
					Current	Future
Add 1,4 dioxane as contaminant of concern	Modify remedy to add 1,4 dioxane as contaminant of concern	EPA	EPA	03/31/2011	N	N
Former Disposal Area/Mounded Area soil vapor extraction system well blinding	Implement Active Air Injection Pilot	PRP	EPA	03/31/2011	N	N

In February 2012, EPA issued a second ESD for the Site relating to both the FDA/MA and MPA groundwater remedies adding vinyl chloride and 1,4 dioxane as contaminants of concern, as well as a cumulative risk performance standard for the groundwater remedies in both OU2 and OU4. Performance standards are either MCLs or non-zero Maximum Contaminant Level Goals (MCLGs), whichever is more stringent, or where there are neither, the EPA risk range.

Specifically, the second ESD established the following performance standards for groundwater:

The performance standards for the contaminants in the groundwater at the MPA:

Contaminant	MCL (ug/l)	MCLG (ug/l)	Risk Range(ug/l)
Chloroform	80	0	-
Trichloroethene(TCE)	5	0	-
1,1-Dichloroethene(1,1-DCE)	7	7	-
1,2-Dichloroethane(1,2-DCA)	5	0	-
Tetrachloroethene(PCE)	5	0	-
Vinyl Chloride	2	0	-
1,4-Dioxane	-	-	0.67 - 67.0

The performance standards for the contaminants in the FDA/MA groundwater are listed below:

Contaminant	MCL (ug/l)	MCLG (ug/l)	Risk Range (ug/l)
Chloroform	80	0	-
Trichloroethene(TCE)	5.0	0	-
1,1-Dichloroethene(1,1-DCE)	7.0	7	-
1,2-Dichloroethane(1,2-DCA)	5.0	0	-
Tetrachloroethene(PCE)	5.0	0	-
Vinyl Chloride	2.0	0	-
1,4-Dioxane	-	-	0.67 - 67.0

Site cleanup goals for groundwater will be achieved when the cumulative risk of all site contaminants, including 1,4-dioxane and vinyl chloride, meet the groundwater performance standard described above. In addition, the cumulative risk presented by all remaining Site-related compounds in the groundwater at the conclusion of the remedy must be at or below the 1E-04 cancer risk level, and the non-cancer hazard index ("H.I."), which is the sum of the chemical-specific, target-organ-specific hazard quotients for these compounds, must be equal to or less than 1.

In addition, as described above in the System Operation/Operation and Maintenance Section an active air injection pilot was implemented in June and July 2011 and in 2014 a pulsed operation program was implemented in the FDA/MA. The purpose of the pulsed or cyclic operation program was to determine if additional mass removal of VOCs could be realized via the pulsed operation of the system or if the SVE system had reached its effective limit to remove VOC mass. Neither the AAI Pilot Test nor Pulsed Operation program resulted in a sustained increase in mass flux. Based on the results, it has been determined that the SVE system is no longer an enhanced mass-removal operation and its application appears to have reached the limits of the technology. However, the objective of the SVE system was to reduce the VOC mass in subsurface soil enough to allow for natural attenuation processes to effectively restore FDA/MA groundwater to Groundwater performance standards. Although the SVE system was very successful in removing over 11,800 lbs of VOC mass, it does not appear that sufficient

VOC mass was removed to allow natural attenuation processes to achieve the groundwater clean-up performance standards in the FDA/MA. A FFS is recommended to evaluate alternatives to restore FDA/MA groundwater to performance standards.

VI. Five-Year Review Process

Administrative Components

This Third five-year review of the Site was completed by Charlie Root, EPA RPM for the Site. The PADEP RPM, Carly Baker was notified of the five-year review process. PADEP Supervisor, Tim Cherry participated in the May 07, 2015 Site Inspection. PADEP has reviewed the third five year review document.

Community Involvement

A public notice of the Third five-year review for the Site was posted in the Daily Local Newspaper of Chester County on May 22, 2015. On May 07, 2015 the EPA RPM, along with PADEP and representatives of demaximis, inc. and Obrien & Gere, contractors for the CSDG, met with the East Whiteland Township Environmental Advisory Committee to provide a general Site update, explain the five year review process and answer any questions or concerns they had regarding the Site. In addition, the EPA RPM spoke with John Nagel, East Whiteland Township Manager regarding the five year review and the Site in general. The township officials did not raise any issues of concern regarding the Site, or the five year review. They also expressed that they were pleased with the progress at the Site and wished to be updated as the clean-up progresses.

Document Review

The five-year review consisted of the review of relevant documents including the following:

- ROD dated November 1997
- ROD Amendment dated March 2005
- Explanation of Significant Difference dated July 2009
- Explanation of Significant Differences dated February 29, 2012
- Remedial Action Report prepared by Chemclene Corporation in September 2000
- Remedial Action Report for Residential Waterline Connections prepared by de maximis, inc., July 30, 2001
- Remedial Action Construction Completion Report, March 2006
- Malvern AISB Construction Completion Report, September 2012
- Malvern TCE Site Monthly Progress Reports, October 2010 through May 2015 prepared by de maximis, inc. on behalf of CSDG.
- Draft Groundwater Monitoring Progress Report FDA/MA, March 2015
- Draft Fourth SVE performance Report, February 2015

Data Review

FDA/MA Groundwater - MNA

FDA/MA bedrock monitoring wells (CC-5, CC-9, CC-11R, CC-14), converted SVE extraction wells (B-5S, C-9D, D-7D) in the overburden groundwater zone, and selected residential wells in the Hill Brook Circle neighborhood (DW-41, DW-60, DW-69) which were converted into monitoring wells during installation of the waterline are monitored semi-annually to help track the progress of clean-up in the FDA/MA dissolved contaminant plume (Figure 5). VOC contamination in the closest converted residential well to the FDA/MA (DW-41) decreased below MCLs in the early 2000's and has been not been detected at all since 2005. The other converted residential wells (DW-60 and DW-69) have been non-detect for VOCs since routine sampling began after installation of the waterline in 2000 (Table 3).

Since the Second Five Year Review in 2010, the concentration of TCE in monitoring well CC-5 has fluctuated between 24 ppb and 12 ppb, the concentration of PCE has fluctuated between 3 ppb and 8 ppb and the concentration of 1,4 dioxane had a high detection of 19 ppb and a low of 12 ppb during the ten sampling events conducted. However, these concentrations are significantly lower than the historic high concentrations prior to implementation of the remedial action in 2005 (TCE – 380 ppb , PCE – 100 ppb and 1,4 dioxane – 58 ppb, respectively). The concentration of cis dichloroethene (cDCE) has decreased from 3,200 ppb in 2006 to 78 ppb in 2014 (Table 3).

Well CC-9 data shows increasing concentrations (TCE, PCE, VC) or significant variation in concentration (cDCE, 1,1-DCE) since the Second Five Year Review. The concentrations for all five contaminants exceed their respective groundwater performance standards. The increasing trend is problematic and warrants further consideration in relation to the Site CSM and whether the SVE system has removed sufficient VOC mass to allow natural attenuation processes to achieve groundwater performance standards. The concentration of 1,4 dioxane in Well CC-9 has remained relatively stable since the Second Five Year Review with concentrations less than 20 ppb (Table 3).

VOCs have not been detected in any samples collected from monitoring well CC-11R since 2005.

TCE (~110 ppb), 1,4 dioxane (~20 ppb) and PCE (~8 ppb) concentrations have remained stable in monitoring well CC-14 since the implementation of the remedial action in 2005 (Table 3, Figure 5). The CC-14 open-borehole interval was found to have collapsed or filled in between 130.4 to 145 feet below ground surface. It has been speculated that the collapsed portion of the bore hole or failed well construction could be contributing to the stable sampling results. OBG on behalf of the CSDG submitted a plan in June 2015, which was subsequently approved by EPA, to install two new wells in the area of CC-14. One well will be completed as a bedrock monitoring well and the second well will be completed as an overburden well. CC-14 will not be abandoned until after drilling the new wells. If observations from drilling the new wells indicate that CC-14 monitors an interflow zone between overburden and competent bedrock, CC-14 could be retained for monitoring. However, given the current concerns with CC-14, it is anticipated that this well will be abandoned. The well installation is expected to be completed by early August 2015. Sampling of the new wells will be incorporated into the semi-annual sampling plan to assess the location of additional wells in that area of the FDA/MA that will be necessary to complete the CSM.

B-5S, D-7D and C-9D are former SVE system wells converted in 2007 to monitoring locations for overburden groundwater immediately under the FDA/MA SVE system. Concentrations of total VOCs have decreased significantly for each well from 2007 to 2014, however, they remain well above performance standards. Well C-9D had the highest historic total VOC concentration among the three overburden wells with a total VOC concentration of 35,146 ppb which decreased to 4,886 ppb in 2014. Similarly total VOC concentrations in B-5S decreased from 1,507 ppb in 2007 to 426 ppb in 2014 and in D-7D from 15,298 ppb in 2007 to 1,848 ppb in 2014 (Table 3, Figure 5). Although the SVE system was very successful in removing over 11,800 lbs of VOC mass, it does not appear that sufficient mass was removed to allow MNA mechanisms to achieve groundwater clean-up objectives based on the most recent data. Sub surface soil sampling may be warranted to better define the extent and concentration of residual VOCs in sub surface soils and to determine if additional remedial action is warranted to further reduce VOC mass. A FFS will be prepared to evaluate soil and groundwater alternatives to restore FDA/MA groundwater to performance standards. Three dimensional visualization software is recommended to assist with the evaluation.

Parameters in addition to the VOCs which are monitored routinely as part of the FDA/MA MNA evaluation program include, field measurement of dissolved oxygen (DO), oxidation reduction potential (ORP), pH, ferrous metal and lab analysis of nitrite, nitrate, iron, sulfate, sulfide, phosphorous, manganese, sodium, potassium, calcium, magnesium, methane, ethane, ethene, alkalinity, chloride, carbon dioxide and total and dissolved organic carbon. Results from these analyses are routinely reported along with the analyses for VOCs in the FDA/MA.

The results of the MNA monitoring indicate that natural attenuation processes (aerobic degradation and reductive chlorination) to some degree appear to be reducing the dissolved contaminant plume in the overburden groundwater. Analysis of the MNA samples indicate that total VOC concentrations are decreasing in the bedrock groundwater and a number of natural attenuation processes may be occurring at the Site including, dispersion, dilution, in situ biodegradation and diffusion. However, sampling will continue and MNA will be evaluated in the FFS with other alternatives capable of restoring groundwater.

MPA Groundwater - AISB

OBG, on behalf of the CSDG, has provided updated AISB data and evaluation packages semi-annually since the AISB system came on-line in 2010 (Table 4.). With the exception of the period in 2013 and 2014 where system flow and amendment distribution was impacted due to well bio-fouling, all of the evaluations showed encouraging trends towards complete degradation of TCE/TCA in the MPA area.

While the total VOC concentrations in MPA source area wells remains significantly above clean-up standards, an overall 76-90% reduction in VOC concentration has been realized compared to source area historical maximum concentrations prior to start-up of the AISB system.

TCE concentrations in MPA source area wells have decreased significantly from historic maximums as a result of the operation of the AISB system:

- GW-10: 81,400 to 390 ppb
- GW-12A: 3,550 to 350 ppb
- GW-18: 33,000 to 100 ppb
- CC-7: 21,000 to 530 ppb
- GW-7: 20,000 to 2 ppb (30,050 to 75 ppb cDCE)
- GW-8: 313 to 2 ppb (20,480 to 6 ppb cDCE)
- GW-1: 23,000 to 2 ppb

Figure 6 is a graphic depiction of the distribution of total chlorinated ethenes in groundwater in the MPA in snapshots from 2008, 2012, 2014 and 2015. After lengthy negotiations to gain access, monitoring well GW-19 was installed in the municipal right of way of a residential property north of the MPA in June 2013. The well has been sampled twice a year since it was installed. The most recent sampling results for TCE from the well was 52 ppb, which is consistent with the previous four rounds of sampling from the well. While the addition of GW-19 and the sampling data it provides has enhanced the CSM, additional monitoring location(s) are required to define the extent of the plume in the MPA.

As Figure 6 indicates, there is a large spatial distance between GW-19 and GW-14A/14B with total VOC concentrations above 100 ppb and possibly over 1,000 ppb in the wells with no additional wells further north or west. The graphic depiction arbitrarily cuts off the extent of the groundwater plume to the north and west as a result of a lack of data beyond the existing well network. The same can be said for the area between GW-11 and CC-01 and the area beyond them to the south and west. Therefore, additional monitoring locations are required to the north, south and west of the current MPA well network to clarify the extent of VOC contamination and complete the CSM consistent with EPA's May 2014 Groundwater Remedy Completion Strategy.

The AISB system sampling results to date have been encouraging and the system appears to be functioning as designed and intended by the decision documents. The AISB treatment system appears to be distributing amendments throughout the intended MPA treatment area, and characteristic changes in groundwater have been observed throughout the intended treatment area. The AISB system has shown success at achieving complete de-chlorination of TCE/PCE to ethene and chloroethane, respectively, as evidenced by the increased concentrations of both identified during monitoring.

1,4 Dioxane

Analysis for 1,4 dioxane has been included for all ground water samples collected at the Site since the 2005 five year review. 1,4 dioxane is present in both the MPA and FDA/MA ground water. The 2012 ESD added 1,4 dioxane as a contaminant of concern. However, since sampling began in 2005 concentrations of 1,4 dioxane have decreased by an order of magnitude in the area of the AISB ground water treatment system. Although 1,4 dioxane remains present in excess of the acceptable risk range in the MPA, it is believed that the AISB system will be able to deliver the appropriate treatment media necessary to treat 1,4 dioxane.

Site Inspection

The third five year review Site inspection was conducted on May 07, 2015. The inspection was conducted by Charlie Root, EPA, along with Tim Cherry, PADEP. Contractor representatives for the CSDG, including Chris Young, demaximis, inc. and Mike Kozar and Scott Brown, OBG also participated in the inspection. Bill McKenty, EPA hydrogeologist, and Katie Matta, EPA Biological Technical Assistance group representative for the Site, also participated in the Site inspection. The AISB treatment system for groundwater treatment in the MPA was inspected including the building, pumps, piping and meters, equalization tank, amendment feed tanks, nitrogen blanket system, control system, injection wells and vaults and extraction wells and vaults. All were found to be in good working order and operating as designed.

The MPA cap, storm water drainage system, fence and access road were also inspected. The cap vegetation cover was excellent with no signs of erosion. The cap storm water drainage system appeared to be operating as designed. The MPA access road and fence were in good repair. However, a few tall dead trees just outside the MPA fence were noted. If these trees fell in the future they could damage the fence and/or treatment building. The CSDG is evaluating cutting down trees to prevent any damage in the future. The SVE system in the FDA/MA portion of the Site was also inspected even though it is currently not being operated. The access road to the FDA/MA was in good repair and the storm water drainage measures appeared to be functioning properly. The SVE treatment system fence, enclosing the blowers, GAC units and control unit was in good condition. The control unit and the blowers are housed in sea transportation boxes that have been retrofitted for this use. Both boxes were in good condition. The SVE wells and the header boxes which house the well valving were in good repair. In summary, all components of the remedies for the both the MPA and FDA/MA portions of the Site were found to be in good condition, as designed and called for in the decision documents.

Interviews

A public notice was placed in the local paper, the Daily Local Newspaper of Chester County, on May 22, 2015. The EPA RPM did not receive any public inquiry regarding the Third Five Year Review as a result of the public notice. The EPA RPM spoke with John Nagel, East Whiteland Township Manager regarding the five year review and the Site in general. The township manager did not raise any issues of concern regarding the Site, or the five year review.

VII. Technical Assessment

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

The assessment of this Third Five Year Review found that the remedies were constructed in accordance with the 1997 ROD, as modified by the 2005 ROD Amendment, the 2009 ESD, and 2012 ESD. The remedy is functioning as intended by the decision documents with the exception of the SVE system, as described below. Currently, the MPA cap is being maintained and is performing as intended. The AISB groundwater remedy for the MPA is operating as designed and has achieved a significant reduction of the total TCE source area mass. The SVE system in the FDA/MA was very successful in removing over 11,800 lbs of VOC mass, however, the limits of the technology have been reached. Immediate threats have been addressed and the remedies are protective.

The OU1 portion of the selected remedy (Building Deconstruction and Debris Removal) was partially performed as a removal action due to a fire at the Site in 1999. After the fire, an emergency removal action was taken to remove hazardous debris. Remaining building deconstruction and debris removal was completed as part of the construction of the MPA cap in 2005. The remedial objective of OU3 relating to the water supply portion of the remedy to prevent ingestion and inhalation of contaminants in groundwater at residences affected or potentially affected by the Site was achieved in June 2000 with construction of the water line.

Construction of the OU2 (Cap) and OU4 (SVE System) soil remedies and the OU4 groundwater remedy (MNA) were completed in 2005 and have been functioning as designed with routine operation and maintenance since 2005. The OU2 cap prevents contact with the contaminated soil that remains on-site in that location, and institutional controls are in place to prevent disturbance of the cap. Various efforts have been ongoing since 2006 to increase the mass removal of VOCs in areas of the SVE system where some well screens are blinded by lenses of perched groundwater and an increased persistent water table. Based on those efforts a general consensus has been established that the SVE system has reached the limits of its effectiveness given the current Site conditions in the FDA/MA. The objective of the SVE system was to reduce the VOC mass in subsurface soil to allow for natural attenuation processes to effectively restore FDA/MA groundwater to groundwater performance standards. It does not appear that sufficient VOC mass was removed to meet the groundwater clean-up objectives. Sub surface soil sampling is warranted to better define the extent and concentration of residual VOCs in sub surface soils remaining above the FDA/MA soil clean-up standards and determine if additional remediation is required to achieve FDA/MA GW RAOs. A FFS is recommended to evaluate soil and groundwater alternatives that are more likely to achieve the groundwater performance standard. Three dimensional visualization software is recommended to assist with the evaluation.

TCE concentrations have remained stable in monitoring well CC-14 since the implementation of the remedial action in 2005. OBG on behalf of the CSDG submitted a plan in June 2015, which was subsequently approved by EPA, to install two new wells in the area of CC-14. Sampling of the new wells will be incorporated into the semi-annual sampling plan to assess the location of additional wells in that area of the FDA/MA necessary to complete the CSM.

The OU2 groundwater portion of the selected remedy (AISB treatment system) was constructed in the Fall and Winter of 2009-2010. Completion of construction was documented in the July 2010 PCOR for the Site. The AISB system sampling results have been encouraging and the system appears to be functioning as designed and intended by the decision documents. However, additional monitoring location(s) are required in the MPA to further refine the CSM consistent with EPA's May 2014 Groundwater Remedy Completion Strategy.

1,4 dioxane is present in both the MPA and FDA/MA ground water. Although 1,4 dioxane remains present in excess of the acceptable risk range in the MPA, it is believed that the AISB system will be able to deliver the appropriate treatment media necessary to treat 1,4 dioxane.

Although groundwater performance standards have not yet been achieved, the provision of the water supply to nearby residents and the implementation of institutional controls to prevent installation of new potable water wells in areas of groundwater contamination prevent consumption of contaminated groundwater from the site.

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

Since 1997, there have been numerous changes in exposure assumptions and toxicity data, however, these changes do not result in changes to the original risk decisions made for the Site or the protectiveness of the remedies selected and implemented. The Remedial Action Objectives stated above are still valid to address the risks posed by Site conditions and will be met by the remedies constructed pursuant to the 1997 ROD, the 2005 ROD Amendment, the July 2009 ESD and February 2012 ESD. The groundwater performance standards set by the 2012 ESD (and listed in Section V above) are equal to the current MCLs for each of the chemicals (with the exception of 1,4-dioxane for which there is no MCL) and in all cases equal to or more stringent than those set by the 1997 ROD.

There have been significant changes in EPA's risk assessment guidance since 1997. These include changes in dermal guidance, inhalation methodologies, exposure factors, and a change in the way early-life exposure is assessed for TCE and vinyl chloride. Regarding changes in toxicity values, some have increased while others have decreased, making it impossible to generalize about whether the risks would be higher or lower if recalculated today. However, as required by the 2012 ESD, a cumulative risk assessment will be performed for the site with the most up-to-date guidance and toxicity values when groundwater cleanup standards have been achieved. Additionally, in late 2009 and early 2010, VI samples were collected from residential dwellings near the site. The findings indicated that VI was not occurring at these properties. Therefore, it is recommended that the groundwater be evaluated at the end of the remedy to ensure protectiveness at that time. Significant progress has been made in both the FDA/MA and MPA groundwater towards meeting the Site RAOs, which remain valid.

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

No information has been identified which questions the protectiveness of the remedies selected in the 1997 ROD, the 2005 ROD Amendment, the July 2009 ESD, or February 2012 ESD.

Technical Assessment Summary

Based on the data reviewed, the monitoring and operating reports and the site inspection, the remedies are operating as intended by the ROD, the ROD Amendment, and the ESDs. Immediate threats have been addressed and the remedies are protective in the short-term. Additional monitoring locations are required to the north, south and west of the current MPA well network to further refine the CSM consistent with EPA's May 2014 Groundwater Remedy Completion Strategy. The objective of the SVE system was to reduce the VOC mass in subsurface soil to allow for natural attenuation processes to effectively restore FDA/MA groundwater to groundwater performance standards. It does not appear that sufficient VOC mass was removed to meet the groundwater clean-up objectives. Sub surface soil sampling is warranted to better define the extent and concentration of residual VOCs remaining above the FDA/MA soil clean-up standards and determine if additional remedial action is required to achieve FDA/MA GW RAOs. A FFS is recommended to evaluate soil and groundwater alternatives that are more likely to achieve the groundwater performance standard. TCE concentrations have remained stable in monitoring well CC-14 since the implementation of the remedial action in 2005. Two new wells are being installed in the area of CC-14. Sampling of the new wells will be incorporated into the semi-annual sampling plan to assess the location of additional wells in that area of the FDA/MA necessary to complete the CSM.

VIII. Issues

Table 5: Issues

	Issues	Affects Current Protectiveness (Y/N)	Affects Future Protectiveness (Y/N)
#1	The CSM is incomplete, and the extent of groundwater plume in the MPA has not been fully delineated.	N	Y
#2	FDA/MA soils not completely treated by soil vapor extraction system.	N	Y
#3	The CSM is incomplete, and the extent of the groundwater plume in the FDA/MA near CC-14 has not been fully delineated.	N	Y

IX. Recommendations and Follow-Up Actions

Table 6: Recommendations and Follow-up Actions

Issue	Recommendations and Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness (Y/N)	
					Current	Future
The CSM is incomplete, and the extent of groundwater plume in the MPA has not been fully delineated.	Fully delineate MPA plume through installation and monitoring of additional wells.	PRPs	EPA/ PADEP	09/30/2016	N	Y
FDA/MA soils not completely treated by soil vapor extraction system.	Determine if residual VOC contamination in soils will allow MNA to achieve performance standards in a reasonable time frame and prepare an FFS. Three dimensional visualization software is recommended to assist with the evaluation.	PRPs	EPA/ PADEP	06/30/2018	N	Y
The CSM is incomplete, and the extent of the groundwater plume in the FDA/MA near CC-14 has not been fully delineated.	Delineate plume in FDA/MA in area of well CC-14 through installation and monitoring of additional monitoring wells.	PRPs	EPA/ PADEP	09/30/2016	N	Y

X. Protectiveness Statement(s)

Operable Unit: 1 - MPA Building Deconstruction and Removal

The assessment during this five-year review found that the building deconstruction and removal remedy was completed in accordance with the Site decision documents and is protective of human health and the environment.

Operable Unit: 2 - Main Plant Area

The assessment during this five-year review found that the Main Plant Area cap and AISB treatment system remedies are operating as designed in accordance with the Site decision documents and are protective of human health and the environment in the short-term. Long-term protectiveness is expected to be achieved when groundwater performance standards have been met.

Operable Unit 3 – Residential Water Supply

The assessment during this five-year review found that the residential water supply remedy was completed in accordance with the Site decision documents and is protective of human health and the environment.

Operable Unit 4 – Former Disposal Area/Mounded Area

The assessment during this five-year review found that the Former Disposal Area/Mounded Area SVE System and MNA remedies are operating as designed in accordance with the Site decision documents and are protective of human health and the environment in the short-term. Long-term protectiveness is expected to be achieved when groundwater performance standards have been met.

Site-wide Protectiveness Statement

The assessment during this five-year review found that the remedies are operating as designed in accordance with the requirements of the Record of Decision (ROD), dated November 1997, the ROD Amendment, signed March 2005 and the Explanation of Significant Difference (ESD), dated July 2009 and the ESD dated February 2012. The Site is protective of human health and the environment in the short term. Immediate threats have been addressed and the remedies are protective. Long term protectiveness is expected to be achieved when groundwater performance standards have been met throughout the Site.

XI. Next Review

The next five-year review for the Site is to be completed within five years from the completion date of this review.

FIGURES

Malvern TCE
Superfund Site
Figure 1. - Site Location Map
Pennsylvania Turnpike Toll Road
76
Yorktown Rd
Yorktown Ct
Spruce Rd
Aston Rd
Hayes Rd
Yellow Springs Rd
Ashlawn Cir
Ashlawn Rd
Flat Rd
Almy Dr
Thayer Dr
Forge Dr
Fetters Mill Dr
McCoy Ct
Oak Glenn Rd
Sidley Rd
Flintshire Rd
Moores Rd
Hillbrook Cir
Phoenixville Pike
Church Rd
Smith Ln
Holly Hill Ln
Shamrock Hill Ln
Old Valley Rd
Clover Mill Ln
Craig Ln
401
202
© 2010 Google
©2009 Google

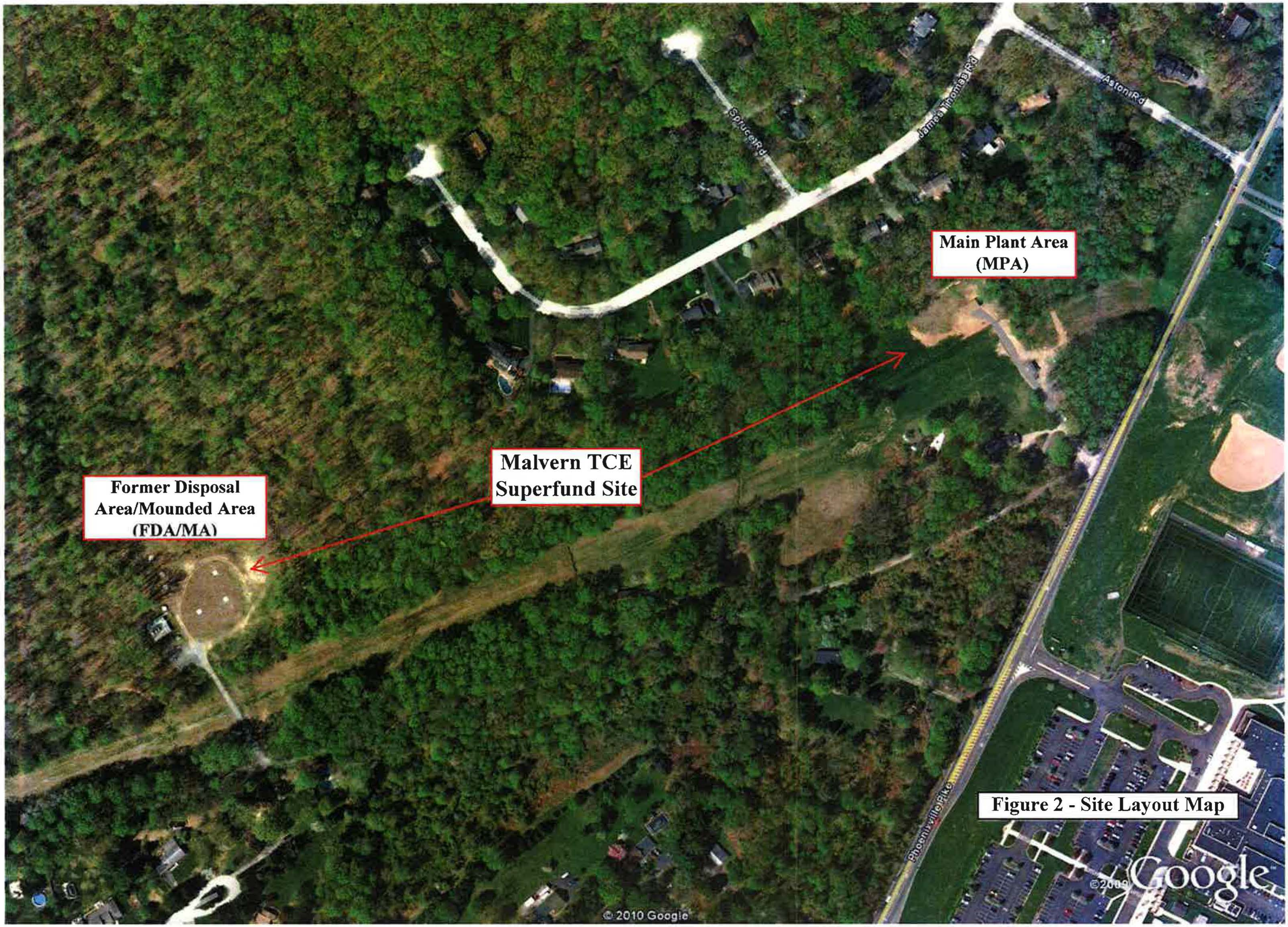


Figure 2 - Site Layout Map

Figure 3 - MPA Map

Figure 4 - FDA/MA Map

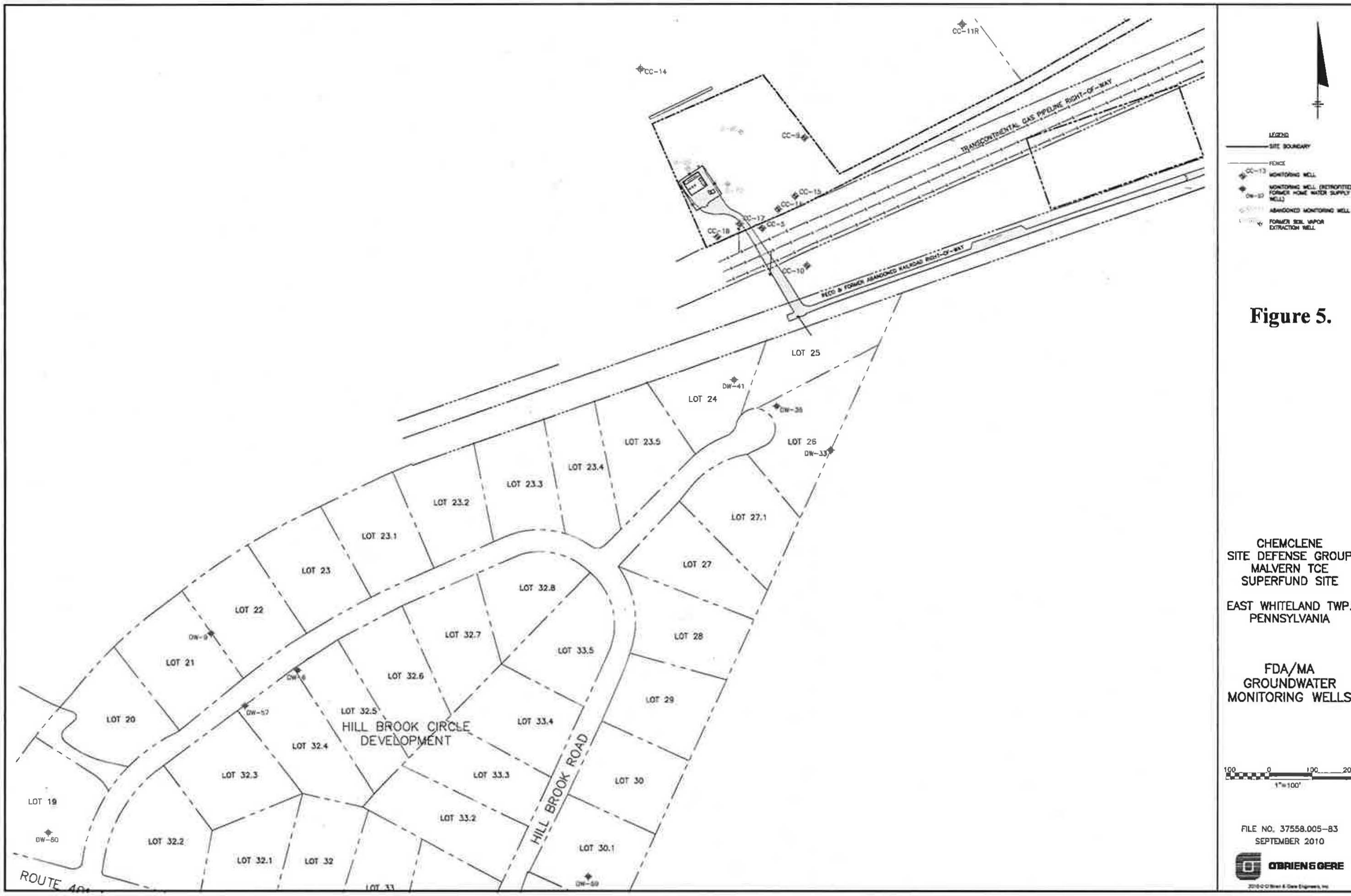


Figure 5.

CHEMCLENE
SITE DEFENSE GROUP
MALVERN TCE
SUPERFUND SITE

EAST WHITELAND TWP.
PENNSYLVANIA

FDA/MA
GROUNDWATER
MONITORING WELLS

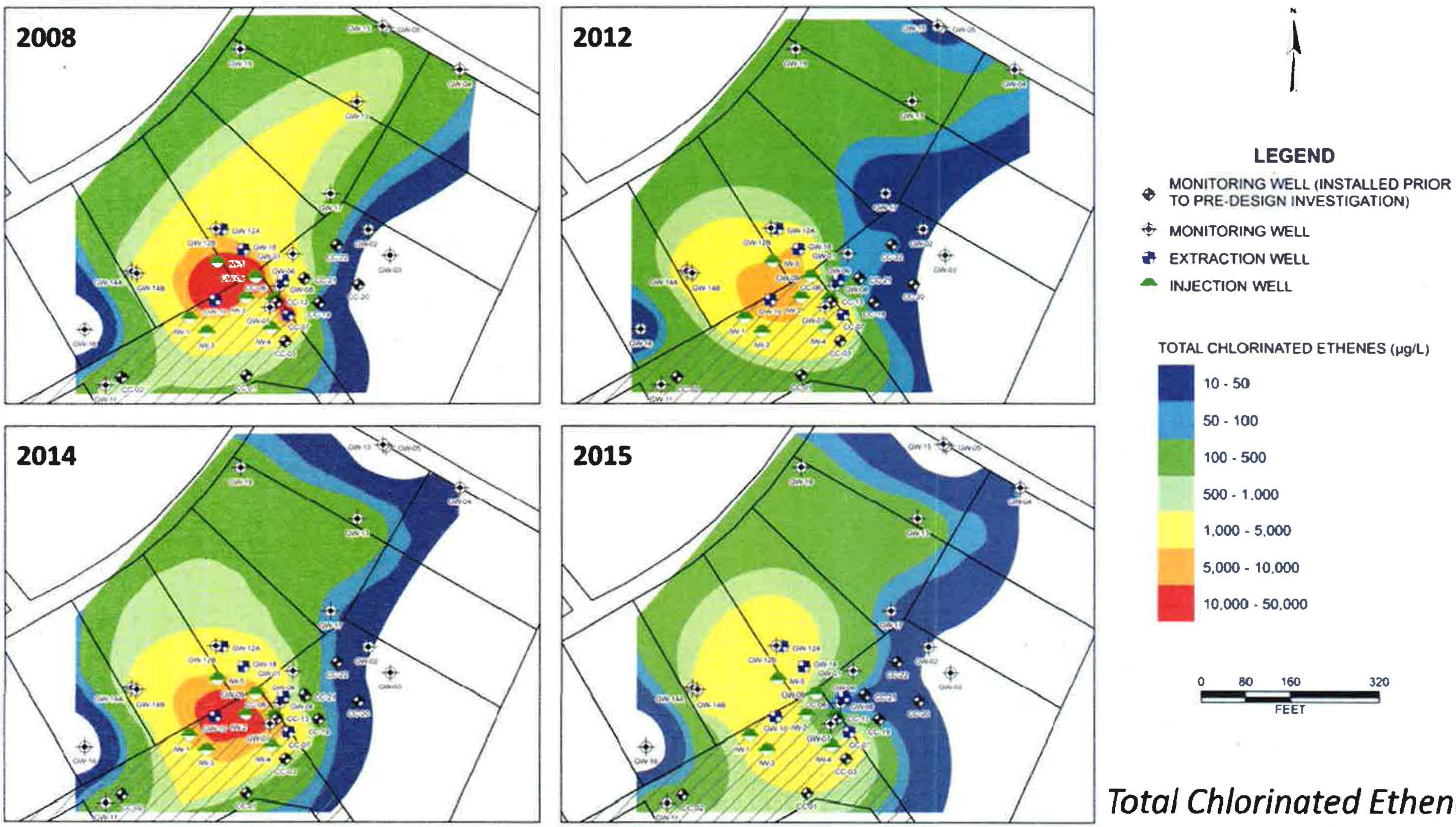
FILE NO. 37558.005-83
SEPTEMBER 2010

O'BRIEN & GERE

Sep 16, 2010 - 2:30pm

I:\Chemclene-Site.12261\37558.Malvern-Tce-Ge\dwg\37558083.dwg

Malvern TCE Superfund Site
Main Plant Area – Ground water
Total Chlorinated Ethenes Concentrations 2008 – 2015



Total Chlorinated Ethenes

Figure 6.

Figure 7.

Main Plant Area – Ground water
Change in Source Area Total VOC Concentrations Over Time

Well	Well Type	Date	Historical Max Prior to Full-Scale (March 2010)	Average Concentration Prior to Treatment[1]	Current Average Concentration[2]	% Reduction from Historical Maximum	% Reduction from Prior to Treatment
CC-07*	E	6/23/04	34,390	30,310	2,834	92%	91%
GW-07*	M	4/12/06	84,035	6,225	3,323	93%	47%
GW-08*	E	10/31/06	28,715	28,250	467	95%	95%
GW-10*	E	11/12/08	92,858	53,125	9,767	85%	73%
GW-12A	E	5/7/08	4,641	3,934	3,314	48%	38%
GW-12B	M	5/7/08	1,728	1,294	91	94%	93%
GW-18	E	8/21/09	43,156	43,171	2,205	95%	95%
					Average:	**86%**	**76%**
					Weighted Average:	**90%**	**84%**

All results in ug/L
CVOCs include PCE, TCE, cDCE, VC, 1,1,1-TCA, 1,1-DCA
E = Extraction ; M = Monitoring
1/2 detection limit was used for calculations, as appropriate
1 - Average concentration prior to treatment takes the average of up to three data points collected prior to the start of treatment, pilot test or full-scale. This may include a time range of several years due to infrequent data collection.
2 - The average concentration of the most recent three data points through February 2015. For source area wells, the average is based on a time range of six months; for MNA and Peripheral wells, the average is based on a time range of one year.
* - Indicates well was part of the pilot testing

TABLES

Table 3.

Volatile Organc Compounds in FDA/MA Ground Water: 2005-2014
2014 FDA/MA Groundwater Monitoring Progress Report
Malvern TCE Superfund Site

Sample Location	EPA Maximum Contaminant Level (MCL)	CC-05	CC-05	CC-05	CC-05	CC-05	CC-05	CC-05	CC-05	CC-05	CC-05	CC-05	CC-05	CC-05
Sample Date		11/08/2005	11/08/2005 (Duplicate)	03/29/2006	06/21/2006	09/21/2006	12/20/2006	12/20/2006 (Duplicate)	03/29/2007	03/29/2007 (Duplicate)	06/19/2007	06/19/2007 (Duplicate)	09/25/2007	09/25/2007 (Duplicate)
Volatile Organic Componds (ug/L)														
Acetone	NS	< 6	< 6	< 6	< 12	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Benzene	5	< 0.5	< 0.5	< 0.5	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromodichloromethane	80 [2]	< 1	< 1	< 1	< 2	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromoform	80 [2]	< 1	< 1	< 1	< 2	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromomethane	NS	< 1	< 1	< 1	< 2	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
2-Butanone	NS	< 3	< 3	< 3	< 6	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Carbon Disulfide	NS	< 1	< 1	< 1	< 2	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon Tetrachloride	5	< 1	< 1	< 1	< 2	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	100	< 0.8	< 0.8	< 0.8	< 2	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Chloroethane	NS	< 1	< 1	< 1	< 2	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chloroform	80 [2]	3 J	3 J	6	3 J	2 J	2 J	2 J	1 J	1 J	1 J	1 J	1 J	1 J
Chloromethane	NS	< 1	< 1	< 1	< 2	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dibromochloromethane	80 [2]	< 1	< 1	< 1	< 2	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
cis-1,2-Dichloroethene (cDCE)	70	1,000	1,100	3,200	2,000	980	690	650	490	480	680	670	660	640
cis-1,3-Dichloropropene	NS	< 1	< 1	< 1	< 2	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1-Dichloroethane	NS	7	7	18	10	6	4 J	4 J	3 J	3 J	4 J	4 J	4 J	4 J
1,2-Dichloroethane (DCA)	5	11	11	15	9 J	5 J	3 J	4 J	3 J	3 J	3 J	3 J	2 J	2 J
1,1-Dichloroethene (DCE)	7	22	23	57	32	23	12	12	8	7	8	8	6	6
1,2-Dichloropropane	5	< 1	< 1	< 1	< 2	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,4-Dioxane	0.78 - 78 [1]	56	58	36	30	24	21	20	19	19	20	19	23	21
Ethylbenzene	700	< 0.8	< 0.8	< 0.8	< 2	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
2-Hexanone	NS	< 3	< 3	< 3	< 6	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
4-Methyl-2-pentanone	NS	< 3	< 3	< 3	< 6	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Methylene Chloride	5	< 2	< 2	< 2	< 4	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Propane	NS	< 1	< 1	< 1	< 1	< 1	1 J	< 1 J	< 1	< 1	< 1	< 1	< 1	< 1
Styrene	100	< 1	< 1	< 1	< 2	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,2,2-Tetrachloroethane	NS	< 1	< 1	< 1	< 2	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Tetrachloroethene (PCE)	5	60	60	100	48	48	31	32	22	20	24	25	22	22
Toluene	1,000	< 0.7	< 0.7	< 0.7	< 1	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
trans-1,2-Dichloroethene	100	1 J	2 J	2 J	< 2	0.9 J	< 0.8	< 0.8	1 J	1 J	< 0.8	< 0.8	< 0.8	< 0.8
trans-1,3-Dichloropropene	NS	< 1	< 1	< 1	< 2	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,1-Trichloroethane (TCA)	200	45	45	120	57	36	24	24	17	16	19	19	15	15
1,1,2-Trichloroethane	5	15	15	21	14	7	5	5	3 J	3 J	3 J	3 J	2 J	2 J
Trichloroethene (TCE)	5	240	240	380	260	190	130	130	100	96	86	86	71	71
Vinyl Chloride	2	< 1	< 1	1 J	< 2	< 1	< 1	< 1	< 1	< 1	1 J	1 J	< 1	< 1
Xylene (Total)	10,000	< 0.8	< 0.8	< 0.8	< 2	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8

Table 3.

Volatile Organc Compounds in FDA/MA Ground Water: 2005-2014
2014 FDA/MA Groundwater Monitoring Progress Report
Malvern TCE Superfund Site

Sample Location	EPA Maximum Contaminant Level (MCL)	CC-05	CC-05	CC-05	CC-05	CC-05	CC-05	CC-05	CC-05	CC-05	CC-05	CC-05	CC-05	CC-05	CC-05	CC-05	CC-05
Sample Date		12/18/2007	12/18/2007 (Duplicate)	03/25/2008	3/25/2008 (Duplicate)	06/19/2008	6/19/2008 (Duplicate)	09/17/2008	12/10/2008	12/10/2008 (Duplicate)	03/25/2009	03/25/2009 (Duplicate)	09/24/2009	03/30/2010	09/21/2010	03/24/2011	03/24/2011 (Duplicate)
Volatile Organic Componds (ug/L)																	
Acetone	NS	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Benzene	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromodichloromethane	80[2]	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromoform	80[2]	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromomethane	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
2-Butanone	NS	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Carbon Disulfide	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon Tetrachloride	5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	100	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Chloroethane	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chloroform	80[2]	2 J	2 J	1 J	1 J	1 J	1 J	0.8 J	1 J	1 J	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Chloromethane	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dibromochloromethane	80[2]	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
cis-1,2-Dichloroethene (cDCE)	70	1,200	1,200	590	600	280	290	200	180	180	130	180	99	100	150	150	150
cis-1,3-Dichloropropene	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1-Dichloroethane	NS	8	7	4 J	4 J	2 J	2 J	< 1	1 J	1 J	< 1	< 1	< 1	1 J	2 J	3 J	3 J
1,2-Dichloroethane (DCA)	5	2 J	2 J	1 J	1 J	< 1	1 J	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1-Dichloroethene (DCE)	7	8	8	6	6	5 J	5 J	3 J	4 J	4 J	2 J	3 J	3 J	3 J	2 J	4 J	4 J
1,2-Dichloropropane	5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,4-Dioxane	0.78 - 78[1]	15	14	15	14	14	13	11	17	25	19	16	24	11	15	19	19
Ethylbenzene	700	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
2-Hexanone	NS	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
4-Methyl-2-pentanone	NS	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Methylene Chloride	5	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Propane	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	NA	NA	NA	NA	NA
Styrene	100	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,2,2-Tetrachloroethane	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Tetrachloroethene (PCE)	5	20	20	14	14	12	11	11	13	13	7	10	7	7	5 J	5 J	8
Toluene	1,000	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
trans-1,2-Dichloroethene	100	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
trans-1,3-Dichloropropene	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,1-Trichloroethane (TCA)	200	18	17	11	11	8	8	5	6	6	3 J	5 J	3 J	4 J	3 J	6	6
1,1,2-Trichloroethane	5	3 J	2 J	1 J	1 J	0.8 J	0.8 J	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Trichloroethene (TCE)	5	64	62	46	46	38	37	30	40	40	26	35	25	23	17	24	24
Vinyl Chloride	2	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	1 J	< 1	< 1	< 1
Xylene (Total)	10,000	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8

Table 3.

Volatile Organc Compounds in FDA/MA Ground Water: 2005-2014
2014 FDA/MA Groundwater Monitoring Progress Report
Malvern TCE Superfund Site

Sample Location	EPA Maximum Contaminant Level (MCL)	CC-05	CC-05	CC-05	CC-05	CC-05	CC-05	CC-05
Sample Date		09/28/2011	03/30/2012	09/11/2012	04/02/2013	10/01/2013	04/01/2014	10/01/2014
Volatile Organic Componds (ug/L)								
Acetone	NS	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Benzene	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromodichloromethane	80[2]	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5
Bromoform	80[2]	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5
Bromomethane	NS	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5
2-Butanone	NS	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Carbon Disulfide	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon Tetrachloride	5	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5
Chlorobenzene	100	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5
Chloroethane	NS	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5
Chloroform	80[2]	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5
Chloromethane	NS	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5
Dibromochloromethane	80[2]	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5
cis-1,2-Dichloroethene (cDCE)	70	160	310	220	99	77	58	78
cis-1,3-Dichloropropene	NS	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5
1,1-Dichloroethane	NS	3 J	10	5	2 J	1 J	1	2
1,2-Dichloroethane (DCA)	5	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5
1,1-Dichloroethene (DCE)	7	3 J	4 J	2 J	3 J	3 J	3	2
1,2-Dichloropropane	5	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5
1,4-Dioxane	0.78 - 78[1]	15	14	12	18	16	16	17
Ethylbenzene	700	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5
2-Hexanone	NS	< 3	< 3	< 3	< 3	< 3	< 3	< 3
4-Methyl-2-pentanone	NS	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Methylene Chloride	5	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Propane	NS	NA	NA	NA	NA	NA	NA	NA
Styrene	100	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,2,2-Tetrachloroethane	NS	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5
Tetrachloroethene (PCE)	5	7	5 J	3 J	6	5	5	5
Toluene	1,000	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.5	< 0.5
trans-1,2-Dichloroethene	100	< 0.8	1 J	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5
trans-1,3-Dichloropropene	NS	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5
1,1,1-Trichloroethane (TCA)	200	4 J	6	3 J	4 J	3 J	3	2
1,1,2-Trichloroethane	5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5
Trichloroethene (TCE)	5	22	15	12	18	20	18	15
Vinyl Chloride	2	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5
Xylene (Total)	10,000	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5

Sample Location	EPA Maximum Contaminant Level (MCL)	CC-09	CC-09	CC-09	CC-09	CC-09	CC-09	CC-09	CC-09	CC-09
Sample Date		11/08/2005	03/28/2006	06/21/2006	09/21/2006	12/19/2006	03/29/2007	06/19/2007	09/25/2007	12/18/2007
Volatile Organic Componds (ug/L)										
Acetone	NS	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Benzene	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromodichloromethane	80[2]	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromoform	80[2]	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromomethane	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
2-Butanone	NS	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Carbon Disulfide	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon Tetrachloride	5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	100	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Chloroethane	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chloroform	80[2]	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Chloromethane	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dibromochloromethane	80[2]	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
cis-1,2-Dichloroethene (cDCE)	70	110	130	150	130	110	110	130	130	100
cis-1,3-Dichloropropene	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1-Dichloroethane	NS	4 J	4 J	5	4 J	4 J	3 J	4 J	3 J	3 J
1,2-Dichloroethane (DCA)	5	1 J	1 J	1 J	1 J	< 1	1 J	1 J	< 1	< 1
1,1-Dichloroethene (DCE)	7	12	14	14	13	11	12	12	10	10
1,2-Dichloropropane	5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,4-Dioxane	0.78 - 78[1]	29	30	27	28	27	31	33	34	20
Ethylbenzene	700	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
2-Hexanone	NS	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
4-Methyl-2-pentanone	NS	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Methylene Chloride	5	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Propane	NS	< 1	< 1	< 1	< 1	< 1 J	< 1	< 1	< 1	< 1
Styrene	100	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,2,2-Tetrachloroethane	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Tetrachloroethene (PCE)	5	12	11	8	11	10	12	4 J	7	12
Toluene	1,000	5 J	6	8	7	5	2 J	3 J	2 J	2 J
trans-1,2-Dichloroethene	100	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
trans-1,3-Dichloropropene	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,1-Trichloroethane (TCA)	200	17	17	15	13	14	19	17	16	15
1,1,2-Trichloroethane	5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Trichloroethene (TCE)	5	29	20	14	18	19	32	9	13	22
Vinyl Chloride	2	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	5 J
Xylene (Total)	10,000	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8

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Table 3.

Volatile Organic Compounds in FDA/MA Ground Water: 2005-2014
2014 FDA/MA Groundwater Monitoring Progress Report
Malvern TCE Superfund Site

Sample Location	EPA Maximum Contaminant Level (MCL)	CC-09	CC-09	CC-09	CC-09	CC-09	CC-09	CC-09	CC-09	CC-09	CC-09	CC-09	CC-09	CC-09	CC-09	CC-09	CC-09
Sample Date		03/25/2008	06/17/2008	09/17/2008	12/09/2008	03/25/2009	09/24/2009	03/30/2010	09/21/2010	03/24/2011	09/29/2011	03/30/2012	09/11/2012	04/02/2013	10/01/2013	04/01/2014	10/01/2014
Volatile Organic Componds (ug/L)																	
Acetone	NS	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Benzene	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromodichloromethane	80 [2]	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5
Bromoform	80 [2]	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5
Bromomethane	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5
2-Butanone	NS	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Carbon Disulfide	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon Tetrachloride	5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5
Chlorobenzene	100	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5
Chloroethane	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5
Chloroform	80 [2]	< 0.8	< 0.8	0.8 J	0.8 J	< 0.8	< 0.8	< 0.8	< 0.8	0.9 J	1 J	0.8 J	0.8 J	1 J	0.9 J	2	1
Chloromethane	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5
Dibromochloromethane	80 [2]	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5
cis-1,2-Dichloroethene (cDCE)	70	100	97	78	64	35	55	51	42	53	65	48	51	63	53	92	85
cis-1,3-Dichloropropene	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5
1,1-Dichloroethane	NS	3 J	3 J	2 J	2 J	5	5 J	6	5	3 J	3 J	6	3 J	4 J	8	6	9
1,2-Dichloroethane (DCA)	5	< 1	1 J	< 1	< 1	< 1	< 1	1 J	1 J	< 1	< 1	< 1	< 1	1 J	1 J	< 0.5	1
1,1-Dichloroethene (DCE)	7	11	10	9	8	4 J	8	7	6	9	9	7	8	9	6	12	9
1,2-Dichloropropane	5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5
1,4-Dioxane	0.78 - 78 [1]	29	31	29	32	28	31	29	32	36	36	35	33	44	41	46	42
Ethylbenzene	700	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5
2-Hexanone	NS	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
4-Methyl-2-pentanone	NS	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Methylene Chloride	5	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Propane	NS	< 1	< 1	< 1	< 1	< 1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Styrene	100	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,2,2-Tetrachloroethane	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5
Tetrachloroethene (PCE)	5	7	5 J	17	12	5	19	17	13	29	31	19	24	31	16	29	24
Toluene	1,000	2 J	3 J	0.8 J	2 J	3 J	1 J	1 J	2 J	< 0.7	< 0.7	1 J	1 J	< 0.7	1 J	0.5 J	0.6 J
trans-1,2-Dichloroethene	100	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5
trans-1,3-Dichloropropene	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5
1,1,1-Trichloroethane (TCA)	200	17	18	17	14	12	13	10	9	14	13	9	9	15	9	15	12
1,1,2-Trichloroethane	5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	0.8 J	0.7 J
Trichloroethene (TCE)	5	14	8	31	32	13	36	33	26	53	55	33	43	50	28	48	37
Vinyl Chloride	2	10	30	10	20	49	12	24	30	5	5	11	4 J	8	12	12	14
Xylene (Total)	10,000	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5

Table 3.

Volatile Organc Compounds in FDA/MA Ground Water: 2005-2014
2014 FDA/MA Groundwater Monitoring Progress Report
Malvern TCE Superfund Site

Sample Location	EPA Maximum Contaminant Level (MCL)	CC-11R	CC-11R	CC-11R	CC-11R	CC-11R	CC-11R	CC-11R	CC-11R	CC-11R	CC-11R	CC-11R	CC-11R	CC-11R	CC-11R	CC-11R	CC-11R
Sample Date		11/08/2005	03/28/2006	06/21/2006	09/21/2006	12/19/2006	03/29/2007	06/19/2007	09/25/2007	12/18/2007	03/26/2008	06/19/2008	09/17/2008	09/17/2008 (Duplicate)	12/09/2008	03/25/2009	09/24/2009
Volatile Organic Componds (ug/L)																	
Acetone	NS	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Benzene	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromodichloromethane	80[2]	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromoform	80[2]	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromomethane	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
2-Butanone	NS	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Carbon Disulfide	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon Tetrachloride	5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	100	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Chloroethane	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chloroform	80[2]	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Chloromethane	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dibromochloromethane	80[2]	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
cis-1,2-Dichloroethene (cDCE)	70	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
cis-1,3-Dichloropropene	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1-Dichloroethane	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2-Dichloroethane (DCA)	5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1-Dichloroethene (DCE)	7	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,2-Dichloropropane	5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,4-Dioxane	0.78 - 78[1]	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Ethylbenzene	700	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
2-Hexanone	NS	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
4-Methyl-2-pentanone	NS	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Methylene Chloride	5	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Propane	NS	< 1	< 1	< 1	< 1	< 1 J	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	NA
Styrene	100	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,2,2-Tetrachloroethane	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Tetrachloroethene (PCE)	5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Toluene	1,000	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
trans-1,2-Dichloroethene	100	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
trans-1,3-Dichloropropene	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,1-Trichloroethane (TCA)	200	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1,2-Trichloroethane	5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Trichloroethene (TCE)	5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Vinyl Chloride	2	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Xylene (Total)	10,000	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8

Table 3.

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Volatile Organc Compounds in FDA/MA Ground Water: 2005-2014
2014 FDA/MA Groundwater Monitoring Progress Report
Malvern TCE Superfund Site

Sample Location	EPA Maximum Contaminant Level (MCL)	CC-11R	CC-11R	CC-11R	CC-11R	CC-11R	CC-11R	CC-11R	CC-11R	CC-11R	CC-11R	CC-11R	CC-14	CC-14	CC-14	CC-14	CC-14
Sample Date		09/24/2009 (Duplicate)	03/30/2010	09/21/2010	03/24/2011	09/29/2011	03/30/2012	09/11/2012	04/02/2013	10/01/2013	04/01/2014	10/01/2014	11/07/2005	03/28/2006	03/28/2006 (Duplicate)	06/21/2006	06/21/2006 (Duplicate)
Volatile Organic Componds (ug/L)																	
Acetone	NS	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Benzene	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromodichloromethane	80[2]	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1
Bromoform	80[2]	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1
Bromomethane	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1
2-Butanone	NS	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Carbon Disulfide	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon Tetrachloride	5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	100	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Chloroethane	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1
Chloroform	80[2]	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Chloromethane	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1
Dibromochloromethane	80[2]	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1
cis-1,2-Dichloroethene (cDCE)	70	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	33	34	34	32	31
cis-1,3-Dichloropropene	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1
1,1-Dichloroethane	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1
1,2-Dichloroethane (DCA)	5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1
1,1-Dichloroethene (DCE)	7	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	4 J	5 J	5 J	5 J	5 J
1,2-Dichloropropane	5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1
1,4-Dioxane	0.78 - 78[1]	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	28	23	23	21	19
Ethylbenzene	700	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
2-Hexanone	NS	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
4-Methyl-2-pentanone	NS	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Methylene Chloride	5	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Propane	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1 J	< 1	< 1	< 1	< 1
Styrene	100	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,2,2-Tetrachloroethane	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1
Tetrachloroethene (PCE)	5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	8	7	7	9	8
Toluene	1,000	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.5	< 0.5	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
trans-1,2-Dichloroethene	100	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
trans-1,3-Dichloropropene	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1
1,1,1-Trichloroethane (TCA)	200	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	8	8	8	8	8
1,1,2-Trichloroethane	5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Trichloroethene (TCE)	5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	110	110	110	120	110
Vinyl Chloride	2	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1
Xylene (Total)	10,000	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8

Table 3.

Volatile Organc Compounds in FDA/MA Ground Water: 2005-2014
2014 FDA/MA Groundwater Monitoring Progress Report
Malvern TCE Superfund Site

Sample Location	EPA Maximum	CC-14	CC-14	CC-14	CC-14	CC-14	CC-14	CC-14	CC-14	CC-14	CC-14	CC-14	CC-14	CC-14	CC-14	CC-14	CC-14
Sample Date	Contaminant Level (MCL)	09/21/2006	09/21/2006 (Duplicate)	12/20/2006	03/29/2007	06/19/2007	.09/25/2007	12/18/2007	03/26/2008	06/19/2008	09/18/2008	12/09/2008	03/25/2009	09/24/2009	03/30/2010	03/30/2010 (Duplicate)	09/21/2010
Volatile Organic Componds (ug/L)																	
Acetone	NS	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Benzene	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromodichloromethane	80 [2]	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromoform	80 [2]	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromomethane	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
2-Butanone	NS	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Carbon Disulfide	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon Tetrachloride	5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	100	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Chloroethane	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chloroform	80 [2]	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Chloromethane	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dibromochloromethane	80 [2]	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
cis-1,2-Dichloroethene (cDCE)	70	32	31	26	38	37	31	34	28	26	19	17	26	26	24	26	24
cis-1,3-Dichloropropene	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1-Dichloroethane	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2-Dichloroethane (DCA)	5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1-Dichloroethene (DCE)	7	5	5	4 J	5	5	5 J	5	5 J	5	2 J	1 J	4 J	4 J	4 J	4 J	4 J
1,2-Dichloropropane	5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,4-Dioxane	0.78 - 78 [1]	19	20	19	24	26	30	18	22	21	25	25	18	15	18	18	17
Ethylbenzene	700	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
2-Hexanone	NS	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
4-Methyl-2-pentanone	NS	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Methylene Chloride	5	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Propane	NS	< 1	< 1	< 1 J	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	NA	NA	NA	NA
Styrene	100	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,2,2-Tetrachloroethane	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Tetrachloroethene (PCE)	5	9	9	8	8	7	8	8	9	8	5 J	5 J	9	7	7	7	9
Toluene	1,000	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	1 J	< 0.7	< 0.7	< 0.7
trans-1,2-Dichloroethene	100	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
trans-1,3-Dichloropropene	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,1-Trichloroethane (TCA)	200	8	7	6	8	8	7	7	6	7	7	6	6	6	5	5	5 J
1,1,2-Trichloroethane	5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Trichloroethene (TCE)	5	120	120	96	120	110	110	120	120	130	61	60	120	110	110	120	110
Vinyl Chloride	2	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Xylene (Total)	10,000	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8

Table 3.

Volatile Organc Compounds in FDA/MA Ground Water: 2005-2014
2014 FDA/MA Groundwater Monitoring Progress Report
Malvern TCE Superfund Site

Sample Location	EPA Maximum Contaminant Level (MCL)	CC-14	CC-14	CC-14	CC-14	CC-14	CC-14	CC-14	CC-14	CC-14	CC-14	CC-14	CC-14	CC-14	CC-14	CC-14	CC-14
Sample Date		09/21/2010 (Duplicate)	03/24/2011	03/24/2011 (Duplicate)	09/29/2011	03/30/2012	03/30/2012 (Duplicate)	09/11/2012	09/11/2012 (Duplicate)	04/02/2013	04/02/2013 (Duplicate)	10/01/2013	10/01/2013 (Duplicate)	4/1/2014	04/1/14 (Duplicate)	10/1/2014	10/1/14 (Duplicate)
Volatile Organic Componds (ug/L)																	
Acetone	NS	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Benzene	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromodichloromethane	80[2]	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5
Bromoform	80[2]	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5
Bromomethane	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5
2-Butanone	NS	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Carbon Disulfide	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon Tetrachloride	5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5
Chlorobenzene	100	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5
Chloroethane	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5
Chloroform	80[2]	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5
Chloromethane	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5
Dibromochloromethane	80[2]	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5
cis-1,2-Dichloroethene (cDCE)	70	23	26	25	22	22	21	21	21	20	20	11	11	25	25	21	22
cis-1,3-Dichloropropene	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5
1,1-Dichloroethane	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	0.9 J	0.8 J	< 0.5	< 0.5
1,2-Dichloroethane (DCA)	5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5
1,1-Dichloroethene (DCE)	7	4 J	5 J	5 J	3 J	4 J	3 J	4 J	4 J	4 J	4 J	< 0.8	< 0.8	5	5	4	4
1,2-Dichloropropane	5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5
1,4-Dioxane	0.78 - 78[1]	17	20	19	20	20	19	15	15	20	20	20	20	21	20	18	17
Ethylbenzene	700	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5
2-Hexanone	NS	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
4-Methyl-2-pentanone	NS	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Methylene Chloride	5	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Propane	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Styrene	100	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,2,2-Tetrachloroethane	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethene (PCE)	5	9	9	9	8	8	8	8	8	9	9	8	8	8	7	7	8
Toluene	1,000	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.5	< 0.5	< 0.5	< 0.5
trans-1,2-Dichloroethene	100	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5
trans-1,3-Dichloropropene	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5
1,1,1-Trichloroethane (TCA)	200	5 J	6	6	< 0.8	4 J	4 J	4 J	4 J	5	5	3 J	3 J	5	5	4	4
1,1,2-Trichloroethane	5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5
Trichloroethene (TCE)	5	110	110	110	100	100	97	100	100	110	120	55	56	120	110	100	100
Vinyl Chloride	2	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5
Xylene (Total)	10,000	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	0.7 J	1	< 0.5	< 0.5

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Table 3.

Volatile Organc Compounds in FDA/MA Ground Water: 2005-2014
2014 FDA/MA Groundwater Monitoring Progress Report
Malvern TCE Superfund Site

Sample Location	EPA Maximum Contaminant Level (MCL)	DW-41	DW-41	DW-41	DW-41	DW-41	DW-41	DW-41	DW-41	DW-41	DW-41	DW-41	DW-41	DW-41	DW-41	DW-41	DW-41
Sample Date		11/09/2005	03/27/2006	06/20/2006	09/20/2006	12/19/2006	03/28/2007	06/18/2007	09/24/2007	12/17/2007	03/24/2008	06/17/2008	09/16/2008	12/08/2008	03/23/2009	09/23/2009	03/29/2010
Volatile Organic Componds (ug/L)																	
Acetone	NS	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Benzene	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromodichloromethane	80 [2]	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromoform	80 [2]	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromomethane	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
2-Butanone	NS	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Carbon Disulfide	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon Tetrachloride	5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	100	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Chloroethane	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chloroform	80 [2]	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Chloromethane	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dibromochloromethane	80 [2]	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
cis-1,2-Dichloroethene (cDCE)	70	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
cis-1,3-Dichloropropene	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1-Dichloroethane	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2-Dichloroethane (DCA)	5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1-Dichloroethene (DCE)	7	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,2-Dichloropropane	5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,4-Dioxane	0.78 - 78 [1]	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Ethylbenzene	700	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
2-Hexanone	NS	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
4-Methyl-2-pentanone	NS	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Methylene Chloride	5	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Propane	NS	< 1	< 1	< 1	< 1	< 1 J	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	NA	NA
Styrene	100	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,2,2-Tetrachloroethane	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Tetrachloroethene (PCE)	5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Toluene	1,000	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
trans-1,2-Dichloroethene	100	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
trans-1,3-Dichloropropene	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,1-Trichloroethane (TCA)	200	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1,2-Trichloroethane	5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Trichloroethene (TCE)	5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Vinyl Chloride	2	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Xylene (Total)	10,000	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8

Table 3.

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Volatile Organc Compounds in FDA/MA Ground Water: 2005-2014
2014 FDA/MA Groundwater Monitoring Progress Report
Malvern TCE Superfund Site

Sample Location	EPA Maximum Contaminant Level (MCL)	DW-41	DW-41	DW-41	DW-41	DW-41	DW-41	DW-41	DW-41	DW-41	DW-60	DW-60	DW-60	DW-60	DW-60	DW-60	DW-60
Sample Date		09/20/2010	03/23/2011	09/28/2011	03/29/2012	09/10/2012	04/01/2013	09/30/2013	03/31/2014	09/30/2014	11/09/2005	03/28/2006	06/20/2006	09/20/2006	12/19/2006	03/28/2007	06/18/2007
Volatile Organic Componds (ug/L)																	
Acetone	NS	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Benzene	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromodichloromethane	80 [2]	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromoform	80 [2]	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromomethane	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 1
2-Butanone	NS	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Carbon Disulfide	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon Tetrachloride	5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	100	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Chloroethane	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chloroform	80 [2]	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Chloromethane	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dibromochloromethane	80 [2]	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 1
cis-1,2-Dichloroethene (cDCE)	70	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
cis-1,3-Dichloropropene	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1-Dichloroethane	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2-Dichloroethane (DCA)	5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1-Dichloroethene (DCE)	7	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,2-Dichloropropane	5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,4-Dioxane	0.78 - 78 [1]	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Ethylbenzene	700	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
2-Hexanone	NS	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
4-Methyl-2-pentanone	NS	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Methylene Chloride	5	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Propane	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1	< 1	< 1	< 1	< 1 J	< 1	< 1
Styrene	100	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,2,2-Tetrachloroethane	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Tetrachloroethene (PCE)	5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Toluene	1,000	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.5	< 0.5	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
trans-1,2-Dichloroethene	100	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
trans-1,3-Dichloropropene	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,1-Trichloroethane (TCA)	200	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1,2-Trichloroethane	5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Trichloroethene (TCE)	5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Vinyl Chloride	2	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Xylene (Total)	10,000	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8

Table 3.

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Volatile Organc Compounds in FDA/MA Ground Water: 2005-2014
2014 FDA/MA Groundwater Monitoring Progress Report
Malvern TCE Superfund Site

Sample Location	EPA Maximum Contaminant Level (MCL)	DW-60	DW-60	DW-60	DW-60	DW-60	DW-60	DW-60	DW-60	DW-60	DW-60	DW-60	DW-60	DW-60	DW-60	DW-60	DW-60
Sample Date		09/24/2007	12/17/2007	03/24/2008	06/17/2008	09/17/2008	12/08/2008	03/23/2009	09/24/2009	03/29/2010	09/20/2010	03/23/2011	09/28/2011	03/29/2012	09/10/2012	04/01/2013	09/30/2013
Volatile Organic Componds (ug/L)																	
Acetone	NS	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Benzene	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromodichloromethane	80[2]	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromoform	80[2]	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromomethane	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
2-Butanone	NS	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Carbon Disulfide	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon Tetrachloride	5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	100	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Chloroethane	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chloroform	80[2]	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Chloromethane	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dibromochloromethane	80[2]	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
cis-1,2-Dichloroethene (cDCE)	70	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
cis-1,3-Dichloropropene	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1-Dichloroethane	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2-Dichloroethane (DCA)	5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1-Dichloroethene (DCE)	7	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,2-Dichloropropane	5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,4-Dioxane	0.78 - 78[1]	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Ethylbenzene	700	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
2-Hexanone	NS	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
4-Methyl-2-pentanone	NS	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Methylene Chloride	5	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Propane	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	NA	NA	NA	NA	NA	NA	NA	NA	NA
Styrene	100	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,2,2-Tetrachloroethane	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Tetrachloroethene (PCE)	5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Toluene	1,000	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
trans-1,2-Dichloroethene	100	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
trans-1,3-Dichloropropene	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,1-Trichloroethane (TCA)	200	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1,2-Trichloroethane	5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Trichloroethene (TCE)	5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Vinyl Chloride	2	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Xylene (Total)	10,000	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8

Table 3.

Volatile Organc Compounds in FDA/MA Ground Water: 2005-2014
2014 FDA/MA Groundwater Monitoring Progress Report
Malvern TCE Superfund Site

Sample Location	EPA Maximum Contaminant Level (MCL)	DW-60	DW-60	DW-69	DW-69	DW-69	DW-69	DW-69	DW-69	DW-69	DW-69	DW-69	DW-69	DW-69	DW-69	DW-69	DW-69
Sample Date		03/31/2014	10/02/2014	11/09/2005	03/27/2006	06/20/2006	09/20/2006	12/18/2006	03/28/2007	06/18/2007	09/24/2007	12/17/2007	03/24/2008	06/17/2008	09/16/2008	12/08/2008	03/23/2009
Volatile Organic Componds (ug/L)																	
Acetone	NS	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Benzene	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromodichloromethane	80 [2]	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromoform	80 [2]	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromomethane	NS	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
2-Butanone	NS	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Carbon Disulfide	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon Tetrachloride	5	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	100	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Chloroethane	NS	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chloroform	80 [2]	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Chloromethane	NS	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dibromochloromethane	80 [2]	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
cis-1,2-Dichloroethene (cDCE)	70	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
cis-1,3-Dichloropropene	NS	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1-Dichloroethane	NS	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2-Dichloroethane (DCA)	5	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1-Dichloroethene (DCE)	7	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,2-Dichloropropane	5	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,4-Dioxane	0.78 - 78 [1]	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Ethylbenzene	700	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
2-Hexanone	NS	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
4-Methyl-2-pentanone	NS	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Methylene Chloride	5	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Propane	NS	NA	NA	< 1	< 1	< 1	< 1	< 1 J	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Styrene	100	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,2,2-Tetrachloroethane	NS	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Tetrachloroethene (PCE)	5	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Toluene	1,000	< 0.5	< 0.5	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
trans-1,2-Dichloroethene	100	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
trans-1,3-Dichloropropene	NS	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,1-Trichloroethane (TCA)	200	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1,2-Trichloroethane	5	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Trichloroethene (TCE)	5	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Vinyl Chloride	2	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Xylene (Total)	10,000	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8

Table 3.

Volatile Organc Compounds In FDA/MA Ground Water: 2005-2014
2014 FDA/MA Groundwater Monitoring Progress Report
Malvern TCE Superfund Site

Sample Location	EPA Maximum Contaminant Level (MCL)	DW-69	DW-69	DW-69	DW-69	DW-69	DW-69	DW-69	DW-69	DW-69	DW-69	DW-69	B-5S	B-5S	B-5S	B-5S	B-5S
Sample Date		09/23/2009	03/29/2010	09/20/2010	03/23/2011	09/28/2011	03/29/2012	09/10/2012	04/01/2013	09/30/2013	03/31/2014	09/30/2014	12/19/2007	03/25/2008	06/18/2008	09/18/2008	12/10/2008
Volatile Organic Componds (ug/L)																	
Acetone	NS	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Benzene	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromodichloromethane	80[2]	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1
Bromoform	80[2]	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1
Bromomethane	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1
2-Butanone	NS	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Carbon Disulfide	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon Tetrachloride	5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	44	< 1	< 1	< 1	< 1
Chlorobenzene	100	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Chloroethane	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1
Chloroform	80[2]	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	2 J	3 J	3 J	1 J	1 J
Chloromethane	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1
Dibromochloromethane	80[2]	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1
cis-1,2-Dichloroethene (cDCE)	70	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	680	830	880	330	280
cis-1,3-Dichloropropene	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1
1,1-Dichloroethane	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	13	16	17	6	6
1,2-Dichloroethane (DCA)	5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	3 J	5 J	4 J	1 J	1 J
1,1-Dichloroethene (DCE)	7	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	40	57	58	18	15
1,2-Dichloropropane	5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1
1,4-Dioxane	0.78 - 78[1]	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	10	28	21	7.8 J	5.6
Ethylbenzene	700	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
2-Hexanone	NS	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
4-Methyl-2-pentanone	NS	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Methylene Chloride	5	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Propane	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1	< 1	< 1	< 1	< 1
Styrene	100	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,2,2-Tetrachloroethane	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1
Tetrachloroethene (PCE)	5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	82	120	87	39	30
Toluene	1,000	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.5	< 0.5	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
trans-1,2-Dichloroethene	100	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	4 J	4 J	4 J	2 J	2 J
trans-1,3-Dichloropropene	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1
1,1,1-Trichloroethane (TCA)	200	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	270	320	350	160	120
1,1,2-Trichloroethane	5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	3 J	5 J	4 J	2 J	1 J
Trichloroethene (TCE)	5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	400	510	490	220	180
Vinyl Chloride	2	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1
Xylene (Total)	10,000	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8

Table 3.

Volatile Organc Compounds in FDA/MA Ground Water: 2005-2014
2014 FDA/MA Groundwater Monitoring Progress Report
Malvern TCE Superfund Site

Sample Location	EPA Maximum Contaminant Level (MCL)	B-5S	B-5S	B-5S	B-5S	B-5S	B-5S	B-5S	B-5S	B-5S	B-5S	B-5S	B-5S	C-9D	C-9D	C-9D	C-9D
Sample Date		03/24/2009	09/25/2009	03/31/2010	09/22/2010	03/25/2011	09/30/2011	04/02/2012	09/12/2012	04/03/2013	10/02/2013	04/02/2014	10/02/2014	12/19/2007	03/25/2008	06/18/2008	09/18/2008
Volatile Organic Componds (ug/L)																	
Acetone	NS	< 6	< 6	< 6	< 6	< 6	< 6	19 J	< 6	< 6	< 6	< 6	< 6	940	520	450	200 J
Benzene	5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 5	< 5	< 10	< 10
Bromodichloromethane	80[2]	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 10	< 10	< 20	< 20
Bromoform	80[2]	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 10	< 10	< 20	< 20
Bromomethane	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 10	< 10	< 20	< 20
2-Butanone	NS	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 30	36 J	< 60	< 60
Carbon Disulfide	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 10	< 10	< 20	< 20
Carbon Tetrachloride	5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 10	< 10	< 20	< 20
Chlorobenzene	100	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	13 J	10 J	< 16	< 16
Chloroethane	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 10	< 10	< 20	< 20
Chloroform	80[2]	2 J	1 J	1 J	2 J	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	0.5 J	460	280	230	120
Chloromethane	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 10	< 10	< 20	< 20
Dibromochloromethane	80[2]	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 10	< 10	< 20	< 20
cis-1,2-Dichloroethene (cDCE)	70	680	430	380	830	240	190	270	230	140	110	130	240	5,700	4,700	5,300	4,400
cis-1,3-Dichloropropene	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 10	< 10	< 20	< 20
1,1-Dichloroethane	NS	14	9	6	14	4 J	3 J	13	8	8	3 J	5	5	140	120	110	70 J
1,2-Dichloroethane (DCA)	5	5 J	3 J	2 J	5 J	2 J	< 1	1 J	< 1	< 1	< 1	< 0.5	1	23 J	15 J	< 20	< 20
1,1-Dichloroethene (DCE)	7	55	38	29	40	19	14	13	14	11	4 J	8	11	1,000	800	720	360
1,2-Dichloropropane	5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 10	< 10	< 20	< 20
1,4-Dioxane	0.78 - 78[1]	24	11	11	24	8.3 J	4.8 J	8.2	3.2	5.1	4.7	4	6.7	250	320	240	96
Ethylbenzene	700	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	33 J	17 J	< 16	19 J
2-Hexanone	NS	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 30	< 30	< 60	< 60
4-Methyl-2-pentanone	NS	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	160	74 J	< 60	< 60
Methylene Chloride	5	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	1,600	970	790	340
Propane	NS	< 1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1	< 1	< 1	< 1
Styrene	100	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	12 J	< 10	< 20	< 20
1,1,2,2-Tetrachloroethane	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 10	< 10	< 20	< 20
Tetrachloroethene (PCE)	5	120	75	66	84	38	30	2 J	3 J	12	7	10	18	12,000	12,000	12,000	11,000
Toluene	1,000	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	2 J	< 0.7	< 0.7	< 0.7	< 0.5	< 0.5	430	180	250	160
trans-1,2-Dichloroethene	100	5 J	2 J	2 J	4 J	1 J	0.9 J	1 J	0.8 J	< 0.8	< 0.8	< 0.5	0.8 J	70	58	60 J	57 J
trans-1,3-Dichloropropene	NS	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 10	< 10	< 20	< 20
1,1,1-Trichloroethane (TCA)	200	250	220	130	200	77	57	42	41	31	12	20	32	3,800	3,400	4,200	3,000
1,1,2-Trichloroethane	5	4 J	3 J	2 J	5 J	1 J	0.8 J	0.9 J	< 0.8	< 0.8	< 0.8	0.6 J	1	32 J	17 J	< 16	< 16
Trichloroethene (TCE)	5	430	290	260	470	170	120	6	19	53	42	64	110	8,300	6,400	5,800	4,400
Vinyl Chloride	2	< 1	< 1	< 1	< 1	< 1	< 1	1 J	< 1	2 J	< 1	< 0.5	< 0.5	92	78	98 J	51 J
Xylene (Total)	10,000	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	81	33 J	19 J	49 J

Table 3.

Volatile Organc Compounds in FDA/MA Ground Water: 2005-2014
2014 FDA/MA Groundwater Monitoring Progress Report
Malvern TCE Superfund Site

Sample Location	EPA Maximum Contaminant Level (MCL)	C-9D	C-9D	C-9D	C-9D	C-9D	C-9D	C-9D	C-9D	C-9D	C-9D	C-9D	C-9D	C-9D	D-7D	D-7D	D-7D	D-7D
Sample Date		12/10/2008	03/24/2009	09/25/2009	03/31/2010	09/22/2010	03/25/2011	09/30/2011	04/02/2012	09/12/2012	04/03/2013	10/02/2013	04/02/2014	10/02/2014	12/19/2007	03/25/2008	06/18/2008	09/18/2008
Volatile Organic Componds (ug/L)																		
Acetone	NS	< 120	< 120	< 60	< 60	< 30	< 60	< 12	< 30	< 6	< 6	< 12	< 12	< 6	< 60	< 60	< 60	< 120
Benzene	5	< 10	< 10	< 5	< 5	< 3	< 5	< 1	< 3	< 0.5	< 0.5	< 1	< 1	< 0.5	< 5	< 5	< 5	< 10
Bromodichloromethane	80[2]	< 20	< 20	< 10	< 10	< 5	< 10	< 2	< 5	< 1	< 1	< 2	< 1	< 0.5	< 10	< 10	< 10	< 20
Bromoform	80[2]	< 20	< 20	< 10	< 10	< 5	< 10	< 2	< 5	< 1	< 1	< 2	< 1	< 0.5	< 10	< 10	< 10	< 20
Bromomethane	NS	< 20	< 20	< 10	< 10	< 5	< 10	< 2	< 5	< 1	< 1	< 2	< 1	< 0.5	< 10	< 10	< 10	< 20
2-Butanone	NS	< 60	< 60	< 30	< 30	< 15	< 30	< 6	< 15	< 3	< 3	< 6	< 6	< 3	< 30	< 30	< 30	< 60
Carbon Disulfide	NS	< 20	< 20	< 10	< 10	< 5	< 10	< 2	< 5	< 1	< 1	< 2	< 2	< 1	< 10	< 10	< 10	< 20
Carbon Tetrachloride	5	< 20	< 20	< 10	< 10	< 5	< 10	< 2	< 5	< 1	< 1	< 2	< 1	< 0.5	< 10	< 10	< 10	< 20
Chlorobenzene	100	< 16	< 16	14 J	10 J	9 J	< 8	5 J	4 J	1 J	< 0.8	< 2	2 J	2	< 8	< 8	< 8	< 16
Chloroethane	NS	< 20	< 20	< 10	< 10	< 5	< 10	< 2	< 5	< 1	< 1	< 2	< 1	< 0.5	< 10	< 10	< 10	< 20
Chloroform	80[2]	140	67 J	78	24 J	14 J	27 J	18	< 4	3 J	4 J	< 2	< 1	1	11 J	12 J	12 J	< 16
Chloromethane	NS	< 20	< 20	< 10	< 10	< 5	< 10	< 2	< 5	< 1	< 1	< 2	< 1	< 0.5	< 10	< 10	< 10	< 20
Dibromochloromethane	80[2]	< 20	< 20	< 10	< 10	< 5	< 10	< 2	< 5	< 1	< 1	< 2	< 1	< 0.5	< 10	< 10	< 10	< 20
cis-1,2-Dichloroethene (cDCE)	70	3,900	4,100	3,800	3,000	2,400	1,900	1,700	1,700	1,600	1,300	960	1,000	880	13,000	14,000	14,000	9,200
cis-1,3-Dichloropropene	NS	< 20	< 20	< 10	< 10	< 5	< 10	< 2	< 5	< 1	< 1	< 2	< 1	< 0.5	< 10	< 10	< 10	< 20
1,1-Dichloroethane	NS	68 J	55 J	51	58	23 J	24 J	21	16 J	13	16	11	12	7	120	120	110	100
1,2-Dichloroethane (DCA)	5	< 20	< 20	< 10	< 10	< 5	< 10	< 2	< 5	< 1	< 1	< 2	< 1	< 0.5	180	210	250	150
1,1-Dichloroethene (DCE)	7	310	380	340	290	160	170	130	120	90	120	95	47	70	70	100	78	42 J
1,2-Dichloropropane	5	< 20	< 20	< 10	< 10	< 5	< 10	< 2	< 5	< 1	< 1	< 2	< 1	< 0.5	< 10	< 10	< 10	< 20
1,4-Dioxane	0.78 - 78[1]	140	68	120	29 J	21 J	39	25	11 J	5.1	9.7	5	5	4	71	110	110	66
Ethylbenzene	700	< 16	< 16	9 J	17 J	< 4	< 8	4 J	< 4	< 0.8	< 0.8	< 2	2 J	< 0.5	< 8	< 8	< 8	< 16
2-Hexanone	NS	< 60	< 60	< 30	< 30	< 15	< 30	< 6	< 15	< 3	< 3	< 6	< 6	< 3	< 30	< 30	< 30	< 60
4-Methyl-2-pentanone	NS	< 60	< 60	< 30	< 30	< 15	< 30	< 6	< 15	< 3	< 3	< 6	< 6	< 3	< 30	< 30	< 30	< 60
Methylene Chloride	5	340	200	210	73	42	77	61	< 10	9	< 2	< 4	< 4	3 J	20 J	< 20	64	< 40
Propane	NS	< 1	< 1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1	< 1	< 1	< 1
Styrene	100	< 20	< 20	< 10	< 10	< 5	< 10	< 2	< 5	< 1	< 1	< 2	< 2	< 1	< 10	< 10	< 10	< 20
1,1,2,2-Tetrachloroethane	NS	< 20	< 20	< 10	< 10	< 5	< 10	< 2	< 5	< 1	< 1	< 2	< 1	< 0.5	< 10	< 10	< 10	< 20
Tetrachloroethene (PCE)	5	13,000	16,000	13,000	14,000	8,400	5,700	4,500	3,900	2,200	3,100	2,600	1,200	2,800	65	110	84	72 J
Toluene	1,000	47 J	33 J	95	160	22 J	31 J	50	21 J	2 J	1 J	< 1	21	3	< 7	< 7	< 7	< 14
trans-1,2-Dichloroethene	100	52 J	64 J	58	51	31	25 J	23	20 J	18	17	14	7	10	39 J	42 J	16 J	25 J
trans-1,3-Dichloropropene	NS	< 20	< 20	< 10	< 10	< 5	< 10	< 2	< 5	< 1	< 1	< 2	< 1	< 0.5	< 10	< 10	< 10	< 20
1,1,1-Trichloroethane (TCA)	200	2,600	2,800	2,600	2,600	1,200	1,000	710	530	380	560	460	270	260	530	550	490	330
1,1,2-Trichloroethane	5	< 16	< 16	< 8	< 8	< 4	< 8	2 J	< 4	0.9 J	< 0.8	< 2	< 1	< 0.5	12 J	15 J	13 J	< 16
Trichloroethene (TCE)	5	5,400	5,600	5,000	5,000	3,100	2,400	1,900	1,800	990	1,300	1,100	740	840	340	480	400	240
Vinyl Chloride	2	38 J	41 J	34 J	67	14 J	14 J	10	11 J	9	12	8 J	5	6	860	400	430	300
Xylene (Total)	10,000	< 16	< 16	14 J	49 J	5 J	< 8	12	< 4	< 0.8	< 0.8	< 2	5	< 0.5	< 8	< 8	21 J	< 16

O'Brien & Gere Engineers, Inc.
December 2014

Table 3.

DRAFT

Volatile Organc Compounds in FDA/MA Ground Water: 2005-2014
2014 FDA/MA Groundwater Monitoring Progress Report
Malvern TCE Superfund Site

Sample Location	EPA Maximum Contaminant Level (MCL)	D-7D	D-7D	D-7D	D-7D	D-7D	D-7D	D-7D	D-7D	D-7D	D-7D	D-7D	D-7D	D-7D	D-7D
Sample Date		12/10/2008	03/24/2009	09/25/2009	03/31/2010	03/31/2010 (Duplicate)	09/22/2010	03/25/2011	09/30/2011	04/02/2012	09/12/2012	04/03/2013	10/02/2013	04/02/2014	10/02/2014
Volatile Organic Componds (ug/L)															
Acetone	NS	< 120	< 60	< 30	< 30	< 60	< 6	< 30	< 6	< 12	< 6	< 6	< 6	< 12	< 6
Benzene	5	< 10	< 5	< 3	< 3	< 5	0.6 J	< 3	< 0.5	< 1	< 0.5	< 0.5	< 0.5	< 1	0.6 J
Bromodichloromethane	80 [2]	< 20	< 10	< 5	< 5	< 10	< 1	< 5	< 1	< 2	< 1	< 1	< 1	< 1	< 0.5
Bromoform	80 [2]	< 20	< 10	< 5	< 5	< 10	< 1	< 5	< 1	< 2	< 1	< 1	< 1	< 1	< 0.5
Bromomethane	NS	< 20	< 10	< 5	< 5	< 10	< 1	< 5	< 1	< 2	< 1	< 1	< 1	< 1	< 0.5
2-Butanone	NS	< 60	< 30	< 15	< 15	< 30	< 3	< 15	< 3	< 6	< 3	< 3	< 3	< 6	< 3
Carbon Disulfide	NS	< 20	< 10	< 5	< 5	< 10	< 1	< 5	< 1	< 2	< 1	< 1	< 1	< 2	< 1
Carbon Tetrachloride	5	< 20	< 10	< 5	< 5	< 10	< 1	< 5	< 1	< 2	< 1	< 1	< 1	< 1	< 0.5
Chlorobenzene	100	< 16	< 8	< 4	< 4	< 8	< 0.8	< 4	< 0.8	< 2	< 0.8	< 0.8	< 0.8	< 1	< 0.5
Chloroethane	NS	< 20	< 10	< 5	< 5	< 10	< 1	< 5	< 1	< 2	< 1	< 1	< 1	< 1	< 0.5
Chloroform	80 [2]	< 16	< 8	8 J	< 8	< 8	4 J	< 4	2 J	< 2	2 J	2 J	1 J	1 J	2
Chloromethane	NS	< 20	< 10	< 5	< 5	< 10	< 1	< 5	< 1	< 2	< 1	< 1	< 1	< 1	< 0.5
Dibromochloromethane	80 [2]	< 20	< 10	< 5	< 5	< 10	< 1	< 5	< 1	< 2	< 1	< 1	< 1	< 1	< 0.5
cis-1,2-Dichloroethene (cDCE)	70	11,000	3,300	8,300	4,800	4,800	2,900	3,400	1,600	1,400	1,800	1,500	1,400	1,300	1,300
cis-1,3-Dichloropropene	NS	< 20	< 10	< 5	< 5	< 10	< 1	< 5	< 1	< 2	< 1	< 1	< 1	< 1	< 0.5
1,1-Dichloroethane	NS	110	50 J	68	33 J	33 J	36	28	15	14	25	15	14	14	15
1,2-Dichloroethane (DCA)	5	190	130	190	64	64	74	78	28	28	47	39	29	31	28
1,1-Dichloroethene (DCE)	7	46 J	< 8	58	29 J	29 J	17	27	15	12	16	16	13	10	11
1,2-Dichloropropane	5	< 20	< 10	< 5	< 10	< 10	< 1	< 5	< 1	< 2	< 1	< 1	< 1	< 1	< 0.5
1,4-Dioxane	0.78 - 78 [1]	87	85	73	35	35	43	43	15 J	17	17	20	13	16	17
Ethylbenzene	700	< 16	< 8	< 4	< 4	< 8	< 0.8	< 4	< 0.8	< 2	< 0.8	< 0.8	< 0.8	< 1	2
2-Hexanone	NS	< 60	< 30	< 15	< 15	< 30	< 3	< 15	< 3	< 6	< 3	< 3	< 3	< 6	< 3
4-Methyl-2-pentanone	NS	< 60	< 30	< 15	< 15	< 30	< 3	< 15	< 3	< 6	< 3	< 3	< 3	< 6	< 3
Methylene Chloride	5	< 40	< 20	10 J	10 J	< 20	5 J	< 10	< 2	< 4	< 2	< 2	2 J	< 4	< 2
Propane	NS	< 1	< 1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Styrene	100	< 20	< 10	< 5	< 5	< 10	< 1	< 5	< 1	< 2	< 1	< 1	< 1	< 2	< 1
1,1,2,2-Tetrachloroethane	NS	< 20	< 10	< 5	< 5	< 10	3 J	< 5	2 J	4 J	5	3 J	3 J	3	5
Tetrachloroethene (PCE)	5	71 J	< 8	87	62	62	33	44	130	29	29	38	29	17	18
Toluene	1,000	< 14	< 7	< 4	< 4	< 7	1 J	< 4	< 0.7	< 1	< 0.7	< 0.7	< 0.7	< 1	2
trans-1,2-Dichloroethene	100	< 16	< 8	19 J	8 J	8 J	6	6 J	7	6 J	3 J	4 J	12	3	2
trans-1,3-Dichloropropene	NS	< 20	< 10	< 5	< 5	< 10	< 1	< 5	< 1	< 2	< 1	< 1	< 1	< 1	< 0.5
1,1,1-Trichloroethane (TCA)	200	320	39 J	280	120	120	74	80	42	27	54	44	24	17	21
1,1,2-Trichloroethane	5	< 16	6 J	9 J	< 8	< 8	5 J	< 4	2 J	3 J	4 J	3 J	2 J	3	4
Trichloroethene (TCE)	5	270	22 J	280	140	140	91	110	86	44	77	71	49	43	32
Vinyl Chloride	2	200	140	76	48	130	120	48	16	23	16	17	18	16	360
Xylene (Total)	10,000	< 16	12 J	< 4	< 4	< 8	14	< 4	< 0.8	2 J	< 0.8	< 0.8	< 0.8	< 1	30

Notes:
ug/L - microgram per liter
NA - Not Analyzed; NS - MCL not established
Italics/Bold - Indicates that the compond is a Constituent of Concern (COC) with a specific Performance Standard as defined in the 1997 Record of Decision (ROD) and/or 2012 Explanation of Significant Differences (ESD)
[1] Site performance standard risk range for 1,4 Dioxane is 0.78 - 78 ug/L as assigned in the 2012 ESD and based on the current EPA R3 Risk-based Screening Level (RSL) for tap water (May 2014)
[2] The individual trihalomethanes (bromodichloromethane; bromoform; dibromochloromethane, chloroform) all have the MCL of 80 µg/L listed in the RSL table. However, 80 µg/L is the MCL for Total Trihalomethanes.
< - the analyte was not detected above the specified method detection limit.
COC exceeds Performance Standard
J - The analyte was detected at a concentration less than the PQL but greater than the MDL. The concentration is estimated.
UJ - The result has been qualified as approximate.

Table 4.

AISB Performance Monitoring- 2010 to Current
Summary of VOCs in Groundwater
Malvern TCE Superfund Site
East Whiteland Township, Pennsylvania

CC-07 - Extraction Well								
	PCE	TCE	cDCE	VC	Ethene	1,1,1-TCA	1,1-DCA[2]	CA[2]
MCL[1]	5	5	70	2	NS	200	2	21,000
1/26/2009	110	250	1,050	211	286	< 25	76	77
3/11/2009	60	170	1,280	257	302	< 30	87	98
8/20/2009	82	300	540	250	71	60	160	48
3/18/2010	1,110	2,250	10,060	780	660	700	230	23
4/1/2010	600	2,000	10,680	779	633	760	256	14
4/15/2010	360	1,380	7,780	696	460	580	200	6
4/29/2010	370	2,150	9,570	783	481	535	247	7
5/13/2010	< 20	1,700	10,570	985	573	530	298	11
5/27/2010	250	1,420	13,100	1,090	679	550	390	13
6/30/2010	175	840	8,180	900	700	350	280	13
8/5/2010	187	1,353	9,467	1,053	611	381	326	15
9/2/2010	50 est	447	5,940	920	840	190	290	15
9/30/2010	150 est	912	5,390	914	1,010	195	282	22
10/28/2010	<20	<45	3,010	1,380	1,380	<40	290	4
12/2/2010	< 20	390	1,710	354	1,520	60 est	175	53
12/29/2010	< 20	520	1,510	190	1,030	65	120	44
1/31/2011	< 20	134	1,230	250	1,120	50	129	42
3/2/2011*	34	230	3,000	500	1,300	97	190	42
3/30/2011	< 180	493	4,920	708	1,430	260	228	23
4/28/2011	<160	514	6,180	671	1,570	310	219	17
6/8/2011	< 35	< 12	133	148	2,710	< 10	330	< 4
7/7/2011	190	1,720	4,320	439	1,600	280	152	18
8/4/2011	80 est	542	3,360	694	1,970	170	161	22
9/1/2011	670 est	2,960	4,470	386	1,270	430	130	14
9/29/2011	180 est	1,200	4,840	410	1,400	270	135	14
10/27/2011	150	870	5,450	560	1,450	280	140	12
12/1/2011	290 est	1,470	5,980	480	1,230	300	120	14
12/29/2011	100 est	580	5,440	570	1,540	290	130	12
1/26/2012	110 est	820	5,980	520	1,310	360	160	13
03/01/2012*	42	290	3,300	420	2,100	120	150	26
3/27/2012	48 est	410	3,240	370	1,450	130	84	13
4/26/2012	32 est	180	2,630	320	1,360	120	79	12
6/1/2012	110	600	2,620	380	1,030	130	100	12
6/1/2012^	120	650	2,840	370	1,030	130	110	12
8/30/2012	40 est	270	1,500	310	1,150	82	63	21
11/29/2012	30 est	280	2,010	260	440	40 est	55	7
2/28/2013*	69	510	7,800	330	310	190	140	< 10 U
5/30/2013*	290	3,300	5,300	260	190	120	110	< 10
9/12/2013	170	1,190	2,850	240	250	100	50	11
11/25/2013	43	590	2,400	180	130	53	36	5
2/27/2014*	340	2,000	6,400	280	180	270	110	11 J
2/27/2014	270	1,310	4,100	170	180	150	56	5
5/29/2014	240	1,210	4,300	250	330	180	73	5
8/28/2014	18 est	100	3,810	290	660	130	110	7.9
11/24/2014	23	85	490	140	770	36	79	9.0
2/25/2015*	96	530	2,100	270	360	84	110	26

GW-07 - Monitoring Well								
	PCE	TCE	cDCE	VC	Ethene	1,1,1-TCA	1,1-DCA[2]	CA[2]
MCL[1]	5	5	70	2	NS	200	2	21,000
1/26/2009	< 20	< 12	< 20	< 4	14	< 25	< 10	76
8/18/2009	3 J	9	180	94	1,600	7	33	320
3/18/2010	< 30	36	1,330	450	2,460	48 est	220	50
4/1/2010	< 30	219	30,050	3,380	1,390	1,420	385	55
4/15/2010	110	490	17,880	2,760	1,330	860	230	28
4/29/2010	250	992	16,470	4,880	2,790	810	433	42
4/29/2010^	210	918	15,680	4,690	2,570	815	434	43
5/13/2010	210	730	10,960	5,330	3,950	570	675	38
5/27/2010	280	920	14,500	4,020	3,230	650	820	25
6/30/2010	310	1,210	7,400	780	3,420	450	150	270
8/5/2010	139	802	6,445	947	2,289	305	217	493
9/2/2010	530	1,730	14,030	2,660	3,010	620	400	42
9/30/2010	50 est	133	14,540	4,860	3,560	240	400	116
10/28/2010	<20	<12	12,740	2,520	2,020	280	350	25
12/1/2010	< 80 est	< 20	545	221	3,990	< 20	82	73
12/1/2010^	< 20	< 20	245	106	1,255	< 20	17	66
12/29/2010	< 20	< 12	38	15	3,140	< 20	< 10	75
1/31/2011	< 20	< 12	148	52	4,230	< 25	71	49
3/2/2011*	2 J	3 J	250	86	4,100	8	39	41
3/30/2011	< 35	21	1,920	807	2,370	50	119	55
4/28/2011	< 100	< 12	1,150	330	2,640	35	115	55
6/7/2011	140 est	< 12	206	83	3,130	< 25	38	33
7/7/2011	<100	< 12	162	61	2,580	< 20	16	22
8/4/2011	< 20	< 12	450	141	2,750	< 20	26	19
9/1/2011	< 20 est	23	348	174	3,280	< 40	44	13
9/29/2011	< 20	< 12	70	50	3,510	< 20	40	14
10/27/2011	< 20	66	230	110	2,840	< 40	71	31
12/1/2011	< 35	180	1,530	590	2,580	< 30	52	17
12/29/2011	240 est	800	1,710	530	2,380	50	53	23
1/26/2012	150 est	410	1,350	460	2,390	25	72	24
02/29/2012*	4 J	16	860	560	3,500	73	180	43
3/27/2012	< 20 est	< 12	1,750	900	2,390	60	77	16
4/26/2012	< 20 est	49	1,470	770	3,380	100	120	11
6/1/2012	20	88	3,300	1,250	3,020	66	170	9
8/29/2012	120 est	640	1,740	480	3,470	88	55	16
11/29/2012	< 20	37	550	160	1,990	< 20	27	26
2/28/2013*	10	15	450	230	1,700	17	56	30
5/30/2013*	7	22	400	170	2,900	10	40	35
9/12/2013	590	2,660	1,220	160	450	< 20	< 10	14
11/25/2013	430	1,730	1,830	340	1,450	< 20	43	10
2/27/2014*	1,100	6,700	2,300	350	2,100	120	60	15 J
2/27/2014	940	4,890	1,650	230	1,350	70	27	8.4
5/29/2014	800	3,770	1,940	280	1,690	110	43	18
8/28/2014	600	3,150	4,690	810	1,900	150	120	8.2
11/24/2014	< 20	8.0 est	220	46	1,140	< 20	12	17
2/23/2015*	2	2	75	41	170	1	22	43

Indicates data prior to full-scale lactate injections.
All values are reported as ug/L (ppb)
1. Value shown is MCL (maximum contaminant level)
2. No specified MCL, value is EPA 2009 Regional Screening Level (RSL) for Tap Water
NS - No standard NA - not analyzed
PCE- Tetrachloroethene TCE- Trichloroethene cDCE- cis 1,2-dichloroethene VC- Vinyl chloride
1,1,1-TCA - 1,1,1-trichloroethane 1,1-DCA- 1,1-dichloroethane CA- Chloroethane
* - Analysis performed by Lancaster Laboratories
^ - Indicates field duplicate results
As of 9/12/2013, analyses are performed by XDD, LLC unless otherwise noted

Table 4.

AISB Performance Monitoring- 2010 to Current
Summary of VOCs in Groundwater
Malvern TCE Superfund Site
East Whiteland Township, Pennsylvania

GW-08 - Extraction Well								
	PCE	TCE	cDCE	VC	Ethene	1,1,1-TCA	1,1-DCA[2]	CA[2]
MCL[1]	5	5	70	2	NS	200	2	21,000
1/26/2009	< 20	< 12	28	14	1,380	45	55	5
8/18/2009	1 J	3 J	78	28	2,900	8	92	72
3/18/2010	< 30	130	3,110	840	1,770	310	240	52
4/1/2010	< 30	70	2,442	848	1,600	190	295	46
4/15/2010	< 20	29	2,260	610	1,910	110	300	45
4/29/2010	< 25	33	1,920	536	2,040	102	337	90
5/13/2010	< 20	69	1,500	560	2,040	56	270	122
5/27/2010	<20	43	1,610	495	2,520	60	250	155
6/30/2010	< 25	22	730	300	2,200	60	130	145
8/5/2010	26	18	618	262	2,082	55	114	127
9/2/2010	<20	21	630	250	2,320	27	110	130
9/2/2010^	29	22	683	249	2,373	45	119	127
9/30/2010	<20	19	651	269	2,430	<30	111	132
10/28/2010	<20	<12	390	175	2,270	<20	97	95
12/2/2010	< 20	< 12	348	239	2,170	< 20	76	96
12/29/2010	< 20	< 12	250	168	1,660	< 20	75	73
1/31/2011	< 20	< 12	147	74	1,780	< 20	74	76
3/3/2011*	5 J	6	280	150	2,000	12	74	85
3/30/2011	< 60	< 12	307	128	1,430	< 25	63	46
4/28/2011	<110	<12	252	110	1,400	<25	65	45
6/8/2011	< 35	< 12	124	51	1,270	< 10	49	46
7/7/2011	<100	<12	144	61	1,570	<25	59	45
8/4/2011	< 20	<12	100	50	1,610	< 20	44	40
9/1/2011	< 20	< 12	87	41	1,300	< 20	30	40
9/29/2011	< 20	<12	61	35	1,350	34	42	41
10/27/2011	< 20	<12	105	48	1,650	< 20	52	54
12/1/2011	< 20	< 12	70	38	1,290	< 20	44	50
12/29/2011	< 20	< 12	63	36	1,380	< 20	35	47
1/26/2012	< 20	< 12	48	24	1,190	26	32	44
03/01/2012*	2 J	2 J	51	34	1,400	2 J	65	86
3/27/2012	< 20	< 12	58	37	1,110	< 20	21	35
4/26/2012	< 20	12	150	73	1,150	< 20	37	34
6/1/2012	< 20	< 12	170	70	1,040	< 20	30	31
8/30/2012	< 20	< 12	120	53	720	< 20	17	25
11/29/2012	< 20	< 12	160	52	420	< 20	13	24
2/28/2013*	7	7	190	44	310	2 J	35	31
5/30/2013*	6	7	190	58	460	7	71	44
9/12/2013	17 est	63	610	180	980	19	57	13
11/25/2013	14 est	29	420	75	540	< 20	23	14
2/27/2014*	37	200	1,700	450	960	30	57	14
2/27/2014	37	150	1,360	310	710	22	36	7.2
5/29/2014	50	250	2,320	380	450	41	36	4.6
8/28/2014	19 est	84	870	160	1,200	28	100	4.5
11/24/2014	< 20	< 12	49	25	280	< 20	19	8.6
2/25/2015*	1	2	6	4	3.9 est	< 0.5	9	20

GW-18 - Extraction Well								
	PCE	TCE	cDCE	VC	Ethene	1,1,1-TCA	1,1-DCA[2]	CA[2]
MCL[1]	5	5	70	2	NS	200	2	21,000
8/21/2009	4,100	33,000	4,200	< 25 U	< 1.0 U	1,800	56 J	< 25 U
3/18/2010	1,830	9,850	5,250	490	200	890	72	14
4/1/2010	1,020	6,250	7,080	523	290	775	111	13
4/15/2010	760	3,730	7,490	568	390	650	100	9
4/29/2010	640	4,500	10,200	682	581	752	186	13
5/13/2010	770	3,180	13,100	626	423	790	163	11
5/27/2010	810	5,580	12,640	680	555	820	190	19
6/30/2010	170	1,230	15,090	600	570	760	160	25
8/5/2010	207	1,173	12,842	602	933	721	137	45
9/2/2010	660 est	4,090	9,310	570	916	660	120	40
9/30/2010	210 est	1,490	9,440	669	1,080	500	130	39
10/28/2010	230 est	2,320	11,820	747	1,370	670	140	53
12/2/2010	< 20	620	10,560	866	1,450	540	155	74
12/29/2010	< 20	1,160	13,540	1,040	960	650	130	49
1/31/2011	< 20	3,150	20,640	1,120	1,130	1,250	180	43
3/3/2011*	300	2,000	9,600	790	1,300	430	150	70
3/30/2011	< 250	1,270	11,830	978	1,650	580	144	66
4/28/2011	<120	264	11,410	986	1,620	470	175	57
6/8/2011	< 50	423	6,820	755	1,960	300	149	59
6/8/2011^	< 50	429	6,900	748	1,930	300	153	58
7/7/2011	<100	123	7,020	766	1,680	310	143	60
8/4/2011	260 est	1,450	7,230	765	1,540	340	108	53
9/1/2011	230 est	1,250	6,710	732	1,710	350	110	54
9/29/2011	50 est	185	5,190	540	1,570	240	100	42
10/27/2011	40	240	7,200	790	1,880	280	110	41
12/1/2011	< 20	92	5,910	700	1,640	220	94	42
12/29/2011	< 25	120	6,740	870	1,870	230	100	47
1/26/2012	< 20	110	5,700	840	1,740	210	110	46
03/01/2012*	20 J	94	5,900	760	2,000	180	110	55
03/01/2012*^	19 J	89	5,800	720	2,000	170	110	56
3/27/2012	< 20	21	2,930	625	1,880	85	69	35
4/26/2012	< 20	< 12	3,540	650	1,960	120	85	35
6/1/2012	< 20	< 12	2,620	640	2,050	99	77	41
8/30/2012	< 20	15	3,500	750	1,150	120	81	31
11/29/2012	< 20	48	3,580	910	1,190	110	74	26
2/28/2013*	7 J	24 J	3,800	750	1,500	120	94	23 J
2/28/2013*^	10 J	38	4,600	830	1,500	140	99	21 J
5/30/2013*	13 J	57	5,400	1,100	1,100	120	110	29 J
9/12/2013	8 est	41	3,780	740	940	81	67	14
9/12/2013^	< 20	32	2,990	580	850	< 20	43	13
11/25/2013	7.7 est	< 12	2,360	720	1,310	37	61	20
2/27/2014*	23	100	2,400	670	1,400	70	82	25
2/27/2014	23.0	63	1,790	470	880	51	42	18
2/27/2014^	24.0	58	1,600	440	920	46	35	18
5/29/2014	14 est	41	2,070	470	840	61	73	19
8/28/2014	14 est	43	1,640	280	720	63	60	11
8/28/2014^	15 est	48	1,880	300	720	65	72	13
11/24/2014	16 est	84	1,490	210	540	46	33	13
11/24/2014^	14 est	71	1,390	220	550	48	27	13
2/25/2015*	16	100	2,100	270	430	67	56	19
2/25/2015*^	17	100	2,100	280	420	70	57	20

Indicates data prior to full-scale lactate injections.
All values are reported as ug/L (ppb)
1. Value shown is MCL (maximum contaminant level)
2. No specified MCL, value is EPA 2009 Regional Screening Level (RSL) for Tap Water
NS - No standard NA - not analyzed
PCE- Tetrachloroethene TCE- Trichloroethene cDCE- cis 1,2-dichloroethene VC- Vinyl chloride
1,1,1-TCA - 1,1,1-trichloroethane 1,1-DCA- 1,1-dichloroethane CA- Chloroethane
* - Analysis performed by Lancaster Laboratories
^ - Indicates field duplicate results
As of 9/12/2013, analyses are performed by XDD, LLC unless otherwise noted

Table 4.

AISB Performance Monitoring- 2010 to Current
Summary of VOCs in Groundwater
Malvern TCE Superfund Site
East Whiteland Township, Pennsylvania

GW-10 - Extraction Well								
	PCE	TCE	cDCE	VC	Ethene	1,1,1-TCA	1,1-DCA[2]	CA[2]
MCL[1]	5	5	70	2	NS	200	2	21,000
1/26/2009	43	350	16,340	273	434	1,080	100	47
3/11/2009	47	190	9,500	599	626	290	130	125
8/20/2009	4 J	4 J	1,400	2,200	1,700	66	380	160
3/18/2010	< 30	560	5,770	210	135	730	98	6
4/1/2010	47	374	5,960	175	119	690	115	5
4/15/2010	60	210	9,320	207	122	990	150	5
4/29/2010	110	647	8,370	393	212	681	257	5
5/13/2010	50 est	266	10,070	470	202	790	335	5
5/27/2010	140	856	9,290	532	277	645	431	6
6/30/2010	50 est	330	9,110	540	260	380	470	35
8/5/2010	<20	80	9,803	914	442	341	509	42
8/5/2010^	<20	56	7,829	765	422	284	429	33
9/2/2010	<20	1,070	5,990	560	380	360	260	13
9/30/2010	75 est	667	6,120	691	576	350	279	22
10/28/2010	<40	360	8,010	780	604	400	350	70
12/2/2010	< 20	225	3,630	633	870	80 est	192	24
12/2/2010^	< 20	239	3,950	631	870	90	200	25
12/29/2010	< 20	46	3,000	521	763	86	165	17
1/31/2011	< 20	367	5,270	748	981	330	313	18
3/3/2011*	10 J	43	3,200	580	900	98	210	27
3/3/2011*^	19 J	150	3,300	530	810	100	200	25 J
3/30/2011	< 120	209	5,270	889	1,360	350	297	29
4/28/2011	<80	221	7,620	1,010	1,920	330	377	34
6/8/2011	790 est	3,700	10,030	765	1,680	930	327	35
7/7/2011	<100	1,730	8,360	851	2,890	630	272	28
8/4/2011	310 est	2,980	7,710	928	2,250	680	280	43
9/1/2011	100 est	922	9,630	1,010	1,810	880	280	56
9/29/2011	70 est	550	6,220	840	2,090	390	270	20
10/27/2011	55	640	12,560	1,060	1,990	880	330	22
12/1/2011	50 est	490	5,260	930	1,750	250	170	21
12/29/2011	140 est	1,150	7,720	1,110	2,370	440	280	29
1/26/2012	260 est	2,170	7,280	990	1,980	580	270	24
03/01/2012*	170	2,000	7,800	620	1,600	410	260	38 J
3/27/2012	160 est	1,640	7,990	830	1,990	540	220	17
4/26/2012	150 est	1,140	10,000	1,030	2,410	560	280	25
6/1/2012	130	1,440	10,090	1,060	2,070	550	320	16
8/30/2012	750 est	2,890	13,970	1,700	1,130	1,290	280	< 4
9/26/2012	1000 est	4,200	12,230	1,310	890	1,200	170	< 4
10/25/2012	1,720	9,410	11,080	1,550	1,800	1,350	210	< 4
11/29/2012	40 est	250	12,430	1,390	1,870	780	510	< 4
12/27/2012	560	1,460	13,340	1,050	1,700	1,040	390	< 4
1/31/2013	2,440	12,570	7,730	1,030	800	1,350	140	< 4
2/28/2013*	1,300	4,800	13,000	630	1,400	1,300	270	< 10 U
5/30/2013*	1,600	6,900	21,000	1,800	2,200	1,900	370	69 J
9/12/2013	3,300	14,230	12,780	1,310	1,390	1,880	270	34
11/25/2013	2,290	13,560	7,400	1,020	890	1,660	130	< 4
2/27/2014*	510	2,500	21,000	1,200	2,200	1,700	410	< 25
2/27/2014	390	1,560	10,900	610	1,140	970	230	5
5/29/2014	1,130	3,770	11,100	1,050	790	1,200	260	15
8/8/2014	760	6,600	5,270	500	760	840	170	15
8/28/2014	870	5,930	6,310	490	1,100	750	190	16
10/9/2014	150	1,180	3,800	320	1,130	250	130	7.8
11/24/2014	500	3,430	4,440	600	1,410	360	170	12
2/25/2015*	42	390	3,900	510	1,600	230	190	19

Amendment Tank								
	PCE	TCE	cDCE	VC	Ethene	1,1,1-TCA	1,1-DCA[2]	CA[2]
MCL[1]	5	5	70	2	NS	200	2	21,000
3/18/2010	490	3,860	5,780	490	432	670	150	23
4/1/2010	170	1,850	6,250	393	398	586	155	14
6/30/2010	90 est	580	7,870	510	500	350	270	39
8/5/2010	64	414	7,920	660	562	325	292	38
9/2/2010	190 est	1,150	6,150	530	576	300	213	31
9/30/2010	<70	576	6,050	592	658	270	215	31
10/28/2010	85	830	8,190	646	726	410	260	59
12/2/2010	< 20	245	4,070	474	740	130	170	39
12/29/2010	< 20	270	4,680	439	532	180	120	25
1/31/2011	< 20	398	6,320	666	860	310	239	30
3/3/2011*	73	540	4,300	570	780	170	180	44
3/30/2011	< 70	354	6,250	710	1,080	280	200	34
4/28/2011	<140	159	6,720	682	1,140	270	234	29
6/9/2011	< 100	1,070	6,100	582	1,450	380	196	37
7/7/2011	<100	489	5,690	598	1,560	290	175	33
8/4/2011	150 est	1,400	6,170	751	1,640	380	189	41
9/1/2011	130 est	1,100	5,830	600	1,170	440	166	37
9/29/2011	50	360	5,010	550	1,450	280	170	26
10/27/2011	55	360	8,220	770	1,660	440	210	27
12/1/2011	60 est	380	4,700	610	1,260	220	130	25
12/29/2011	50 est	380	5,520	740	1,720	270	160	30
1/26/2012	85 est	830	5,610	740	1,420	320	180	28
3/27/2012	32 est	360	3,910	530	1,440	190	100	21
4/26/2012	41 est	270	4,530	570	1,510	200	120	26
6/1/2012	50	340	4,060	520	880	210	160	22
6/27/2012	60	230	4,280	630	1,270	220	120	22
7/26/2012	90	280	4,640	630	860	290	110	23
8/30/2012	110 est	360	4,890	640	340	300	130	17
9/26/2012	64 est	240	3,310	500	490	200	92	16
10/25/2012	180	1,110	3,160	610	1,010	220	95	14
11/29/2012	< 20	55	3,660	500	400	150	160	11
12/27/2012	50	130	3,440	510	500	170	110	13
1/31/2013	140	820	3,470	600	610	170	82	15
2/28/2013*	95	420	3,800	420	640	220	120	16
3/21/2013	220	1,060	3,550	520	640	180	90	13
4/25/2013*	65	290	4,300	360	450	230	140	16 J
5/30/2013*	100	510	4,200	520	720 E	190	130	25 J
6/27/2013*	96	560	3,600	350	480	190	110	16 J
7/24/2013*	97	570	3,700	320	290	170	100	15
9/12/2013	170	940	3,460	360	410	210	86	12
10/3/2013	220	1,400	2,950	380	480	260	80	11
10/31/2013	160	1,300	2,820	300	330	230	70	10
11/25/2013	120	930	2,250	250	270	150	60	9.6
12/23/2013	150	900	2,960	290	400	190	64	8.7
1/28/2014	170	700	2,570	280	380	210	64	7.1
2/27/2014*	140	680	5,200	410	750	300	130	15 J
2/27/2014	88	380	2,610	190	340	140	60	5
3/25/2014	81	290	3,430	330	530	200	120	13
4/24/2014	120	490	4,810	770	880	390	200	28
5/29/2014	190	730	4,290	410	450	280	120	9.6
6/24/2014	46	190	6,530	670	620	340	260	11.0
7/28/2014	270	3,620	4,130	390	540	470	130	12.0
8/28/2014	18 est	120	1,890	200	610	62	72	6.6
9/29/2014	21	200	2,340	230	760	88	87	9.4
10/30/2014	40	210	1,800	230	670	67	72	10.0
11/24/2014	190	730	4,290	410	450	280	120	9.6
12/29/2014	25	120	1,530	130	330	60	32	8.3
1/28/2015	28	380	2,550	220	740	85	64	10.0
2/25/2015*	27	210	2,800	300	720	130	100	17
3/30/2015	16	76	1,520	150	420	68	54	7.5

Indicates data prior to full-scale lactate injections.
All values are reported as ug/L (ppb)
1. Value shown is MCL (maximum contaminant level)
2. No specified MCL, value is EPA 2009 Regional Screening Level (RSL) for Tap Water
NS - No standard NA - not analyzed
All analytical results reported in micrograms per liter (ug/L)
PCE- Tetrachloroethene TCE- Trichloroethene cDCE- cis 1,2-dichloroethene
1,1,1-TCA - 1,1,1-trichloroethane 1,1-DCA- 1,1-dichloroethane CA- Chlo
* - Analysis performed by Lancaster Laboratories
^ - Indicates field duplicate results
As of 9/12/2013, analyses are performed by XDD, LLC unless otherwise noted

Table 4.

AISB Performance Monitoring- 2010 to Current
Summary of VOCs in Groundwater
Malvern TCE Superfund Site
East Whiteland Township, Pennsylvania

GW-12A - Extraction Well								
	PCE	TCE	cDCE	VC	Ethene	1,1,1-TCA	1,1-DCA[2]	CA[2]
MCL[1]	5	5	70	2	NS	200	2	21,000
8/20/2009	130	930	1,800	< 5 U	< 2.0 U	320	42	< 5 U
3/18/2010	400	2,680	1,230	35	27	350	30	< 4
4/1/2010	100	1,800	2,500	36	26	400	43	< 4
4/15/2010	120	1,160	2,370	41	31	340	52	< 4
4/29/2010	110	1,170	3,840	84	51	472	91	< 4
5/13/2010	100	945	3,350	147	58	350	99	< 4
5/27/2010	140	950	3,740	190	73	360	110	<4
6/30/2010	70 est	500	3,530	350	150	280	160	< 4
8/5/2010	111	878	2,567	509	440	186	189	18
9/2/2010	80 est	695	1,970	525	591	140	176	26
9/30/2010	<30	272	1,660	667	1,100	80	210	53
10/28/2010	<30	330	1,310	550	1,450	85	180	59
12/2/2010	< 20	490	1,190	278	1,370	60 est	110	73
12/29/2010	< 20	810	1,910	200	1,300	100	81	57
1/31/2011	< 20	1,305	2,110	181	1,450	145	92	62
3/2/2011*	210	2,100	1,800	99	860	120	67	39
3/30/2011	< 180	1,260	2,720	126	983	140	62	36
4/28/2011	<100	428	3,430	169	800	140	68	33
6/8/2011	< 50	492	895	167	930	76	72	29
7/7/2011	<100	115	785	125	1,070	60	95	33
8/4/2011	< 30	110	632	124	1,290	40	92	39
9/1/2011	< 25	270	1,140	110	823	120	75	23
9/29/2011	50 est	230	1,030	120	830	100	93	19
10/27/2011	< 35	140	1,870	185	840	160	95	19
12/1/2011	< 30	110	1,350	150	770	120	88	18
12/29/2011	< 30	110	1,020	140	960	96	84	29
1/26/2012	< 30	120	910	140	1,110	80	82	32
03/01/2012*	52	210	850	77	860	83	82	31
3/27/2012	< 20	81	560	83	930	46	47	23
4/26/2012	< 20	55	970	230	1,400	51	65	38
6/1/2012	< 20	55	500	130	1,350	39	44	34
8/30/2012	< 25	75	420	84	1,480	< 20	33	33
11/29/2012	< 25	120	550	140	1,090	40 est	31	18
2/28/2013*	21	130	560	69	1,200	65	56	18
5/30/2013*	16	71	410	73	970 E	35	63	35
9/12/2013	< 20	39	220	31	740.0	6	< 10	15
11/25/2013	14 est	44	570	55	630.0	20	19	13
2/27/2014*	22	150	880	100	220	67	36	15
2/27/2014	18	60	580	53	220	37	< 10	7
5/29/2014	8.7 est	24	820	110	220	71	50	12
8/28/2014	23	110	2,520	140	260	110	48	7.3
11/24/2014	80	450	2,460	110	410	130	45	12
2/25/2015*	63	350	2,900	180	390	170	52	18

GW-12B - Monitoring Well								
	PCE	TCE	cDCE	VC	Ethene	1,1,1-TCA	1,1-DCA[2]	CA[2]
MCL[1]	5	5	70	2	NS	200	2	21,000
8/20/2009	100	570	99	< 1 U	< 2.0 U	86	3 est	< 1 U
3/18/2010	90	700	130	3	1	80	< 10	< 4
4/1/2010	< 50	695	99	< 4	0	76	< 10	< 4
4/1/2010^	< 50	687	100	< 4	0	72	< 10	< 4
4/15/2010	< 30	180	125	< 4	2	< 30	< 10	< 4
4/29/2010	35 est	227	99	< 4	1	36	< 10	< 4
5/13/2010	< 30	157	97	< 4	1	< 25	< 10	< 4
5/27/2010	60 est	370	110	<4	<0.1	35 est	<10	<4
6/30/2010	70 est	560	110	< 4	< 0.1	70 est	< 10	< 4
8/5/2010	25	79	299	45	26	54	22	<4
9/1/2010	<25	105	70	<4	1	<20	<10	<4
9/30/2010	<20	75	75	<4	1	<30	<10	<4
10/28/2010	<20	78	72	<0.4	0	<20	<10	<4
12/2/2010	< 20	47	140	16	80	< 20	< 10	6
12/29/2010	< 20	48	154	17	98	< 20	< 10	5
1/31/2011	< 20	74	133	6	36	25	< 10	< 4
3/2/2011*	15	64	110	3 est	11	15	3 est	2 est
3/2/2011*^	15	63	110	3 est	10	15	3 est	1 est
3/30/2011	< 240	38	83	< 4	14	< 25	< 10	< 4
4/28/2011	<200	52	111	4	24	<25	<10	< 4
6/7/2011	< 50	35	63	< 4	8	< 20	< 10	< 4
7/7/2011	<150	58	65	< 4	1	<30	<10	< 4
8/4/2011	< 20	43	59	< 4	5	< 20	<10	< 4
9/1/2011	< 20	47	58	< 4	7	< 20	< 10	< 4
9/29/2011	< 20	37	44	< 2	10	< 20	< 10	< 4
10/27/2011	< 20	29	75	2	11	< 20	< 10	< 4
12/1/2011	< 20	38	50	< 4	11	< 20	< 10	< 4
12/29/2011	< 20	45	42	< 4	10	< 20	< 10	< 4
1/26/2012	< 20	39	48	< 4	14	< 20	< 10	< 4
03/01/2012*	12	51	92	4 est	29	13	3 est	2 est
3/27/2012	< 20	21	32	< 4	13	< 20	< 10	< 4
4/26/2012	< 20	34	54	< 4	15	< 20	< 10	< 4
6/1/2012	< 20	37	46	< 4	14	< 20	< 10	< 4
8/29/2012	< 20	37	40	< 4	1	< 20	< 10	< 4
11/29/2012	< 20	22	39	< 4	2	< 20	< 10	< 4
2/28/2013*	14	61	200	5 est	41	17	2 est	< 1 U
5/30/2013*	10	32	41	< 1	1.1 est	8	< 1	< 1
9/12/2013	7.5 est	29	35	< 4	3.4	< 20	< 10	< 4
11/25/2013	9.6 est	28	58	1.8	12.0	< 20	< 10	< 4
2/27/2014*	10	38	39	< 1	< 1	9	< 1	< 1
2/27/2014	10	34	36	< 4	1	< 20	< 10	< 4
5/29/2014	14 est	43	42	< 4	1.7	< 20	< 10	< 4
8/28/2014	13 est	35	32	< 4	0.4	< 20	< 10	< 4
11/25/2014	12 est	29	20	< 4	< 0.1	< 20	< 10	< 4
2/25/2015*	11	37	41	0.6 est	< 1	7	1	< 0.5

Indicates data prior to full-scale lactate injections.
All values are reported as ug/L (ppb)
1. Value shown is MCL (maximum contaminant level)
2. No specified MCL, value is EPA 2009 Regional Screening Level (RSL) for Tap Water

NS - No standard NA - not analyzed
All analytical results reported in micrograms per liter (ug/L)
VC- Vinyl chloride
PCE- Tetrachloroethene TCE- Trichloroethene cDCE- cis 1,2-dichloroethene
1,1,1-TCA - 1,1,1-trichloroethane 1,1-DCA- 1,1-dichloroethane CA- Chloroethane
* - Analysis performed by Lancaster Laboratories
^ - Indicates field duplicate results
As of 9/12/2013, analyses are performed by XDD, LLC unless otherwise noted

Table 4.

AISB Performance Monitoring- 2005 to Current
Summary of VOCs in Groundwater
Malvern TCE Superfund Site
East Whiteland Township, Pennsylvania

CC-02 - Peripheral Monitoring Well								
	PCE	TCE	cDCE	VC	Ethene	1,1,1-TCA	1,1-DCA[2]	CA[2]
MCL[1]	5	5	70	2	NS	200	2	21,000
8/20/2009	**25**	**430**	**78**	**< 1**	**< 1.0**	**23**	**11**	**< 1**
5/27/2010	<20	660	27	<4	<0.1	<20	<10	<4
8/31/2010	<25	578	<25	<4	<0.1	22	<10	<4
11/30/2010	< 300 es	430	32	< 4	< 0.1	< 20	< 10	< 4
3/1/2011*	45	170	110	< 1	< 1	24	17	< 1
6/7//2011	< 50	192	43	< 4	< 0.1	< 20	< 10	< 4
8/31/2011	< 25	80	25	< 4	< 0.1	< 20	< 10	< 4
11/30/2011	< 20	410	< 20	< 4	< 0.1	< 20	< 10	< 4
02/29/2012*	0.9 J	420	8	< 1	< 1	< 0.8	3 J	< 1
5/30/2012	< 20	270	< 20	< 4	< 0.1	< 20	< 10	< 4
8/28/2012	< 20	270	< 20	< 4	< 0.1	< 20	< 10	< 4
2/27/2013*	13	86	25	< 1	< 1	7	8	< 1
9/11/2013	8.2 est	360	< 20	< 4	< 0.1	< 20	< 10	< 4
2/26/2014*	31	110	46	< 1	< 1	13	12	< 1
2/26/2014	24	59	28	< 4	< 0.1	13	< 10	< 4
8/27/2014	< 20	420	< 20	< 4	< 0.1	< 20	< 10	< 4
2/25/2015*	8	110	15	< 0.5	< 1	3	6	< 0.5

CC-03- Peripheral Monitoring Well								
	PCE	TCE	cDCE	VC	Ethene	1,1,1-TCA	1,1-DCA[2]	CA[2]
MCL[1]	5	5	70	2	NS	200	2	21,000
8/21/2009	**250**	**1,800**	**77**	**< 2**	**< 1.0**	**49**	**5 J**	**< 2**
5/27/2010	76 est	585	30	<4	<0.1	<20	<10	<4
8/31/2010	110 est	927	<20	<4	<0.1	<25	<10	<4
11/30/2010	< 20	840	27	< 4	< 0.1	< 20	< 10	< 4
3/1/2011*	160	630	31	< 1	< 1	19	2 J	< 1
3/1/2011*^	800 est	2,040	89	< 4	< 0.1	55	12	< 4
8/31/2011	100	840	43	< 4	0	< 25	< 10	< 4
11/30/2011	190 est	1,250	65	< 4	0	< 30	< 10	< 4
11/30/2011^	200 est	< 12	53	< 4	< 0.1	< 30	1,310	< 4
02/29/2012*	150	710	29	< 1	< 1	14	2 J	< 1
5/31/2012	140	1,020	91	< 4	0.3	< 25	< 10	< 4
8/29/2012	210 est	1,190	32	< 4	< 0.1	< 25	< 10	< 4
2/27/2013*	100	440	22	< 1	< 1	9	2 J	< 1
9/11/2013	120	600	18 est	< 4	< 0.1	< 20	< 10	< 4
2/26/2014*	170	550	28	< 1	< 1	11	3 J	< 1
2/26/2014	130	550	21	< 4	< 0.1	< 20	< 10	< 4
8/27/2014	380	2,910	850	13	2	37	< 10	< 4
2/25/2015*	3	4	2,500	460	410	85	88	25

CC-13- Peripheral Monitoring Well								
	PCE	TCE	cDCE	VC	Ethene	1,1,1-TCA	1,1-DCA[2]	CA[2]
MCL[1]	5	5	70	2	NS	200	2	21,000
8/20/2009	**120**	**800**	**270**	**< 1**	**< 1.0**	**36**	**4 J**	**< 1**
5/27/2010	96 est	533	323	<4	0	< 35	<10	<4
9/1/2010	<20	<12	1,310	88	43	36 est	<10	<4
12/1/2010	< 20	15	650	69	300	< 20	22	13
3/2/2011*	2 J	2 J	200	120	380	24	38	23
6/7/2011	< 50	< 12	< 20	14	569	< 25	26	16
8/31/2011	< 20	< 12	< 20	15	620	< 20	18	15
8/31/2011^	< 20	< 12	< 20	13	595	< 20	16	14
11/30/2011	< 20	< 12	< 20	6	1,740	< 20	22	35
02/29/2012*	< 0.8	< 1	2 J	8	1,000	10	36	49
5/31/2012	< 20	< 12	< 20	5	1,630	< 20	13	23
8/28/2012	< 20	< 12	< 20	6	1,130	< 20	21	26
2/27/2013*	< 0.8	2 J	5 J	9	1,100	< 0.8	20	23
9/11/2013	28	< 12	< 20	5.1	630	< 20	< 10	17
2/26/2014*	< 0.8	< 1	< 0.8	3 J	390	< 0.8	15	16
2/26/2014	< 20	< 12	< 20	< 4	260	< 20	< 10	6
8/27/2014	9.3 est	29	100	8.9	63	< 20	< 10	4.5
2/23/2015*	4	2	360	50	330	0.6 est	56	24.0

CC-21- Peripheral Monitoring Well								
	PCE	TCE	cDCE	VC	Ethene	1,1,1-TCA	1,1-DCA[2]	CA[2]
MCL[1]	5	5	70	2	NS	200	2	21,000
12/20/2005	**154**	**761**	**205**	**< 4**	**< 0.1**	**65**	**< 10**	**< 7**
01/03/2007	**110**	**320**	**62**	**2 J**	**< 1**	**38**	**3 J**	**< 1**
05/05/2008	**300**	**1,500**	**410**	**< 2**	**NA**	**120**	**17**	**< 2**
8/18/2009	**93**	**270**	**1,300**	**170**	**1,100**	**140**	**210**	**8**
5/27/2010	44 est	136	35	<4	<0.1	<20	<10	<4
9/1/2010	170 est	629	830	<4	88	130	61	12
11/30/2010	< 20	54	390	89	960	30 est	60	56
3/1/2011*	53	86	36	9	88	13	11	9
6/7/2011	< 50	15	201	84	992	< 25	57	33
8/31/2011	< 20	50	< 20	< 4	1	< 20	< 10	< 4
11/30/2011	50 est	85	< 20	< 4	2	< 20	< 10	< 4
02/29/2012*	3 J	7	6	3 J	1,500	< 0.8	55	60
5/31/2012	30	48	< 20	< 4	18	< 20	< 10	< 4
8/29/2012	33 est	75	< 20	< 4	100	< 20	< 10	< 4
2/27/2013*	47	89	28	12	26	4 J	3 J	< 1
9/11/2013	36	55	< 20	< 4	4.4	< 20	< 10	< 4
2/27/2014*	56	67	6	< 1	< 1	3 J	< 1	< 1
2/27/2014	44	41	< 20	< 4	1	< 20	< 10	< 4
8/26/2014	40	63	< 20	< 4	1.5	< 20	< 10	< 4
2/25/2015*	2	3	8	3	610	< 0.5	46	24

GW-01- Peripheral Monitoring Well								
	PCE	TCE	cDCE	VC	Ethene	1,1,1-TCA	1,1-DCA[2]	CA[2]
MCL[1]	5	5	70	2	NS	200	2	21,000
8/19/2009	**5 J**	**14**	**840**	**320**	**3,600**	**29**	**200**	**120**
5/27/2010	<20	34	458	203	2,290	65	248	43
9/1/2010	<20	13	285	127	1,525	<25	82	80
9/1/2010^	<20	18	325	140	1,690	<25	87	82
12/1/2010	< 20	< 12	240	112	1,790	< 20	50	68
3/2/2011*	3 J	9	240	100	1,800	11	71	62
6/7/2011	< 50	< 12	112	55	1,320	< 25	35	36
8/31/2011	< 20	< 12	60	36	1,210	< 20	24	30
11/30/2011	< 20	< 12	30	30	1,630	28	24	33
02/29/2012*	0.9 J	2 J	20	13	1,200	< 0.8	31	50
5/30/2012	< 20	< 12	25	23	1,170	< 20	26	32
8/29/2012	< 20	< 12	24	19	1,330	< 20	32	37
2/26/2013*	4 J	11	240	100	1,300	2 J	44	45
9/11/2013	< 20	43	250	63	390	< 20	< 10	13
2/27/2014*	30	73	720	160	420	6	32	19
2/27/2014	20	26	470	85	350	< 20	< 10	10
8/26/2014	37	98	630	110	510	< 20	21	6.7
2/25/2015*	17	2	510	120	440	< 0.5	46	32

GW-06- Peripheral Monitoring Well								
	PCE	TCE	cDCE	VC	Ethene	1,1,1-TCA	1,1-DCA[2]	CA[2]
MCL[1]	5	5	70	2	NS	200	2	21,000
8/19/2009	**190**	**1,100**	**210**	**52**	**150**	**110**	**22**	**9 J**
5/27/2010	430	2,930	600	10	14	280	44	<4
9/1/2010	80 est	581	1,890	380	760	200	128	10
12/1/2010	< 20	148	2,200	731	2,070	115	180	49
3/1/2011*	23	96	1,300	370	1,300	83	120	40
6/7/2011	< 50	60	1,370	447	2,710	80	105	60
8/31/2011	< 20	46	160	45	278	< 30	11	5
11/30/2011	< 25	30	190	61	1,470	35	38	37
02/29/2012*	12	19	360	140	2,400	12	88	75
5/31/2012	120	450	1,200	210	1,630	72	50	30
8/29/2012	200 est	860	1,500	290	2,160	82	56	32
2/27/2013*	180	750	1,200	92	1,000	63	29	17
9/11/2013	420	1,980	1,780	170	490	95	28	10
2/27/2014*	140	480	500	44	66	27	9	3 J
2/27/2014	99	350	370	27	67	22	< 10	< 4
8/26/2014	190	1,080	3,200	350	470.0	88	35	11
2/25/2015*	49	48	1,700	320	930.0	21	87	28

Indicates data prior to full-scale lactate injections.
All values are reported as ug/L (ppb)
1. Value shown is MCL (maximum contaminant level)
2. No specified MCL, value is EPA 2009 Regional Screening Level (RSL) for Tap Water
NS - No standard NA - not analyzed
All analytical results reported in micrograms per liter (ug/L)
PCE- Tetrachloroether TCE- Trichloroetl cDCE- cis 1,2-dichloroethene VC- Vinyl chloride
1,1,1-TCA - 1,1,1-trichloroethar 1,1-DCA- 1,1-dichloroetha CA- Chloroethane
* - Analysis performed by Lancaster Laboratories
^ - Indicates field duplicate results
As of 9/11/2013, analyses are performed by XDD, LLC unless otherwise noted

Table 4.

AISB Performance Monitoring- 2005 to Current
Summary of VOCs in Groundwater
Malvern TCE Superfund Site
East Whiteland Township, Pennsylvania

GW-13- Peripheral Monitoring Well								
	PCE	TCE	cDCE	VC	Ethene	1,1,1-TCA	1,1-DCA[2]	CA[2]
MCL[1]	5	5	70	2	NS	200	2	21,000
1/4/2007	140	1,300	1,600	< 2	< 1.0	180	54	<2
10/19/2007	21	619	1,550	< 4	< 0.1	60 J	68	4
05/08/2008	66	510	730	< 2	< 0.1	73	60	10
8/26/2009	64	320	270	< 1	< 1.0	61	26	4 J
5/27/2010	40 est	335	219	<4	<0.1	40	34	4
8/31/2010	45 est	348	250	<4	<0.1	50	32	4
12/1/2010	< 20	267	140	< 4	< 0.1	20 est	24	< 4
3/2/2011*	61	290	150	< 1	< 1	51	38	6
6/8/2011	< 50	357	137	< 4	< 0.1	40	28	5
9/1/2011	< 60	310	113	< 4	30	40	19	6
11/30/2011	50 est	280	90	5	93	37	18	6.3
11/30/2011^	50 est	290	100	4.7	82	37	15	5.5
03/01/2012*	37	250	100	6	89	26	22	7
5/31/2012	30	170	58	5	140	< 25	15	5
8/29/2012	42 est	170	78	9	200	< 30	15	7
2/27/2013*	36	210	130	15	86	34	15	4 J
9/11/2013	33	180	89	11	99	17 est	< 10	3 est
2/26/2014*	43	200	150	18.0	42	31	14	5
2/26/2014	24	110	86	8.9	45	< 20	< 10	2
8/27/2014	32	150	87	9.6	21	< 20	< 10	< 4
2/24/2015*	33	160	140	15.0	14	20	11	4

GW-14A- Peripheral Monitoring Well								
	PCE	TCE	cDCE	VC	Ethene	1,1,1-TCA	1,1-DCA[2]	CA[2]
MCL[1]	5	5	70	2	NS	200	2	21,000
8/19/2009	260	1,600	2,800	< 3	< 1.0	300	150	4 J
8/19/2009^	290	1,500	2,800	< 5	< 1.0	300	150	6 J
5/27/2010	500	1,750	3,790	<4	0	370	183	<4
9/1/2010	310 est	1,300	3,490	<4	1	305	174	<4
12/1/2010	< 40	867	2,390	< 4	0	170	120	< 4
3/1/2011*	160	590	2,300	< 5	1.4 J	160	130	< 5
6/7/2011	180 est	529	1,630	< 4	3	100	92	< 4
8/31/2011	290 est	1,160	2,420	< 4	0.1	250	110	< 4
11/30/2011	110 est	630	2,280	< 4	0.3	140	97	< 4
3/1/2012	23	92	1,300	1 J	2.2 J	11	110	< 1
5/30/2012	220	710	1,300	< 4	0.4	140	73	< 4
8/28/2012	190 est	640	1,070	< 4	0	130	56	< 4
2/26/2013*	220	850	1,300	1 J	< 1	190	87	< 1
9/11/2013	200	780	1,650	1.4 est	0.45	< 20	84	< 4
2/26/2014*	160	560	1,800	9 J	< 1	170	100	< 3
2/26/2014	120	330	1,090	4	0.6	100	52	< 4
8/27/2014	< 20	8.8 est	240	< 4	< 0.1	< 20	18	< 4
2/24/2015*	18	47	860	0.6 est	< 1	9	88	0.7 est

GW-14B- Peripheral Monitoring Well								
	PCE	TCE	cDCE	VC	Ethene	1,1,1-TCA	1,1-DCA[2]	CA[2]
MCL[1]	5	5	70	2	NS	200	2	21,000
8/19/2009	48	280	440	< 1	< 1.0	53	26	1 J
5/27/2010	30 est	181	491	<4	<0.1	28	20	<4
5/27/2010^	30 est	205	535	<4	<0.1	30	20	<4
9/1/2010	38 est	240	665	<4	<0.1	34	<10	<4
12/1/2010	< 20	159	320	< 4	0	< 20	15	< 4
3/1/2011*	26	200	270	< 1	< 1	20	14	< 1
6/7/2011	< 50	232	386	< 4	< 0.1	20	17	< 4
6/7/2011^	< 50	229	380	< 4	< 0.1	20	15	< 4
8/31/2011	< 20	125	130	< 4	0	< 20	< 10	< 4
11/30/2011	< 20	150	120	< 4	< 0.1	< 20	< 10	< 4
03/01/2012*	13	140	130	< 1	< 1	7	8	< 1
5/30/2012	< 20	100	130	< 4	< 0.1	< 20	< 10	< 4
8/28/2012	< 20	47	130	< 4	1	< 20	< 10	< 4
2/27/2013*	2 J	16	21	< 1	< 1	2 J	< 1	< 1
9/11/2013	18 est	120	150	2.1 est	3.4	11 est	6.6 est	< 4
2/26/2014*	26	140	170	1 J	2.8 J	19	13	< 1
2/26/2014	21	86	100	< 4	2.7	21	< 10	< 4
8/27/2014	< 20	< 12	22	2.3 est	8.5	< 20	< 10	< 4
2/24/2015*	4	26	61	2.0	5.1	3	4	< 0.5

GW-17- Peripheral Monitoring Well								
	PCE	TCE	cDCE	VC	Ethene	1,1,1-TCA	1,1-DCA[2]	CA[2]
MCL[1]	5	5	70	2	NS	200	2	21,000
05/08/2008	8	31	330	140	208	17	32	25
05/08/2008^	9	32	330	140	197	17	31	24
8/21/2009	3 J	7	70	180	410	23	59	12
5/27/2010	<20	25	<20	4	99	<20	<10	<4
9/1/2010	<20	<12	<20	<4	188	<25	<10	4
9/1/2010^	<20	16	<20	5	119	<20	<10	<4
12/8/2010	< 20	< 12	< 20	< 4	62	< 20	16	< 4
3/2/2011*	< 0.8	3 J	7	1 J	100	13	19	2 J
6/8/2011	< 50	< 12	< 20	< 4	222	< 20	13	< 4
8/29/2011	< 20	18	< 20	5	119	< 20	< 10	< 4
11/30/2011	< 20	< 12	< 20	< 4	8.9	< 20	< 10	< 4
03/01/2012*	3 J	7	3 J	< 1	6	3 J	1 J	< 1
5/31/2012	< 20	< 12	< 20	< 4	8	< 20	< 10	< 4
8/29/2012	< 20	12	< 20	< 4	39	< 20	< 10	< 4
2/27/2013*	3 J	12	14	12	240	5 J	11	3 J
9/11/2013	5.3 est	< 12	< 20	< 4	< 0.1	< 20	< 10	< 4
2/26/2014*	7	20	21	10	21	5	5 J	< 1
2/26/2014	6	14	14	5.6	28.0	< 20	< 10	< 4
8/27/2014	< 20	7.5 est	< 20	< 4	3.9	< 20	< 10	< 4
2/25/2015*	3	11	15	7	270	2	30	9

Indicates data prior to full-scale lactate injections.

All values are reported as ug/L (ppb)

1. Value shown is MCL (maximum contaminant level)

2. No specified MCL, value is EPA 2009 Regional Screening Level (RSL) for Tap Water

NS - No standard NA - not analyzed

All analytical results rep TCE- Trichloroet cDCE- cis 1,2-dichloroethene VC- Vinyl chloride

PCE- Tetrachloroethene 1,1-DCA- 1,1-dichloroetha CA- Chloroethane

1,1,1-TCA - 1,1,1-trichloroethane

* - Analysis performed by Lancaster Laboratories

^ - Indicates field duplicate results

As of 9/11/2013, analyses are performed by XDD, LLC unless otherwise noted

Table 4.

AISB Performance Monitoring- 2005 to Current
Summary of VOCs in Groundwater
Malvern TCE Superfund Site
East Whiteland Township, Pennsylvania

GW-03 - MNA Monitoring Well	PCE	TCE	cDCE	VC	Ethene	1,1,1-TCA	1,1-DCA[2]	CA[2]
MCL[1]	5	5	70	2	NS	200	2	21,000
01/05/2007	< 0.8	1 J	< 0.8	< 1	< 1	< 0.8	< 1	< 1
05/06/2008	< 0.8	1 J	< 0.8	< 1	NA	< 0.8	< 1	< 1
08/21/2009	< 0.8	1 J	< 0.8	< 1	< 1.0	< 0.8	< 1	< 1
08/21/2009^	< 0.8	1 J	< 0.8	< 1	< 1.0	< 0.8	< 1	< 1
05/25/2010	< 0.8	2 J	< 0.8	< 1	< 1.0	< 0.8	< 1	< 1
05/25/2010^	< 0.8	2 J	< 0.8	< 1	< 1.0	< 0.8	< 1	< 1
08/30/2010	< 0.8	2 J	< 0.8	< 1	< 1	< 0.8	< 1	< 1
08/30/2010^	< 0.8	2 J	< 0.8	< 1	< 1	< 0.8	< 1	< 1
11/29/2010	< 0.8	< 1	< 0.8	< 1	< 1	< 0.8	< 1	< 1
02/29/2011	1 J	2 J	< 0.8	< 1	< 1	< 0.8	< 1	< 1
06/05/2011	1 J	2 J	< 0.8	< 1	< 1.0	< 0.8	< 1	< 1
08/30/2011	1 J	2 J	< 0.8	< 1	< 1	< 0.8	< 1	< 1
11/29/2011	1 J	1 J	< 0.8	< 1	< 1.0	< 0.8	< 1	< 1
02/23/2012	0.9 J	1 J	< 0.8	< 1	< 1	< 0.8	< 1	< 1
05/30/2012	0.8 J	1 J	< 0.8	< 1	< 1	< 0.8	< 1	< 1
8/27/2012	1 J	1 J	< 0.8	< 1	< 1	< 0.8	< 1	< 1
8/27/2012*	1 J	1 J	< 0.8	< 1	< 1	< 0.8	< 1	< 1
2/26/2013	1 J	2 J	< 0.8	< 1	< 1	< 0.8	< 1	< 1
9/10/2013*	2 J	2 J	< 0.8	< 1	< 1	< 0.8	< 1	< 1
2/24/2014*	1 J	2 J	< 0.8	< 1	< 1	< 0.8	< 1	< 1
8/26/2014*	1 J	2 J	< 0.5	< 0.5	< 1	< 0.5	< 1	< 1
2/24/2015*	1	2	< 0.5	< 0.5	< 1	< 0.5	< 1	< 1

GW-04 - MNA Monitoring Well	PCE	TCE	cDCE	VC	Ethene	1,1,1-TCA	1,1-DCA[2]	CA[2]
MCL[1]	5	5	70	2	NS	200	2	21,000
12/21/2005	18	111	22	< 4	< 1	20	< 10	< 7
05/06/2008	28	170	99	< 1	NA	26	3 J	< 1
08/19/2009	27	150	91	< 1	< 1.0	21	4 J	< 1
05/25/2010	28	130	91	< 1	< 1.0	17	4 J	< 1
08/30/2010	1 J	12	19	< 1	12	1 J	< 1	< 1
11/29/2010	23	97	62	< 1	< 1	13	3 J	< 1
02/28/2011	20	85	50	< 1	< 1	13	2 J	< 1
02/28/2011^	22	91	53	< 1	< 1	14	3 J	< 1
06/08/2011	24	90	58	< 1	< 1.0	13	3 J	< 1
08/30/2011	14	74	48	< 1	< 1	12	2 J	< 1
08/30/2011^	15	74	48	< 1	< 1	12	2 J	< 1
11/28/2011	20	72	47	< 1	< 1.0	12	2 J	< 1
11/28/2011^	18	65	49	< 1	< 1.0	12	2 J < 1	
02/27/2012	20	75	44	< 1	< 1	11	2 J	< 1
02/27/2012^	20	77	44	< 1	< 1.0	11	2 J	< 1
05/29/2012	13	81	33	< 1	< 1	10	2 J	< 1
05/29/2012*	13	58	33	< 1	< 1	10	2 J	< 1
8/27/2012	19	75	29	< 1	< 1	11	2 J	< 1
2/25/2013	16	63	24	< 1	< 1	9	2 J	< 1
2/25/2013^	17	66	24	< 1	< 1	10	2 J	< 1
9/10/2013*	16	58	23	< 1	< 1	8	1 J	< 1
9/10/2013*^	2 J	2 J	< 0.8	< 1	< 1	< 0.8	< 1	< 1
2/24/2014*	4 J	14	7	< 1	< 1	2 J	< 1	< 1
8/25/2014*	17	60	22	0.5 J	< 1	7	1	< 0.5
2/23/2015*	13	47	11	< 0.5	< 1	6	0.9 est	< 0.5
2/23/2015*^	10	37	9	< 0.5	< 1	5	0.7 est	< 0.5

GW-05 - MNA Monitoring Well	PCE	TCE	cDCE	VC	Ethene	1,1,1-TCA	1,1-DCA[2]	CA[2]
MCL[1]	5	5	70	2	NS	200	2	21,000
12/21/2005	< 20	58	43	< 4	< 1	< 15	< 10	< 7
05/06/2008	41	280	130	< 1	< 0.1	57	5 J	< 1
08/19/2009	3 J	18	12	< 1	< 1.0	4 J	< 1	< 1
05/25/2010	2 J	12	8	< 1	< 1.0	2 J	< 1	< 1
08/30/2010	< 0.8	< 1	< 0.8	< 1	< 1	2 J	< 1	< 1
12/01/2010	2 J	13	12	< 1	< 1	2 J	< 1	< 1
02/28/2011	4 J	19	14	< 1	< 1	3 J	< 1	< 1
06/06/2011	5 J	19	15	< 1	< 1.0	3 J	< 1	< 1
08/30/2011	3 J	14	11	< 1	< 1	3 J	< 1	< 1
11/29/2011	3 J	12	11	< 1	< 1.0	2 J	< 1	< 1
02/29/2012	2 J	10	10	< 1	< 1	1 J	< 1	< 1
05/29/2012	1 J	5	7	< 1	< 1	0.8 J	< 1	< 1
8/27/2012	1 J	6	6	< 1	< 1	0.9 J	< 1	< 1
2/26/2013	< 0.8	3 J	3 J	< 1	< 1	< 0.8	< 1	< 1
9/10/2013*	< 0.8	2 J	< 0.8	< 1	< 1	< 0.8	< 1	< 1
2/25/2014*	< 0.8	< 1	< 0.8	< 1	< 1	< 0.8	< 1	< 1
8/26/2014*	< 0.5	1	< 0.5	< 0.5	< 1	< 0.5	< 0.5	< 0.5
2/24/2015*	< 0.5	1	< 0.5	< 0.5	< 1	< 0.5	< 0.5	< 0.5

GW-11 - MNA Monitoring Well	PCE	TCE	cDCE	VC	Ethene	1,1,1-TCA	1,1-DCA[2]	CA[2]
MCL[1]	5	5	70	2	NS	200	2	21,000
01/02/2007	< 0.8	910	8	< 1	< 1	< 0.8	1 J	< 1
05/06/2008	< 0.8	870	7	< 1		< 0.8	2 J	< 1
08/20/2009	1 J	600	4 J	< 1	< 2.0	0.9 J	< 1	< 1
05/25/2010	< 2	1,700	16	< 2	< 1.0	< 2	2 J	< 2
08/31/2010	3 J	1,600	16	< 1	< 1	2 J	4 J	< 1
11/30/2010	< 2	660	9 J	< 2	< 1	< 2	< 2	< 2
02/23/2011	< 0.8	620	6	< 1	< 1	< 0.8	< 1	< 1
06/07/2011	1 J	1,500	16	< 1	< 1.0	< 0.8	2 J	< 1
08/30/2011	< 2	960	11	< 2	< 1	< 2	< 2	< 2
11/29/2011	< 0.8	1,300	14	< 1	< 1.0	< 0.8	2 J	< 1
02/24/2012	0.9 J	1,800	17	< 1	< 1	< 0.8	3 J	< 1
05/30/2012	< 0.8	1,100	12	< 1	< 1	< 0.8	2 J	< 1
8/28/2012	< 0.8	300	8	< 1	< 1	< 0.8	< 1	< 1
2/28/2013	< 0.8	490	6	< 1	< 1	< 0.8	< 1	< 1
9/10/2013*	3 J	1,300	10 J	< 2	< 1	< 2	3 J	< 2
2/25/2014*	< 0.8	510	6	< 1	< 1	< 0.8	1 J	< 1
8/26/2014*	< 0.5	1,000	14	< 0.5	< 1	< 0.5	2	< 0.5
2/24/2015*	0.5 est	950	9	< 0.5	< 1	< 0.5	2	< 0.5

GW-15 - MNA Monitoring Well	PCE	TCE	cDCE	VC	Ethene	1,1,1-TCA	1,1-DCA[2]	CA[2]
MCL[1]	5	5	70	2	NS	200	2	21,000
05/06/2008	< 0.8	< 1	< 0.8	< 1	0	< 0.8	< 1	< 1
08/20/2009	< 0.8	< 1	< 0.8	< 1	< 2.0	< 0.8	< 1	< 1
05/24/2010	< 0.8	< 1	< 0.8	< 1	< 1.0	< 0.8	< 1	< 1
08/31/2010	< 0.8	< 1	< 0.8	< 1	< 1	< 0.8	< 1	< 1
11/29/2010	< 0.8	< 1	< 0.8	< 1	< 1	< 0.8	< 1	< 1
03/31/2011	< 0.8	< 1	< 0.8	< 1	< 1	< 0.8	< 1	< 1
06/06/2011	< 0.8	< 1	< 0.8	< 1	< 1.0	< 0.8	< 1	< 1
08/30/2011	< 0.8	< 1	< 0.8	< 1	< 1	< 0.8	< 1	< 1
11/28/2011	< 0.8	< 1	< 0.8	< 1	< 1.0	< 0.8	< 1	< 1
02/28/2012	< 0.8	< 1	< 0.8	< 1	< 1	< 0.8	< 1	< 1
05/29/2012	< 0.8	< 1	< 0.8	< 1	< 1	< 0.8	< 1	< 1
8/28/2012	< 0.8	< 1	< 0.8	< 1	< 1	< 0.8	< 1	< 1
2/26/2013	< 0.8	< 1	< 0.8	< 1	< 1	< 0.8	< 1	< 1
9/10/2013*	< 0.8	< 1	< 0.8	< 1	< 1	< 0.8	< 1	< 1
2/25/2014*	< 0.8	< 1	< 0.8	< 1	< 1	< 0.8	< 1	< 1
8/26/2014*	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 0.5	< 0.5	< 0.5
2/23/2015*	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 0.5	< 0.5	< 0.5

GW-18 - MNA Monitoring Well	PCE	TCE	cDCE	VC	Ethene	1,1,1-TCA	1,1-DCA[2]	CA[2]
MCL[1]	5	5	70	2	NS	200	2	21,000
05/07/2008	< 0.8	< 1	< 0.8	< 1	1	< 0.8	< 1	< 1
08/21/2009	< 0.8	< 1	< 0.8	< 1	< 1.0	< 0.8	< 1	< 1
05/25/2010	< 0.8	< 1	< 0.8	< 1	< 1.0	< 0.8	< 1	< 1
08/31/2010	< 0.8	< 1	< 0.8	< 1	< 1	< 0.8	< 1	< 1
11/30/2010	< 0.8	< 1	< 0.8	< 1	< 1	< 0.8	< 1	< 1
03/31/2011	< 0.8	< 1	< 0.8	< 1	< 1	< 0.8	< 1	< 1
06/07/2011	< 0.8	< 1	< 0.8	< 1	< 1.0	< 0.8	< 1	< 1
08/31/2011	< 0.8	< 1	< 0.8	< 1	< 1	< 0.8	< 1	< 1
11/29/2011	< 0.8	< 1	< 0.8	< 1	< 1.0	< 0.8	< 1	< 1
02/28/2012	< 0.8	< 1	< 0.8	< 1	< 1	< 0.8	< 1	< 1
05/30/2012	< 0.8	< 1	< 0.8	< 1	< 1	< 0.8	< 1	< 1
8/28/2012	< 0.8	< 1	< 0.8	< 1	< 1	< 0.8	< 1	< 1
2/25/2013	< 0.8	< 1	< 0.8	< 1	< 1	< 0.8	< 1	< 1
9/10/2013*	< 0.8	< 1	< 0.8	< 1	< 1	< 0.8	< 1	< 1
2/25/2014*	< 0.8	< 1	< 0.8	< 1	< 1	< 0.8	< 1	< 1
8/26/2014*	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 0.5	< 0.5	< 0.5
2/24/2015*	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 0.5	< 0.5	< 0.5

GW-19 - MNA Monitoring Well	PCE	TCE	cDCE	VC	Ethene	1,1,1-TCA	1,1-DCA[2]	CA[2]
MCL[1]	5	5	70	2	NS	200	2	21,000
6/19/2013 (85-123)	12	42	120	< 5	NA	< 5	< 5	< 5
6/19/2013 (121.5-123)	12	44	130	< 5	NA	< 5	< 5	< 5
9/10/2013	17	56	140	< 5	< 5	< 5	< 5	< 5
2/25/2014	17	51	140	< 1	< 1	21	7	< 1
8/26/2014*	17	56	150	< 0.5	< 1	15	7	< 0.5
2/24/2015*	17	52	150	< 0.5	< 1	16	7	< 0.5

(shaded) Indicates data prior to full-scale lactate injections.

All values are reported as ug/L (ppb)

1. Value shown is MCL (maximum contaminant level)

2. No specified MCL, value is EPA 2009 Regional Screening Level (RSL) for Tap Water

NS - No standard NA - not analyzed

All analytical results reported in micrograms per liter (ug/L)

PCE- Tetrachloroethene TCE- TrichloroethecDCE- cis 1,2-dichloroethene VC- Vinyl chloride

1,1,1-TCA = 1,1,1-trichloroethane 1,1-DCA- 1,1-dichloroethanCA- Chloroethane

^ - Indicates field duplicate results

* - Analysis performed by Lancaster Laboratories