FIFTH FIVE-YEAR REVIEW REPORT

For

HAVERTOWN PCP

SUPERFUND SITE

HAVERFORD TOWNSHIP

DELAWARE COUNTY, PENNSYLVANIA

SEPTEMBER 2015

PREPARED BY:

United States Environmental Protection Agency
Region III
Philadelphia, Pennsylvania

WITH SUPPORT FROM:

Tetra Tech, Inc.

Approved by:

Cecil Rodrigues
Cecil Rodrigues, Director
Hazardous Site Cleanup Division

Date:

9/28/2015

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List of Acronyms

ARAR	Applicable or Relevant and Appropriate Requirement
ARRA	American Recovery and Reinvestment Act
Bgs	Below Ground Surface
BTEX	Benzene, Toluene, Ethylbenzene, Xylene
CD	Consent Decree
CERCLA	Comprehensive Environmental Response, Compensation, And Liability Act
CIC	Community Involvement Coordinator
COC	Contaminant of Concern
COE	U.S. Army Corps of Engineers
CR	Cumulative Risk
CSM	Conceptual Site Model
CTR	Collection trench
CW	Cluster Well
CZA	Capture Zone Analysis
DMR	Discharge Monitoring Report
EPA	U.S. Environmental Protection Agency
FS	Feasibility Study
GAC	Granular Activated Carbon
GMUC	Groundwater Migration Under Control
gpm	Gallons per Minute
GPRA	Government Performance and Results Act
HEUC	Current Human Exposure Under Control
HI	Hazard Index
IC	Institutional Control
ICIAP	Institutional Control Implementation and Assurance Plan
IW	Injection Well
KW	Kilowatt
LTRA	Long-Term Remedial Action
MCL	Maximum Contaminant Level
MCLG	Maximum Contaminant Level Goal
MTBE	Methyl-Tert Butyl Ether
NAPL	Non-Aqueous Phase Liquid
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NWP	National Wood Preservers
O & M	Operations & Maintenance
OSWER	Office of Solid Waste and Emergency Response
OU	Operable Unit
OWS	Oil Water Separator
PADER	Pennsylvania Department of Environmental Resources
PADEP	Pennsylvania Department of Environmental Protection
PCG	Philadelphia Chewing Gum, Inc.

PCP	Pentachlorophenol
PDU	Peroxide Destruction Unit
pg/L	picograms/liter
PLC	Programmable Logic Controller
PRG	Preliminary Remediation Goal
PTW	Principal Threat Waste
RA	Remedial Action
RAO	Remedial Action Objective
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
ROS	Recreation Open Space
RPM	Remedial Project Manager
RSL	Regional Screening Level
RW	Recovery Well
SWRAU	Site-Wide Ready for Anticipated Use
TBC	To Be Considered
Tt/BV	Tetra Tech/Black & Veatch
UAO	Unilateral Administrative Order
ug/L	micrograms per liter
UV/OX	Ultraviolet oxidation
VOC	Volatile Organic Compound
YMCA	Young Men’s Christian Association

Executive Summary

The Havertown PCP Superfund Site includes a plot of land approximately 12 acres in size located in Haverford Township, Delaware County, Pennsylvania (10 miles west of Philadelphia). It is surrounded by a mixture of private homes, schools, commercial establishments, industrial companies and parks. Naylors Run, a creek that flows in a southeasterly direction through the site, drains the entire Havertown PCP site. (Figures 1 and 2).

The site was formerly used as a wood-treatment facility operated by the National Wood Preservers (NWP). Due to the facility's methods of waste disposal, the property's soil and the groundwater became contaminated. The contaminated groundwater in the shallow zone migrates to the east underneath Eagle Road.

The U.S. Environmental Protection Agency (EPA) divided the cleanup into three operable units (OUs). OU1 focused on addressing onsite soils, staged waste materials, and the storm sewer effluent at the catch basin in Naylors Run. The Record of Decision (ROD) for OU1 was signed on September 11, 1989. OU2 focused on the shallow groundwater aquifer, and the ROD for this OU was signed on September 30, 1991. The ROD called for the construction of a groundwater extraction and treatment facility for the shallow groundwater. In 1993, a Superfund Removal Action was implemented to install a synthetic geomembrane cap over three acres of the Site to prevent exposure to soils contaminated with arsenic and dioxin. OU3 focused on the deep groundwater contamination, the soils and sediments of Naylors Run, as well as the soil and groundwater contamination in the Recreation Open Space (ROS) area of the Site. The OU3 ROD was signed on April 16, 2008, and is the final ROD for the Site. The OU2 remedy was incorporated into the OU3 remedy as a final groundwater remedy. The Site achieved construction completion on September 16, 2010, with the signing of the Preliminary Closeout Report.

The remedy at the Site is protective in the short term because the groundwater extraction and treatment facility is operating as intended, the multi-layer geotextile cap prevents contact with contaminated soil in the Source area, the excavation and off-site disposal of the soils from the Recreation and Open Space area prevent exposure to contaminated soil in that portion of the Site, and institutional controls are in place to maintain the integrity of the remedy and to prevent the installation of groundwater wells. However, for the remedy to remain protective in the long-term, naphthalene levels in the groundwater should be monitored to ensure the levels continue to decrease and the naphthalene plume remains in the Source Area. Downgradient deep aquifer wells CW-12D and CW-13D should be monitored on a quarterly basis for a minimum of one year to determine if Site contaminant concentrations are increasing. Monitoring frequency should be reevaluated after the first year as well as any other potential next steps, e.g., additional monitoring wells. The Institutional Control Implementation and Assurance Plan has been finalized and institutional controls (ICs) are in-place. Finally, monitoring of groundwater and Naylors Run surface water and sediment downgradient of (CTR) coupled with the ongoing operation of the groundwater treatment system should continue until the groundwater cleanup standards are met.

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

Environmental Indicators:

Human Health: HEUC (Current Human Exposure Under Control)
Groundwater Migration: GMUC (Groundwater Migration Under Control)

Sitewide Ready for Anticipated Use (SWRAU): The Site achieved Site-Wide Ready for Anticipated Use (SWRAU) status on November 14, 2013.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site Name: Havertown PCP Superfund Site		
EPA ID: PAD002338010		
Region: 3	**State:** PA	**City/County:** Haverford Township/Delaware
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): Joshua Barber		
Author affiliation: U.S. EPA Region 3		
Review period: September 2014-June 2015		
Date of site inspection: April 28, 2015		
Type of review: Statutory		
Review number: 5		
Triggering action date: 09/29/2010		
Due date *(five years after triggering action date)*: 09/29/2015		

Five-Year Review Summary Form (continued)

Issues/Recommendations

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

Issues and Recommendations Identified in the Five Year Review:

OU(s): OU2, OU3	**Issue Category: Monitoring**
	Issue: Potential for naphthalene concentrations in groundwater to increase or migrate
	Recommendation: Monitor naphthalene levels in Source area groundwater

Affect Current Protectiveness	Affect Future Protectiveness	Implementing Party	Oversight Party	Milestone Date
No	Yes	PADEP	EPA	08/31/2018

Issues and Recommendations Identified in the Five Year Review:

OU(s): OU2, OU3	**Issue Category: Remedy Performance**
	Issue: Potential of increased PCP levels in deep GW downgradient of CTR
	Recommendation: Monitor downgradient wells (CW-12D and CW-13D) on a quarterly basis for a minimum of one year. Reevaluate monitoring frequency after the first year as well as any other potential next steps, e.g., additional monitoring wells.

Affect Current Protectiveness	Affect Future Protectiveness	Implementing Party	Oversight Party	Milestone Date
No	Yes	PADEP	EPA	08/31/2018

Protectiveness Statement(s)
Include each individual OU protectiveness determination and statement. If you need to add more protectiveness determinations and statements for additional OUs, copy and paste the table below as many times as necessary to complete for each OU evaluated in the FYR report.

Operable Unit:	*Protectiveness Determination:*	*Addendum Due Date (if applicable):*
OU1	Protective	
Protectiveness Statement: The remedy for OU1 is protective in the long-term. The multi-layer geotextile cap prevents contact with or migration of contaminated soil in the Source Area. Institutional controls are in place to protect the integrity of the cap as is documented in the Institutional Control Implementation and Assurance Plan (ICIAP).		

Operable Unit:	*Protectiveness Determination:*	*Addendum Due Date (if applicable):*
OU2/OU3	Short-term Protective	
Protectiveness Statement: The remedy for OU2 was an interim remedy that was incorporated into the OU3 remedy as the final groundwater remedy. The OU2/OU3 final groundwater remedy currently protects human health and the environment because the groundwater extraction and treatment facility is operating as intended and groundwater from the Source Area and ROS Area is being captured and effectively treated to discharge limits. The Institutional Control Implementation and Assurance Plan has been finalized and ICs are in-place which prevent the installation of groundwater wells and protect the integrity of the remedy. The excavation and off-site disposal of the soils from the Recreation and Open Space area prevent exposure to contaminated soil in that portion of the Site. However, for the remedy to remain protective in the long-term naphthalene levels in the groundwater should be monitored to ensure the levels continue to decrease and the naphthalene plume remains in the Source Area. Downgradient deep aquifer wells CW-12D and CW-13D should be monitored on a quarterly basis for a minimum of one year to determine if Site contaminant concentrations are increasing. Monitoring frequency should be reevaluated after the first year as well as any other potential next steps, e.g., additional monitoring wells. Finally, monitoring of groundwater and Naylors Run surface water and sediment downgradient of CTR coupled with the ongoing operation of the groundwater treatment system should continue until the groundwater cleanup standards are met.		

Sitewide Protectiveness Statement (if applicable)	
For sites that have achieved construction completion, enter a sitewide protectiveness determination and statement.	
Protectiveness Determination: Short-term Protective	*Addendum Due Date (if applicable):* Click here to enter date.
Protectiveness Statement: The remedy at the Site is protective in the short term because the groundwater extraction and treatment facility is operating as intended, the multi-layer geotextile cap prevents contact with contaminated soil in the Source area, the excavation and off-site disposal of the soils from the Recreation and Open Space area prevent exposure to contaminated soil in that portion of the Site, and institutional controls are in place to maintain the integrity of the remedy and to prevent the installation of groundwater wells. However, for the remedy to remain protective in the long-term naphthalene levels in the groundwater should be monitored to ensure the levels continue to decrease and the naphthalene plume remains in the Source Area. Downgradient deep aquifer wells CW-12D and CW-13D should be monitored on a quarterly basis for a minimum of one year to determine if Site contaminant concentrations are increasing. Monitoring frequency should be reevaluated after the first year as well as any other potential next steps, e.g., additional monitoring wells. The Institutional Control Implementation and Assurance Plan has been finalized and ICs are in-place. Finally, monitoring of groundwater and Naylors Run surface water and sediment downgradient of CTR coupled with the ongoing operation of the groundwater treatment system should continue until the groundwater cleanup standards are met.	

Fifth Five-Year Review Report for Havertown PCP Superfund Site Haverford Township, PA

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 recommendations to address them.

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

> *If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the 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 §300.430(f) (4) (ii) states:

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

The EPA Region III has conducted a Five-Year Review of the remedial actions implemented at the Havertown PCP Superfund Site in Haverford Township, Delaware County, Pennsylvania. This review was conducted from February 2010 to September 2015. This report documents the results of the review.

This is the fifth Five-Year Review for the Havertown PCP Superfund Site. The triggering action for this review is the signature date of the fourth Five-Year Review, September 29, 2010. This statutory review is required because hazardous substances, pollutants, or contaminants are on the site above levels that allow for unlimited use and unrestricted exposure.

II. Site Chronology

Table 1 - Chronology of Site Events

Event	Date
National Wood Preservers (MWP) ran a wood treatment facility on site which resulted in release of contaminants, e.g., diesel fuel, pentachlorophenol (PCP)	1947-1963
NWP facility continued operations using different process, e.g., metal salts (copper chromium arsenate).	1964-1991
Pennsylvania Department of Environmental Resources (PADER) orders Potentially Responsible Parties to clean up Naylors Run	1972
In response to a request from PADER, EPA initiated cleanup activities under Section 311 of the Clean Water Act.	1976
Site Proposed to National Priorities List (NPL)	December 30, 1982
Final Listing on NPL	September 8, 1983
Remedial Investigation/Feasibility Study (RI/FS) Work Plan Approved	May 21, 1984
Unilateral Administrative Order (UAO) signed between EPA and NWP to conduct abatement activities	October 10, 1984
Removal Action: EPA installed a catch basin in Naylors Run to contain the chemicals	1988
Record of Decision (ROD) signature for Operable Unit (OU1)	September 11, 1989
Remedial Design for OU1 approved	October 11, 1990
First RI/FS for OU3 started (subsequently delayed)	August 1991
ROD signature for OU2	September 30, 1991
Remedial Action: EPA installed an oil/water separator at the point where the contaminated groundwater discharged to Naylors Run	October 28, 1991
Removal Action: EPA removed tanks and drums contaminated by hazardous waste from the facility and secured the buildings	1993
RI/FS for OU3 discontinued to concentrate on Removal Action	September 1994
Removal Action: Install single barrier flexible membrane cap on former NWP property to address arsenic and dioxins in on-Site soils	May 1997
First Five-Year Review	July 3, 1997
Remedial Design for OU2 approved	September 15, 1997
Consent Decree is entered into court for payment of past response costs	August 26, 1999
Second Five-Year Review	August 10, 2000
Storm sewer rehabilitated	December 2000 – January 2001
Final Remedial Investigation and Feasibility Study (RI/FS) at the site was initiated for OU3	July 2001
The groundwater treatment plant began operating full-time and the temporary treatment system was removed from the site	August 2001
Oil/water separator removed from Naylors Run inlet	September 2002

Event	Date
EPA learned of an abandoned sewer line that originates in the contaminated groundwater and travels to the residential open space area located behind Rittenhouse Circle	May 2003
EPA cleaned and grouted the abandoned sanitary sewer line	May 2004
Third Five-Year Review	August 19, 2005
ROD for OU3 issued.	April 16, 2008
Remedial Design complete for OU3.	July 30, 2009
Upgrade to pre-treatment portion of the groundwater extraction and treatment facility	November 2008 – February 2009
Remedial Action initiated for OU3.	November 17, 2009
Preliminary Close Out Report	September 16, 2010
Fourth Five-Year Review	September 29, 2010
The groundwater remedy (OU2 & OU3) transitioned from EPA Long-Term Remedial Action to PADEP Operation and Maintenance phase	June 24, 2013

III. Background

Physical Characteristics

The Havertown PCP Superfund Site includes a plot of land approximately 12 acres in size located in Haverford Township, Delaware County, Pennsylvania (10 miles west of Philadelphia) (Figures 1 and 2) . It is surrounded by a mixture of private homes, schools, commercial establishments, industrial companies and parks. Naylors Run, a creek that flows in a southeasterly direction through the site, drains the entire Havertown PCP site.

The Havertown PCP site is located in the Piedmont Uplands section of the Piedmont Physiographic Province. Consolidated rock in the vicinity of the site consists of metamorphic schist and gneiss of the Wissahickon Formation. Regionally the unconsolidated deposits that overlay the bedrock consist of saprolite (in-situ weathered bedrock), and occasional sand and gravel terrace deposits, and artificial fill. In the vicinity of the bed of Naylors Run, thicker unconsolidated gravel deposits have been identified above Wissahickon Schist. Groundwater at the Havertown site flows in a southeasterly direction and occurs in two major zones. The upper zone consists of surficial soils and saprolite (heavily weathered rock). The movement of water in the saprolite zone is influenced by the degree of saprolite weathering, relict bedrock structures, compositional variations, and the thickness of the weathered zone. The lower zone consists of fractured schist bedrock, with water movement occurring along interconnected fractures. Vertical hydraulic gradients are small, suggesting that the aquifer at the site is well connected by porous/fracture flow.

Upward flow occurs within the saturated saprolite and presumably provides observed seepage/base flow to Naylors Run southeast of Rittenhouse Circle. The depth to groundwater below the site ranges from approximately 23 feet below ground surface in the vicinity of former Young's Produce Store to seepage as springs at ground surface in the ROS Area southeast of Rittenhouse Circle. These permeable zones are closely interconnected, and typically represent one aquifer. Semi-confining layers may locally reduce aquifer interconnection — but are not widespread.

Land Resource Use

The site was formerly used as a wood-treatment facility operated by National Wood Preservers (NWP), on property leased from Clifford Rogers. Due to the facility's methods of waste disposal, the property's soil and the groundwater are contaminated. The contaminated groundwater migrates to the east underneath Eagle Road. While groundwater that is impacted by the Site and the surrounding area is not currently used as a potable water supply, the contamination presented a direct contact and ingestion threat to people walking in or near the creek, and impaired future use of the groundwater. There are no groundwater wells within a 1-mile radius of the Site. The nearest known supply well is located more than a mile north and west of the Site, which is upgradient of the source area.

History of Contamination

The Havertown PCP Site was first developed as a railroad storage yard and later became a lumberyard. In 1947 the wood-preserving facility was constructed and operated by Mr. Samuel T. Jacoby. In 1963, the existing facility was purchased by the Harris Goldstein family.

In 1962 the Pennsylvania State Department of Health became aware of contaminants in Naylors Run, and linked the source of contamination to National Wood Preservers waste disposal practices.

The majority of the activities resulting in contamination to the water bearing strata (aquifer) beneath the site occurred during the years of 1947 to 1963. Approximately one million gallons of spent wood preservatives are believed to have been dumped into a 26-foot deep well on property adjacent to the site. The property was leased from Clifford Rogers to Shell Oil Company. This disposal practice appears to be the major source of contamination at the Site.

In 1972 the Pennsylvania Department of Environmental Resources (PADER) identified contaminated groundwater discharging from a storm sewer into Naylors Run. PADER ordered NWP, Philadelphia Chewing Gum Company (owners of the property down gradient from NWP), Shell Oil Company (lessee adjacent to Clifford Rogers property), and Mr. Clifford Rogers (owner of property leased to NWP) to clean up Naylors Run, since they occupy land where contaminated groundwater exists. The above parties appealed to the State Environmental Hearing Board, and later to the Commonwealth Court of Pennsylvania. The court sustained Philadelphia Chewing Gum and Shell Oil Company's appeals and ordered the cleanup to be executed by NWP and Mr. Rogers. Implementation and maintenance of the cleanup actions by NWP and Mr. Rogers were inadequate, however, and failed to address all of the environmental concerns both on and off the site.

In response to a request from PADER in 1976, the EPA initiated cleanup activities under Section 311 of the Clean Water Act. Cleanup activities occurred in two phases. The first phase established containment operations at Naylors Run. Filter fences were installed to remove pentachlorophenol (PCP) contaminated oil from the surface water. These fences were located just downstream from the outfall of the 24-inch storm sewer pipe. Next, a 12-inch sanitary sewer was sealed; however, contaminated groundwater still discharged into Naylors Run from the 24-inch storm sewer pipe.

In 1982, EPA ended containment operations in Naylors Run, when NWP agreed to maintain in-stream treatment measures pursuant to a consent agreement with EPA. However, subsequent inspections revealed NWP was not properly maintaining the filter fences.

The Havertown PCP Site was listed on the National Priorities List by the EPA in September 1983. Subsequently, PADER signed an agreement with EPA to conduct a Remedial Investigation/ Feasibility Study (RI/FS) at the site

Because of continuing releases of PCP-contaminated oil into Naylors Run, in 1988 EPA's Emergency Response Team installed a catch basin in Naylors Run to trap the discharge from the storm pipe.

According to the Remedial Investigation performed by PADER, at least six wood-treatment chemical solutions had been used at the NWP facility since its construction. The primary contaminants of concern at the site are the result of wood-treatment operations at NWP; these are PCP, chlorinated dioxins and dibenzofurans (typical low-level contaminants in the manufacture of PCP), fuel oil and mineral spirits components, heavy metals, certain volatile organic compounds, and phenols. All these materials are primary constituents or impurities of the various wood-treatment solutions used at NWP since operation began in 1947.

Basis for Taking Action

The nature and extent of the contamination associated with the site has been investigated since 1972. Analytical data from groundwater and soil samples collected from the site and surrounding locations have identified the Havertown PCP site as the main source of contamination to soils within and adjacent to the site, to both shallow and deep groundwater and to Naylors Run, a creek that flows in a southeasterly direction from the site. Both PCP and dioxin were identified well above EPA action levels in all three media— groundwater, soil and surface water. A preliminary risk assessment was conducted and determined that both the cancer and non-cancer risks exceeded EPA's acceptable levels.

IV. Remedial Actions

Remedy Selection

In order to facilitate an effective remediation of the site, EPA divided the cleanup into three operable units (OUs).

OU1 focused on addressing on-site soils, staged waste materials, and the storm sewer effluent at the catch basin in Naylors Run. The ROD was signed on September 11, 1989. The Remedial Action Objectives (RAOs) identified in the OU1 ROD are as follows:

- Onsite Soils: Prevent wind entrainment of, and access to, the contaminated on-site soils in excess of safe levels.

Catch Basin in Naylors Run:

- Reduce PCP oil discharge to Naylors Run from the storm sewer to less than 5 milligrams per liter (mg/l). Since the highest PCP level found in the floating oil was 2,951 mg/l, the highest PCP level expected in the water if the objective is reached would be approximately 17 ug/l PCP.
- Reduce the concentration of benzene and other VOCs by 17%.

Drummed Waste Materials:

- Dispose of all contaminated waste materials properly.

The remedial action chosen to meet these RAOs consisted of the following elements:

- No-action for on-site soils with a five-year program for monitoring soils to determine the appropriateness of doing further cleanup actions.
- Installation and operation of an oil/water separator for the storm drain effluent to Naylors Run with continued monitoring.
- Landfilling of on-site waste and off-site treatment of the aqueous waste.

OU2 focused on the existing shallow groundwater aquifer; the ROD for this OU was signed on September 30, 1991. The RAOs for this ROD are as follows:

- Design and implement an interim remedial action to protect human health and the environment by removing free product and contaminated groundwater from the shallow groundwater aquifer.
- Collect data on the aquifer and contaminant response to remedial measures.

The remedial action chosen to meet these RAOs for the interim action for OU2 consisted of the following elements:

- Installation of free product recovery wells on the NWP property.

- Rehabilitation of the existing storm sewer line to reduce infiltration of contaminants from the groundwater to the storm sewer.
- Installation of a groundwater collection drain adjacent to the existing storm sewer line under the backyards of residential properties to collect groundwater for treatment at a treatment plant.
- Installation of a groundwater treatment plant at NWP to fully treat the groundwater prior to discharge back to Naylors Run.

The final phase, OU3, addressed contaminated groundwater throughout the Site and contaminated soils found in the Recreation and Open Space (ROS) area of the Site. The ROD for OU3 was signed on April 16, 2008, and it is the final ROD for the Site. The OU2 remedy was incorporated into the OU3 remedy as a final groundwater remedy. RAOs for the OU3 ROD are as follows:

Groundwater

- Mitigate contamination to Applicable or Relevant and Appropriate Requirements (ARARs) and/or risk-based cleanup levels to protect human health and the environment.
- Discharge treated groundwater to the surface water (Naylors Run) in concentrations that meet NPDES requirements.
- Prevent exposure to contaminated groundwater in the future.
- Prevent discharge of groundwater to surface water at concentrations of contaminants that would result in exceedances of water quality criteria.
- Contain the contamination plume in the source area and the ROS area to prevent further off-site migration and to ensure that downgradient groundwater is not impacted.
- Restore groundwater quality at the Site.

Soil of ROS Area

- Eliminate current exposure of human and ecological receptors to contaminated soils.
- Prevent further migration of contaminants in soil to groundwater.
- Prevent transport of contaminants in surface soils via surface water runoff.
- Prevent potential future exposure to contaminants through ingestion and dermal contact by human and ecological receptors.

The remedial action chosen to meet these RAOs consisted of the following elements:

Installation of an additional deep groundwater recovery well and associated piping to enhance performance of the [then] current groundwater remediation system to prevent the migration of site-related contaminants in both the shallow and deep aquifers.

- Operate and maintain the existing groundwater treatment facility. Upgrade or retrofit the existing groundwater treatment facility to increase the capacity of the facility to process 60 to 70 gallons per minute of contaminated water.
- Treat collected groundwater as necessary to meet discharge requirements.

- In-situ flushing in the Source area, with treated water from the groundwater treatment facility mixed with an emulsifier to enhance mobilization of the principal threat waste. Construction and installation of the in-situ flushing system would include a tank for mixing and holding the flushing solution, new injection wells, piping and an upgraded pump at the collection trench sump.
- Excavation of an area approximately 50 ft. by 50 ft. around wells SW-8 and SW-9 in the ROS area, and a narrow zone along the abandoned sewer line about 200 ft. long and 20 ft. wide. The portion of the abandoned sewer line that has not been sealed will be removed. All excavated material will be properly disposed of off-site.
- Backfilling of the excavated area with clean fill, restoration of sidewalks, curbs, utilities, etc. and planting of appropriate vegetation.
- Installation of three groundwater recovery wells and associated piping in the ROS area to extract groundwater and transport it to the Site's groundwater treatment facility for remediation.
- Demonstrate recovery of benthic macroinvertibrate and fish communities, to examine the efficacy of the ROS area excavation and groundwater treatment to reduce or eliminate the contaminant releases that are the major source of risk to aquatic organisms in Naylors Run. This ecological monitoring program would be used to evaluate incremental improvement in water and sediment quality and aquatic communities.
- Perform groundwater monitoring.
- Institutional controls to protect the integrity of the remedy and to prevent the installation of groundwater wells, through groundwater use restrictions and notices for the Site and surrounding area (as appropriate). An Institutional Control Implementation and Assurance Plan (ICIAP) will be developed for the Site during the remedial design to ensure appropriate institutional controls are drafted, implemented and monitored.

Remedy Implementation – OU1

The OU1 ROD identified remedies for the three areas of contamination: on-site soil, surface water, and disposal of the contaminated drums remaining on-site. The No-Action alternative for on-site soils was originally chosen, as it achieved the remedial objectives. The potential threat to the public's health associated with contaminated dust and infiltration of contaminants into the environment was believed to pose no significant risk to human health.

A five-year monitoring program for the soils was implemented and results were reviewed annually. The soil contamination consisted of arsenic, pentachlorophenol, polynuclear aromatic hydrocarbons, and dioxin. The sampling program was designed to determine if the soils, in their exposed condition, presented a direct contact threat to people working on or crossing the site.

During the monitoring program for soils, EPA identified that the contamination was more extensive than originally determined. Therefore, the soil contamination was addressed in 1996-1997 by a Superfund Removal Action, which provided for a synthetic geomembrane cap to be installed on three acres of the site. The installation of the cap removed the potential for exposure to soils contaminated with arsenic and dioxin by providing a synthetic geomembrane barrier and a minimum of 18 inches of soil cover over the areas of contamination. In the fall of 1997, EPA covered the capped area with an additional four to ten feet of fill and planted the fill with a mixture of seed, mulch and fertilizer. The area currently is covered with grasses and can be used for the construction of a light industrial type building with certain restrictions. Periodic inspections are performed on the cap to ensure its integrity.

The recommended alternative for cleaning up the contaminated waste staged on site was to landfill the soil and oily debris, as well as off-site treatment of aqueous waste. Off-site treatment of the liquid waste was recommended because it could be more readily implemented and would not require discharging of effluent to Naylors Run. EPA successfully removed and disposed of approximately 245 55-gallon drums of waste during the first phase of the cleanup. Also during the first phase, a tanker was emptied of approximately 4,721 gallons of liquid waste and 100 gallons of sludge, which was properly disposed. The second phase included removal and disposal of 30 55-gallon drums.

The installation of an oil/water separator at the point where contamination discharges into Naylors Run was chosen as the best alternative to address the contamination entering surface water. During the installation of the oil/water separator, 11,850 pounds of solid waste and 395 gallons of liquid waste were generated and properly disposed of. After installation in 1991, the separator was maintained and sampled on a regular basis to ensure that it continued to be effective in reducing the discharge of oil from the storm drain. The unit was removed in 2002, after the OU2 remedy was constructed and placed into operation.

Remedy Implementation – OU2

In the second Record of Decision for the site dated September 30, 1991, EPA selected a remedy for the contaminated shallow groundwater (OU2). This remedy consisted of the installation of free product recovery wells on the NWP property; the rehabilitation of the existing storm sewer line; the installation of a groundwater collection drain adjacent to the existing storm sewer line under the backyards of residential properties; and the construction of a groundwater treatment plant at NWP.

Phased construction was started in 1997, with the treatment building construction and installation of both the extraction wells and groundwater collection trench. From 2000-2001 a treatability study was conducted along with plant design, storm drain repairs and construction of transport lines. The plant went on-line in June 2001, with the discharge going to the temporary pre-treatment facility used during the design/construction of the permanent facility. The treatment plant was fully on-line in August 2001 with the discharge going to Naylors Run and sampling in accordance with EPA's National Pollutant Discharge Elimination System (NPDES) permit equivalency.

The groundwater extraction and treatment system consisted of four shallow groundwater recovery wells (RW-1 thru RW-4), one collection trench (CTR), and an on-site treatment system. The treatment system consisted of two major parts: (1) a pre-treatment system (for breaking the oil-water emulsion, removal of metals, and removal of suspended solids); and, (2) an organics removal/treatment system. A complete description of the treatment facility can be found in the 2012-2013 Technical Assessment and Operations & Maintenance Report.

In February 2006, monitoring well CW-25D was converted into a new deep groundwater recovery well (RW-5) (see Figure 2 for all well locations). In addition, two of the older recovery wells (RW-2 and RW-4) were taken out of service. These wells were not pumping due to the low water table and RW-5 lowered the water table further. In April 2006 another deep groundwater recovery well (RW-6) was installed in the old Naylors Run bedding material located near the collection trench. The other two original recovery wells (RW-1 and RW-3) were taken out of service due to the low water table. The new extraction wells captured water from the deeper aquifer, which resulted in an increase in the mass of contamination going to the treatment facility for processing.

Remedy Implementation – OU3

In November 2008, work was initiated to increase the capacity of the existing groundwater treatment facility. EPA redesigned the pre-treatment portion of the groundwater extraction facility to increase the amount of water treated by the facility. The modifications included installation of a new clarifier and a dual pressure filter system; larger pumps and piping system; a building addition to the existing treatment facility; removal and disposal of some existing pre-treatment equipment, tanks, pumps, piping and electrical items; and reuse of several pieces of equipment/tanks (as-is or relocated), related mechanical, electrical, instruments and structural items. This portion of the remedial action was completed in February 2009. The facility can now treat 70 gallons per minute of contaminated groundwater.

On November 17, 2009, remedial construction began on the next phase of the remedy implementation using American Recovery and Reinvestment Act (ARRA) funding. Prior to the start of the contaminated soil excavation, a temporary bridge had to be constructed to access the area. Excavation of contaminated soil and the abandoned sanitary sewer line in the Recreation and Open Space (ROS) area of the Havertown PCP Superfund Site began on January 26, 2010, and was completed on March 18, 2010. Approximately 3,000 cubic yards of soil was excavated. The excavation was conducted in a residential area originating between two homes then continuing through the backyards and into the ROS area. The ROS area is bordered by two creeks, and excavation continued to the creek banks. Constant dewatering of contaminated groundwater was required during the excavation. The water extracted during the dewatering process was pumped to the collection trench and treated at the groundwater extraction and treatment facility. Restoration of the ROS area included capping the sheet piling, placing riprap on the banks of Naylors Run, installing a drainage swale, and placing topsoil and seeding. The restoration of the residential area included replacing a driveway, grading and seeding the yards and landscaping the area.

During the ROS area excavation, a second pipe was found directly below the abandoned sanitary sewer line, and it was also removed. An additional investigation was conducted to determine if the second pipe followed the abandoned sanitary sewer to the groundwater collection trench. The second pipe was also found at the groundwater collection trench and was plugged to ensure contaminated groundwater could not flow through the pipe.

The construction of three monitoring wells and three additional extraction wells (RW-8 thru 10) in the ROS area was started during the week of March 29, 2010. The wells were developed, and a pump test was completed during the week of April 19, 2010. These extraction wells were placed in service in August 2010.

The force main construction began in April and continued through July 2010.

Transportation and disposal of the excavated soil began on May 24, 2010, and was completed on June 21, 2010. The soil was transported to Horizon Environmental, Inc. in Quebec, Canada, for long-term disposal, which is a hazardous waste landfill permitted by the Canadian government. The soil was manifested through Enpro Services of Vermont, Inc. acting as an intermediary arranging for export. A total of 4,421 tons of contaminated soil was shipped off-site for disposal.

Construction of the mix tank and injection wells for the in-situ flushing of the groundwater occurred in July 2010.

In October 2010, an existing deep groundwater monitoring well (CW-31D) was converted into a recovery well (RW-7) in the source area This new extraction well captures water from the deeper aquifer, which has resulted in an increase in the mass of contamination going to the treatment facility for processing.

The Ecological Study called for as part of OU3 was initiated in May 2009 with a baseline sampling event. The Ecological Study was implemented to demonstrate recovery of benthic macroinvertibrate and fish communities, and to examine the efficacy of the ROS area excavation and groundwater treatment to reduce or eliminate the contaminant releases that are the major source of risk to aquatic organisms in Naylors Run. This sampling was performed in 2010, 2012 and 2014 as outlined in the Ecological Study Work Plan for Havertown PCP Superfund Site. Preliminary evaluation of the monitoring results suggests improvement in the benthic and fish communities.

The OU3 ROD required that an Institutional Control Implementation and Assurance Plan (ICIAP) be developed for the Site. Institutional Controls are required to prevent exposure to Site soils and contaminated groundwater and to protect the integrity of the engineered remedy. As part of the OU3 remedial action, eight easements have been put in place to ensure access to and allow maintenance of the engineered remedy. A Township ordinance was enacted on August 9, 2010, which restricts the installation of groundwater wells in the area of the Site. An environmental covenant was placed on the capped area covering OU1, which instituted use restrictions to protect the integrity of the OU1 remedy.

The major Site COCs are considered to be PCP, naphthalene, dioxins/furans, benzene, toluene, ethylbenzene, xylenes (collectively BTEX), methyl-tert butyl ether (MTBE), phenanthrene and arsenic.

System Operation/Operation and Maintenance – OU2 and OU3

The groundwater extraction and treatment facility has been fully operational since August 2001. Currently three deep wells (RW-5, RW-6, RW-7) are capturing deep groundwater, and three shallow wells (RW-8, RW-9, RW-10) and the CTR are capturing shallow groundwater. In June 2013, the site was turned over to Pennsylvania Department of Environmental Protection (PADEP).

Several major plant and non-routine cleanup activities are conducted each year to facilitate the efficient operation of the facility. The major activities are noted in the yearly Technical Assessment and Operations and Maintenance Reports.

During this five-year review period, the following major plant improvements were made:

- Two larger capacity Rayox pumps were purchased and installed, which has added more hydraulic capacity thru the plant.
- The oil-water separator was reconfigured so that it can be used as a backup solids separation tank.
- Anti-scalant chemical was added into the pretreatment system to keep Calcium Carbonate minerals from building up on the inside of piping which had been a continuous problem resulting in flow loss and extra maintenance cleaning pipes. This anti-scaling system has reduced plant shutdown frequency from every 6 weeks to once every six months for cleaning, almost eliminated replacement of piping (was done once every quarter) and reduced maintenance cost substantially (estimated around $50,000/year).
- A new 30 HP VFD air compressor was installed to replace the existing 50 HP compressor. This has reduced electric and maintenance costs.
- The polymer batch system was modified with a new 55-gallon drum incorporating existing DC mixer, fill and flush connections, and a desiccant dryer. The new system saves 1,000 gallons of potable water per day.

Presently, 60 monitoring wells are included in the O&M groundwater monitoring program. These wells can be classified as shallow wells mostly above the bedrock, intermediate wells partially in bedrock, and deep wells in the bedrock. In addition, there are three deep extraction wells (RW-5, 6, and 7), three ROS area extraction wells (RW-8, 9, and 10) and the collector trench (CTR). According to the OU2 RI/FS, the shallow aquifer source area encompasses monitoring wells CW-2S, R-2, CW 4S, CW-5S, HAV-02, and HAV-04. The OU3 ROD further defined the source area encompassing monitoring wells CW-17D, CW-16S, CW-25D (now RW-5), CW-2I/D, and CW-31D (now RW-7) with regard to the deep aquifer (see Figure 3) by establishing the plume of deep free-product oil with PCP; this area is considered to be principle threat waste (PTW). There originally were four shallow recovery wells near the Source area that were taken out of service due to the low water table (RW-1 thru RW-4). Three of these wells (RW-1, RW-2 and RW-4) have been put back into service as injection wells (IW-1 thru IW-3) for the Source area flushing required as part of the OU3 ROD. See Figure 2 for well locations.

Groundwater samples are collected on a quarterly, semi-annual, and annual basis as follows:

- Quarterly sampling of seven locations (RW-8 thru RW-10, MW-1, MW-2, CW-22S/D) to determine the recovery system water quality and extraction system's effectiveness.
- Semi-annual sampling of eleven locations (7 quarterly wells plus RW-5 thru RW-10 and CTR) to monitor the edge of the shallow contaminant capture zone.
- Annual sampling of all monitoring wells to update the historical database. This includes all Site monitoring wells, recovery wells and collection trench.

The monitoring well samples are analyzed for volatile organic compounds, semi-volatile organic compounds, total metals, dissolved metals, and dioxins. During monitoring well sampling, other parameters are also collected, such as, pH, temperature, dissolved oxygen, conductivity and oxidation/reduction potential.

Monthly plant influent and effluent sampling are collected and analyzed in accordance with NPDES permit-equivalent requirements. Additional treatment system samples are collected to evaluate system performance.

Ecological sampling (surface water, sediment, fish tissue, and benthic macroinvertebrate and fish communities) was conducted in 2009 (two events), 2010 (two events), 2012 (two events), 2014 (one event), and 2015 (one event) as part of the monitoring program. Preliminary evaluation of the monitoring results suggests improvement in the benthic and fish communities.

Site maintenance also includes grass cutting, snow removal and trash pickup. There have not been any issues with these routine maintenance items.

The annual systems operations and maintenance costs are shown in Table 2. These costs include personnel, chemicals and electricity to operate and maintain the treatment facility, sampling all the monitoring wells, upkeep of the treatment facility property, as well as monthly and annual reporting.

Table 2 - Annual System Operations and Maintenance Costs

Dates		Costs
From	**To**	
July 2010	June 2011	$912,000 (Included plant improvements of $50,000)
July 2011	June 2012	$923,000 (Included plant improvements of $50,000)
July 2012	June 2013	$963,000
July 2013	June 2014	$984,000 (EPA+PADEP) (Included plant improvements of $100,000)
July 2014	June 2015	$871,500 (PADEP)

2013 – The groundwater remedy transitioned from being a long-term response action operated by EPA to operations and maintenance by PADEP in July 2013. Therefore, in 2013 EPA spent $415K (OU2) and $265K (OU3) and PADEP spent $304k.

V. Progress Since Last Five-Year Review

The protectiveness statement from the last Five-Year Review (September 2010) was as follows:

"The remedy at the Site is protective in the short term because the groundwater extraction and treatment facility is operating as intended, the multi-layer geotextile cap prevents contact with contaminated soil in the Source area and the excavation and off-site disposal of the soils from the Recreation and Open Space area prevent exposure to contaminated soil in that portion of the Site. However, for the remedy to remain protective in the long-term naphthalene levels in the groundwater should be monitored to ensure the levels continue to decrease and the naphthalene plume remains in the Source Area. The Institutional Control Implementation and Assurance Plan should be finalized, and groundwater monitoring coupled with the ongoing operation of the groundwater treatment system should continue until the groundwater cleanup standards are met."

Since the last Five-Year Review, the treatment facility has been operating effectively and meeting discharge limits of the NPDES permit equivalency. Discharge Monitoring Reports (DMRs) are submitted monthly with sampling results of the discharged water. The DMRs are located in the Site Files.

The following issues and recommendations were identified in the previous Five-Year Review (September 2010)

Table 3 - 2010 Five-Year Review Issues, Recommendations and Follow-up Actions

Issue	Recommendations and Follow-up Actions
Potential for naphthalene concentrations in groundwater to increase or migrate	Monitor naphthalene levels in Source area groundwater
Verify future protectiveness of institutional controls	Completing the Institutional Control Implementation and Assurance Plan

The 2010 Five-Year Review recommended that naphthalene levels in the shallow groundwater near the Source area continue to be monitored. As indicated above, both a shallow aquifer and deep aquifer source area have been defined as part of the OU2 and OU3 remedial process. Naphthalene concentrations in the Source Area groundwater and surrounding wells have continued to be monitored since the last five-year review as part of the regular long-term monitoring for the Site. Figure 4 illustrates the 2014 naphthalene concentrations and wells where it was not detected. Table A below compares the 2014 levels in both shallow and deep wells to 2010 levels and the highest historical concentrations.

Table A – 2010 and 2014 Naphthalene Concentrations in Various Wells

Well	Highest Historical Concentration (ug/L)	Date	2010 Concentration (ug/L)	Max 2014 Concentration (ug/L)	Date Observed	Highest Historical Concentration -2010 % Reduction	Highest Historical Concentration -2014 % Reduction
Shallow Wells							
CW-4S	440	2004 Mar	ND	ND	2014 May	100	100
CW-16S	2300	2005 Jun	620	9.9	2014 May	73	100
R-2	24000	1990 Nov	1100	980	2013 Mar**	95	96
RW-1***	1400	2003 Dec	53	0.97	2012 Sep**	96	100
RW-2***	16000	2003 Sep	220	ND	2014 May	99	100
RW-3	1900	2001 Dec	ND	627	2014 May	100	67
RW-4***	370	2004 Sep	170	ND	2014 May	54	100
RW-5	**770**	**2005 Aug**	**370**	**175**	**2014 May**	**52**	**77**
Recovery Trench Area							
HAV-02	3800	2000 Dec	97	280	2012 Mar**	97	93
HAV-04	12000	1990 Nov	ND	ND	2014 May	100	100
HAV-05	290	2003 Sep	60	435	2014 Jan	79	-50
MW-1	ND	2005 Dec	ND	ND	2014 Sep	NA	NA
MW-3	1.4	2005 Jun	ND	ND	2014 May	100	100
CTR	160	2003 Jun	1.2	ND	2014 May	99	100
Deep Wells							
CW-2I	910	2000 Dec	300*	ND	2014 May	67	100
CW-2D	1200	2005 Mar	62	53	2014 May	95	96
CW-4I	930	2004 Mar	ND	2.7	2014 May	100	100
CW-4D	770	2002 Oct	3.9	31	2014 May	99	96
CW-17D	300	2005 Mar	1	100	2014 May	100	67
CW-19D	18	2011 Mar	1	1.2	2014 May	100	93
CW-24D	6600	2006 Mar	1500	415	2014 May	77	94
CW-26D	860	2006 Dec	220	5.9	2014 May	74	99
CW-27D	1600	2006 Dec	930	3.6	2014 May	42	100
CW-28D	840	2005 Aug	350	698	2014 May	58	17
RW-7	330	2010 Dec	61	147	2014 May	82	55

*March 2009
** If no sample collected in 2014, most recent value since September 2010 is reported
*** Converted to injection wells as part of OU3 Remedial Action
Shaded Orange Cells – Indicates Source Area wells
Shaded Yellow Cells – Indicates a decrease in naphthalene reduction between 2010 and 2014

The Source Area percent naphthalene reductions from the historical high concentration to 2010 had a range of 52% to 100%. The Source Area percent naphthalene reductions from the historical high concentration to 2014 has a range of 17% to 100%. This larger percent reduction range is attributed to shallow well HAV-05 and deep well CW-28D. HAV-05 reached a new historical high naphthalene concentration in January 2014 of 435 ug/L which is 50% higher than the previous historical high concentration of 290 ug/L. CW-28D had a detection of 698 ug/L in May 2014, which is a 17% reduction from the historical high naphthalene concentration as compared to the 2010 concentration of 350 ug/L, which was a 58% reduction.

Excluding wells HAV-05 and CW-28D, the percent naphthalene Source area reduction from historical high concentration to 2014 had a range of 55% to 100%, which is a slightly greater reduction than that noted in the 2010 Five-Year Review.

In the shallow aquifer Source area, all other wells showed additional reduction in naphthalene concentrations since the 2010 Five-Year Review. CW-4S achieved a 100% reduction by 2010, and this remained the case in 2014. The one well in the shallow aquifer Source area with an increase in naphthalene was RW-3. This is a former groundwater extraction well within the Source Area that was shutdown in 2006. This well is within the influence of RW-7, and it is reasonable for contaminant concentrations to increase and fluctuate over time as contamination is pulled toward RW-7.

In the Recovery Trench Area, three wells (HAV-04, MW-1 and MW-3) along with the Collection Trench (CTR) were non-detect for naphthalene and had achieved 99% to 100% reduction in 2010. This remained the same in 2014. Well HAV-02 saw a small increase in the naphthalene concentration between 2010 and 2012 (HAV-02 has not been sampled since 2012 as per the Site sampling schedule) from 97 ug/L to 280 ug/L. As discussed above, well HAV-05 has seen a fluctuating, but overall increasing, trend of naphthalene concentrations since the start of 2012. However, HAV-05 is within the capture zone of the groundwater collection remedy, as can be seen in Figure 13 thru 15, and as a result this contamination is being captured. This is further supported by several downgradient shallow and deep monitoring wells (MW-1, HAV-07, CW-21D and CW-10D) have little or no naphthalene detected over the last 5 years.

In the deep aquifer source area, five monitoring wells (CW-2I, CW-2D, CW-24D, CW-26D, and CW-27D) saw an additional decrease in naphthalene concentrations. CW-4I did not have a detection of naphthalene in 2010, but there was a low detection of 2.7 ug/L in 2014, which is still nearly a 100% reduction. Besides CW-28D, which is mentioned above, CW-4D, CW-17D and CW-19D had increased naphthalene concentrations in 2014. CW-4D and CW-19D still have a greater than 92% reduction in naphthalene from the historical high. CW-17D saw an increase from 1 ug/L of naphthalene in 2010 to 100 ug/L in 2014. RW-7 is a recovery well that was converted from MW-31D in 2010 as part of the OU3 remedial action. The reduction in naphthalene decreased between 2010 and 2014 from 82% to 55%. There was a substantial and expected increase in site contaminant concentrations in this well when it was converted in 2010. Since that time, naphthalene concentrations have been declining overall. However, there have been fluctuations in contaminant levels as with other Site monitoring and recovery wells. Similar to RW-3, this pattern is reasonable for a groundwater extraction well.

In general, naphthalene levels continued to decline in most of the shallow and deep wells located in and near the source area. It is important to note that while the 2014 naphthalene concentrations in many wells were the same or lower than in 2010, the decrease in naphthalene was not always linear and the concentrations often fluctuated. However, over both the past five years as well as the longer history of the Site's groundwater remedies, the overall trend is that contaminant concentrations (including naphthalene) in most wells are decreasing.

The graphs below (Figures A and B) from select wells in the shallow and deep Source Area demonstrate this general trend over the past ten years. Appendix B includes graphs that show the naphthalene concentrations in each well for their entire individual history. Fluctuation in these concentrations are likely/potentially attributable to fractured bedrock, water table elevation, and precipitation.

Figure A - 2005-2014 Naphthalene in Wells R-2, CW-4S and CD-16S

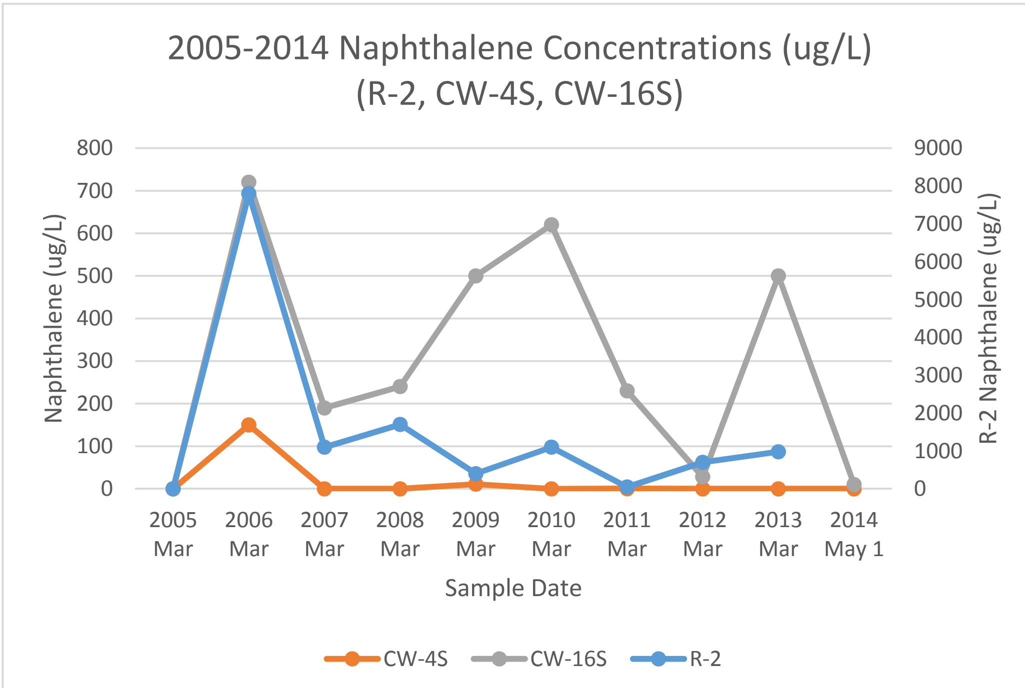
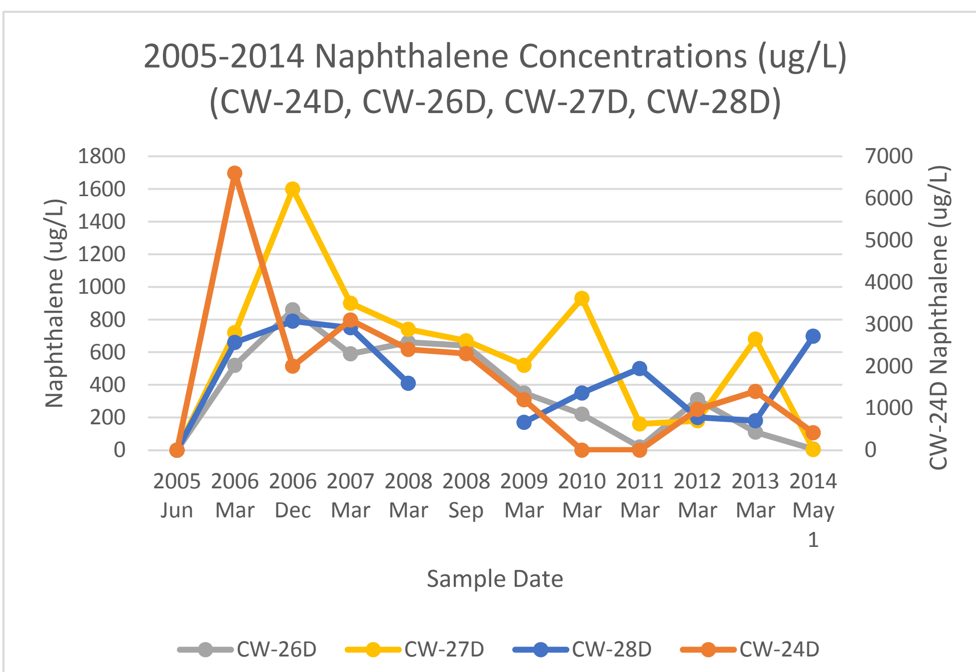


Figure B - 2005-2014 Naphthalene in Wells CW-24D, CW-26D, CW-27D and CW-28D



Those wells with naphthalene concentration decreases between 2010 and 2014 are listed below. Groundwater recovery wells RW-1, RW-2 and RW-4 all saw decreases, but are not included because they were converted to injection wells as part of the OU3 remedial action. If more than one sample was collected in 2014, the maximum detected value is reported.

- CW-16S – 620 ug/L (2010) to 9.9 ug/L (2014)
- R-2 – 1100 ug/L to 980 ug/L
- Collection Trench (CTR) – 1.2 ug/L to non-detect
- RW-5 – 390 ug/L to 175 ug/L
- CW-2I – 300 ug/L to 67 ug/L
- CW-2D -
- CW-24D – 1200 ug/L to 415 ug/L
- CW-26D – 220 ug/L to 5.9 ug/L
- CW-27D – 930 ug/L to 3.6 ug/L

Several wells did not see any change in naphthalene reduction between 2010 and 2014. This is due to the fact that they achieved at or near non-detect levels and have remained as such through 2014. These wells include:

- CW-4S
- HAV-04
- MW-1
- MW-3
- CW-4I

The naphthalene concentration in CW-28D increased from 350 ug/L to 698 ug/L. Naphthalene concentrations also increased in some of wells located around YMCA:

- HAV-2 – 97 ug/L to 280 ug/L
- HAV-5 - 60 ug/L to 435 ug/L
- CW-4D - 3.9 ug/L to 31 ug/L
- CW-17D – non-detect to 100 ug/L
- RW-3 – non-detect to 627 ug/L
- RW-7 - 61 ug/L to 147 ug/L

This could be attributed to desorption of the contaminants in subsurface soils during the construction of the YMCA due to removal of paved surfaces, perforation of the former PCG building foundation and/or increased precipitation infiltration. Continued operation of the groundwater treatment facility will ensure containment of naphthalene to the Source Area and will assist in continued reduction of the naphthalene contamination.

As part of the OU3 remedial action, the Institutional Control Implementation and Assurance Plan (ICIAP) was finalized in June 2011 and updated in September 2013. This plan lists twelve land parcels/properties that are associated with the Site and are used for remedy implementation.

A combination of different institutional controls (ICs) have been employed across twelve parcels to attain the IC objectives for the Site. The purpose of the ICs required for the Site are to prevent exposure to unacceptable risks associated with remaining Site-related contaminants and to protect the components of the remedy. These mechanisms include township ordnances preventing well installation, environmental covenants to protect the integrity of the remedy (specifically the cap and groundwater extraction system), various types of land easements as well as several comfort letters. Specific IC objectives for the Site include:

- Prevent ingestion and dermal contact of contaminants in soil and groundwater;
- Protect integrity of the cap; and,
- Protect integrity of the groundwater collection trench/system.

More information on ICs for the Site can be found in the ICIAP and in Section VII of this report.

VI. Five-Year Review Process

Administrative Components

On April 10, 2015, an advertisement announcing that EPA was conducting this Five-Year Review was placed in the Delaware County Daily Times. The Assistant Township Manager of the Township of Haverford was informed that the review was being conducted on February 19, 2015. A copy of the advertisement was also sent to local State representatives.

The site team for the Five-Year Review was as follows:

Josh Barber - EPA-EPA
Gina Nappi – EPA
Mindi Snoparsky – EPA
Linda Watson – EPA
Harish Mital – Tetra Tech, Inc.
J.B. Moore – Tetra Tech, Inc.
Kiran Pathak – Tetra Tech, Inc.
Tim Cherry – PADEP
Colin Wade - PADEP

Community Involvement

EPA placed an advertisement in the News of Delaware County Daily Times on April 10, 2015, announcing the Five-Year Review was being conducted. The advertisement provided information regarding what a Five-Year Review is and how community members could participate with contact information.

Document Review

A list of documents reviewed during the process of the Five-Year Review is included as Attachment B. The types of documents reviewed include RODs, RI/FS reports and Remedial Action reports.

Data Review

Groundwater Level and Contaminant Containment

The OU3 ROD is the final groundwater ROD for the Site. The OU3 ROD states that the remediation of the groundwater will continue until the Maximum Contaminant Levels (MCLs) or Site-Specific Risk-Based Criteria (Table 12) are attained, and the excess cancer risk associated with potential residential use of the groundwater is reduced to one in ten thousand (1.0E-04) and the Hazard Index (HI) is reduced to 1.

Water level data is presented in the yearly Technical Assessment and Operations & Maintenance Reports. Since 2010, water level data as shown in Figure 5 and 6 indicate a measurable drawdown in the vicinity of the RW wells and the collection trench (CTR). Pumping at recovery well RW-5 [screened at 36 ft. to 46 ft. below ground surface (bgs)] continued to draw down water levels in surrounding deep wells CW-24, CW-26 and CW-16 S/I/D, and to impact the water level in downgradient wells CW 27D, and CW-4S/I/D. Pumping at RW-7 (screened from 90 ft. to 120 ft.

bgs) draws down the water tables in surrounding wells CW-28, NW-1, CW-4S/I/D, and CW 17D, and impacts water levels in downgradient wells CW-3S/I/D, CW-5S/I/D, CW-18D, and CW-19D.

The pumping systems at the CTR (8 ft. to 18 ft. bgs) and RW-6 (screened from 25 ft. to 35 ft. bgs) continued to draw down water levels in nearby monitoring wells MW-1, MW-2, CW-9S/D, and downgradient wells HAV-07 and CW-21S/D. These two pumping systems also influenced water levels in upgradient wells HAV-04, HAV-05, and MW-3.

The ROS area recovery wells RW-8, RW-9, and RW-10 (all three screened from 7 ft. to 18 ft. bgs) drew down water levels in upgradient wells CW-32, CW-33, and CW 34.

Plant Influent Data

Table 6 presents the major contaminants identified in the plant influent, which is the groundwater entering the treatment facility for processing. Table 6 presents monthly data for 2010 through 2014 and provides a yearly average from 2002 to 2014 for each major contaminant. The groundwater remedial objectives established in the OU3 ROD for these major contaminants are as follows:

- PCP 1 µg/L
- Naphthalene 3 µg/L
- Dioxins/Furans (as 2, 3, 7, 8-TCDD) 0.00003 µg/L
- Benzene 5 µg/L
- Toluene 1,000 µg/L
- Ethylbenzene 700 µg/L
- Xylene 10,000 µg/L
- Trichloroethene 5 µg/L
- Phenanthrene 41 µg/L
- Iron 300 µg/L
- Manganese 50 µg/L
- Arsenic 10 µg/L

Figure C displays the yearly average influent concentrations from 2002 to 2014 for PCP, naphthalene and dioxins/furans.

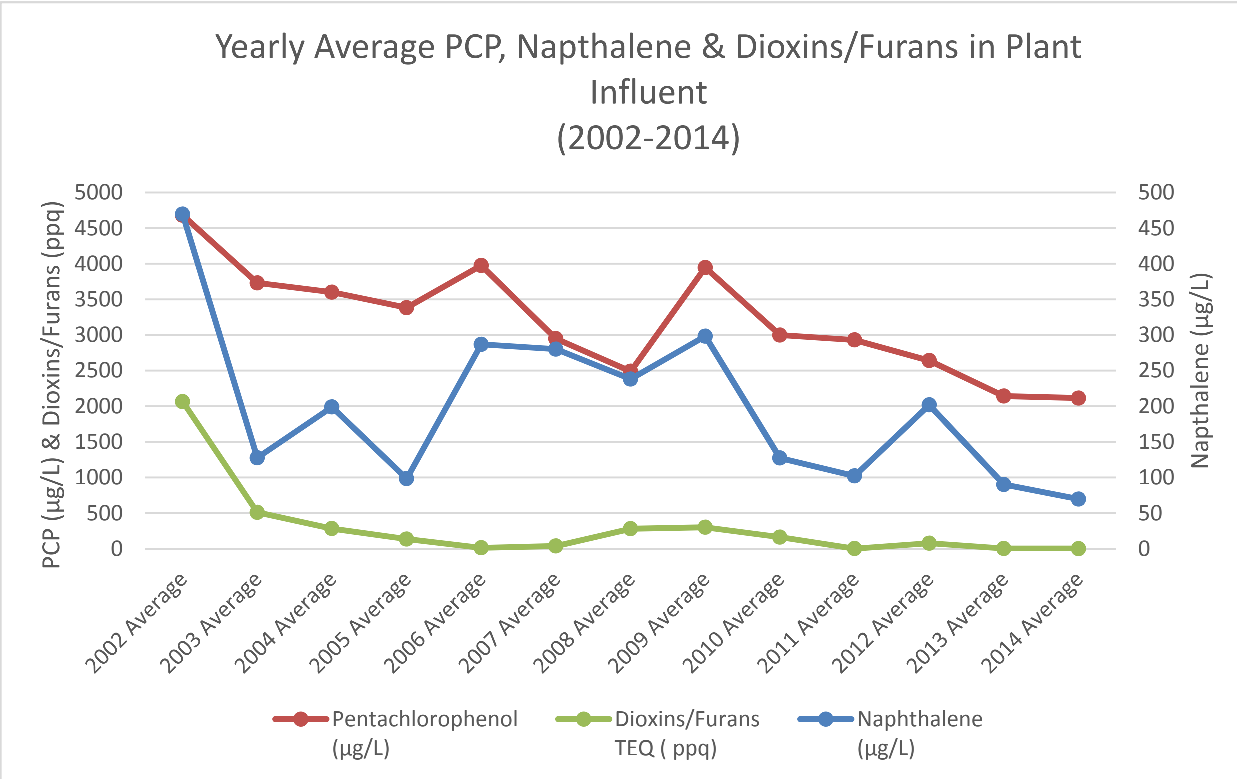
The concentration of PCP varied over the last five years from a low of 980 micrograms per liter (µg/L) occurring in April 2010 to a high of 6,700 µg/L occurring in October 2011. The average PCP influent concentration over the last five years was 2,660 µg/L. The concentration of naphthalene varied over the last five years from a low of 0.0 µg/L occurring in 10 sampling events during February, June, and September of 2011; December 2012; and March, April, September 2013, to a high of 330 µg/L occurring in July 2012. The average naphthalene influent concentration over the last five years was 125 µg/L. The concentration of dioxin varied over the last five years from a low of 0.0 parts per quadrillion (ppq) occurring in July and September of 2012 to 973 ppq in February 2010 for an average of 49 ppq. The influent concentration of both the PCP and dioxin are less than the average from the last five-year review. Average PCP concentrations have reduced ~20% and average Dioxin concentrations have reduced ~68%. A graphical presentation of PCP monthly concentrations in the plant influent as well as the levels after pretreatment (prior to entering the RayOx treatment) is presented in Figure 7, and naphthalene data is presented in Figure 8. The variation in PCP and naphthalene concentration in plant influent can be due to several factors, e.g., fractured bedrock, water table elevation, precipitation events, NAPL, matrix diffusion from the rock, and number of extraction wells operating during sampling event.

Table 7 presents the levels of the major contaminants found in the recovery wells RW-5, RW-6, RW-7, ROS wells RW-8, 9, and 10 and the collection trench (CTR) from 2010 to 2015. Recovery wells RW-5 and RW-6 were installed and operating in 2006. ROS recovery wells RW-8, 9, and 10 were completed and operating in August 2010. Recovery well RW-7 was completed and operating in October 2010. Over the five-year period of 2010 to 2014, the PCP concentrations ranged as follows:

- RW-5 - from 1,300 μg/L in March 2011 to 5,200 μg/L in March 2013
- RW-6 - from 279 μg/L in September 2014 to 990 μg/L in September 2010
- RW-7 - from 2,300 μg/L in March 2011 to 3,700 μg/L in September 2011
- RW-8 - from ND since March 2012 to 3.3 μg/L in December 2010
- RW-9 - from ND since March 2012 to 4.3 μg/L in December 2010
- RW-10 - from ND in March 2012 and December 2012 thru September 2014 to 160 μg/L in September 2012
- CTR - from 330 μg/L in March 2011 to 1,200 μg/L in September 2012.

RW-5 and RW-7, which are located in the Source Area of the Site, contain the highest amount of PCP contamination of all the active recovery wells.

Figure C - 2002-2014 -Yearly Average PCP, Naphthalene and Dioxin/Furans in Plant Influent



Pre-Treatment Performance

Table 8A and 8B show the performance of various unit processes at this plant. Since the 2009 plant modification, the pre-treatment system has been removing a significant amount of PCP, naphthalene and other organic compounds (PCP reduction >90% and naphthalene reduction >80%). This is also depicted in Figure 7 and 8.

Plant Effluent Data

The groundwater extraction and treatment facility operates under a NPDES permit equivalency issued by PADEP. The treated water, which is discharged into Naylors Run, is tested for various parameters on a monthly basis. The sampling results are presented to PADEP in a Monthly Discharge Monitoring Report (DMR) with a copy of the report sent to the Township of Haverford Assistant Township Manager.

Table 9 shows plant effluent data and required NPDES permit limits for several key contaminants from 2010 to 2015. Overall, the plant operated successfully with minor exceedances of several permit limits on occasion. Usually, these exceedances were a result of either equipment failure, which was repaired and the issue was resolved, or due to GAC saturation causing some organics to exceed and that was fixed by replacing carbon. The permit limit for manganese is below background levels found at the Site.

Groundwater Contaminants and Containment

Generally, PCP concentrations in the recovery wells continued to decline. Over the last five years, contaminant concentrations in the Site recovery wells have remained relatively stable, while showing a slight increase in RW-5 and RW-6, a decrease in RW-7 and no change in the CTR. The PCP concentrations in the recovery wells varied as follows:

- RW-6 decreased from 990 micrograms per liter (µg/L) (September 2010) to 700 µg/L (March 2013) to 279 µg/L (September 2014);
- RW-7 decreased from 3,600 µg/L (October 2010) to 3,200 µg/L (March 2013) to 2,680 µg/L (September 2014);
- RW-5 varied from 3,200 µg/L (September 2010) to 5,200 µg/L (March 2013) to 2,350 µg/L (September 2014).

The graphs below (Figures D and E) show the PCP concentrations in RW-5 and RW-7 since the last five-year review was completed.

Figure D - 2010-2014 PCP Concentrations in Well RW-5

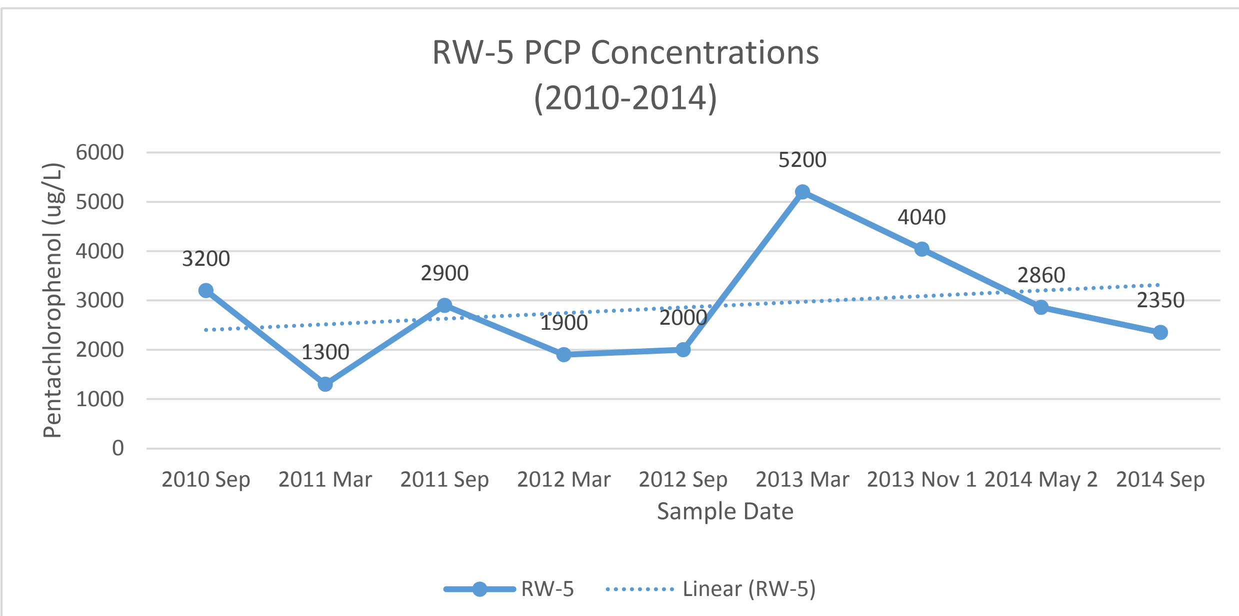
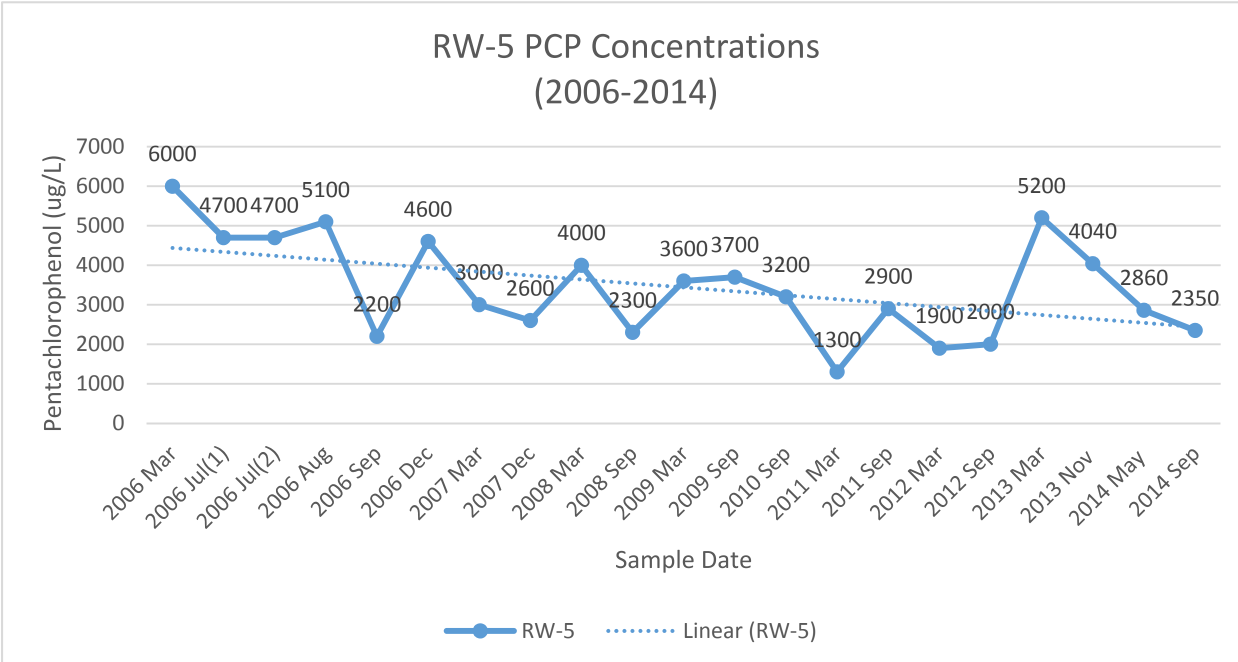


Figure E - 2006-2014 PCP Concentrations Well RW-5



Since the recovery wells began operating, concentrations of PCP and other site COCs have decreased substantially, as seen from the two graphs (Figures F and G) below for RW-5 and RW-7 (note that RW-7 was converted from CW-31D in 2010).

Figure F - 2010-2014 PCP Concentrations in Well RW7

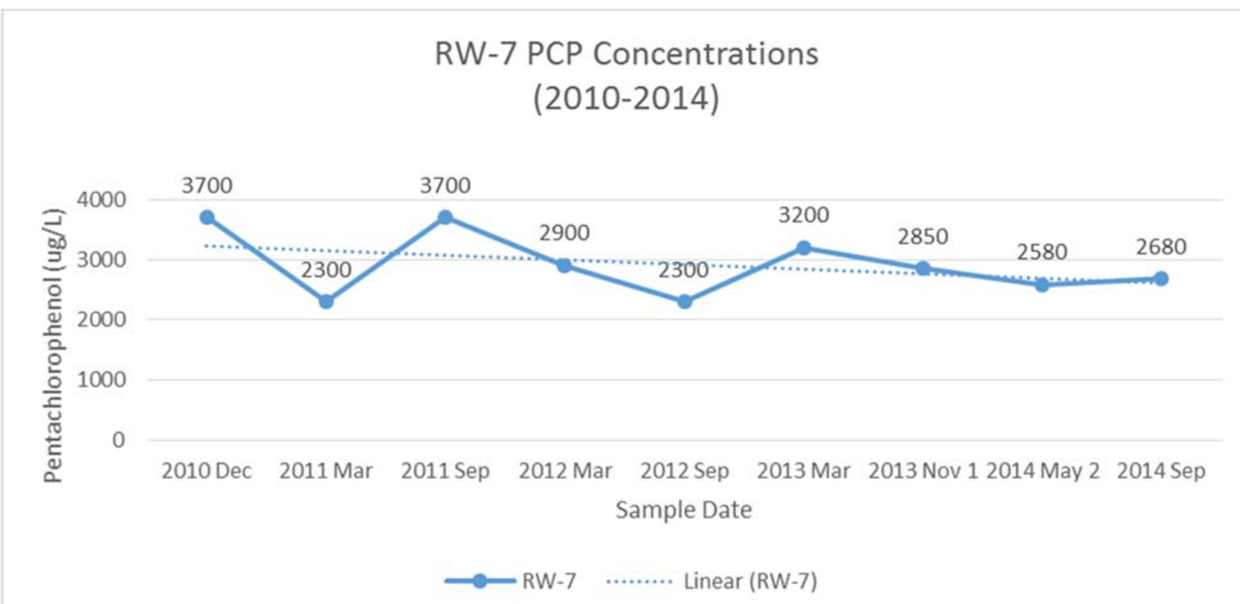
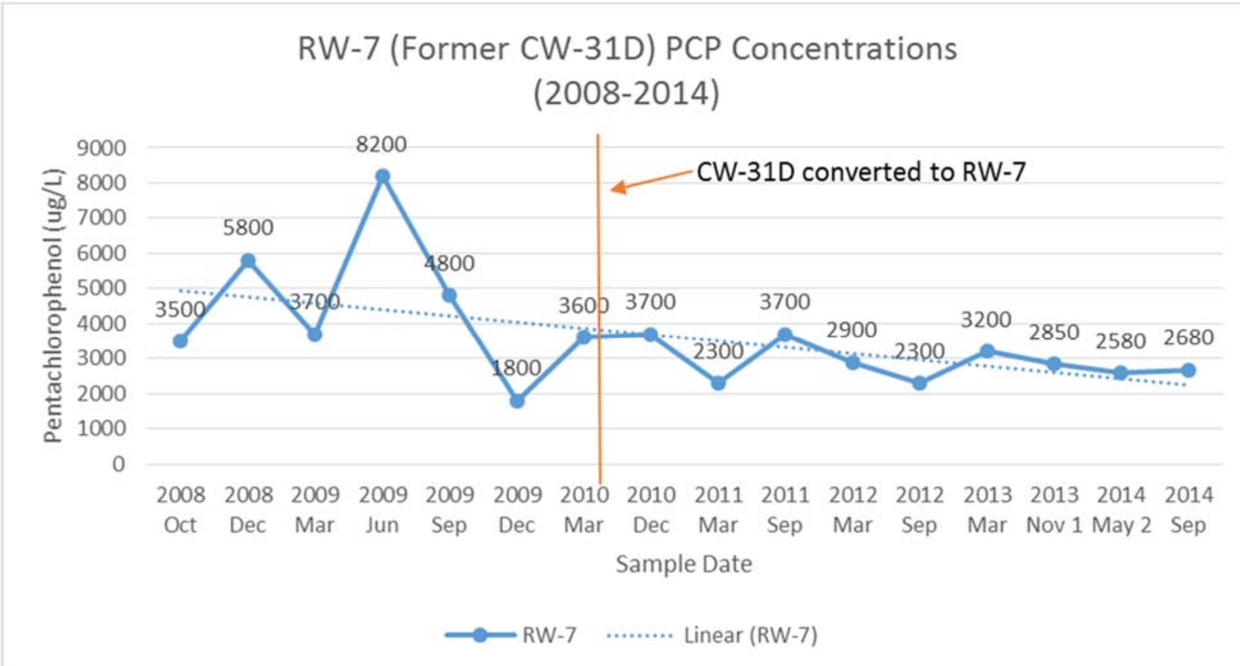


Figure G - 2008 -2014 PCP Concentrations in Well RW 7



Appendix A contains similar charts for all the recovery wells and CTR. The PCP concentration trends illustrates that the contamination from the Site is being captured, removed and transported into the treatment facility for treatment. This is further supported by the decline in treatment plant influent contaminant concentrations over time (Table 6).

Operation of the three other ROS recovery wells (RW-8, RW-9, and RW-10) continued to contain the shallow plume in this area. Based on the 2013-2014 data, PCP and other major Site COC concentrations at these wells have continued to be non-detect (ND) since December 2010 (RW-8 and RW-9) and December 2012 (RW-10).

PCP concentration at collection trench CTR fluctuated from 590 μg/L (September 2010) to 500 μg/L (March 2013) and 509 μg/L (September 2014). More detailed information can be found in Table 7 and Appendix A.

Monitoring Wells PCP Concentrations and Trends

Operation of deep recovery well RW-5 continued to generally decrease PCP concentrations in the source area and deep groundwater as follows:

- CW-16D [48 μg/L (March 2011) to 31 ug/L (March 2012) to 33 μg/L (March 2013) to 27 μg/L (May 2014)].
- CW-27D [4,800 μg/L (December 2011) to March 2012) to 4,600 μg/L (March 2013) to 1,810 μg/L (May2014)].

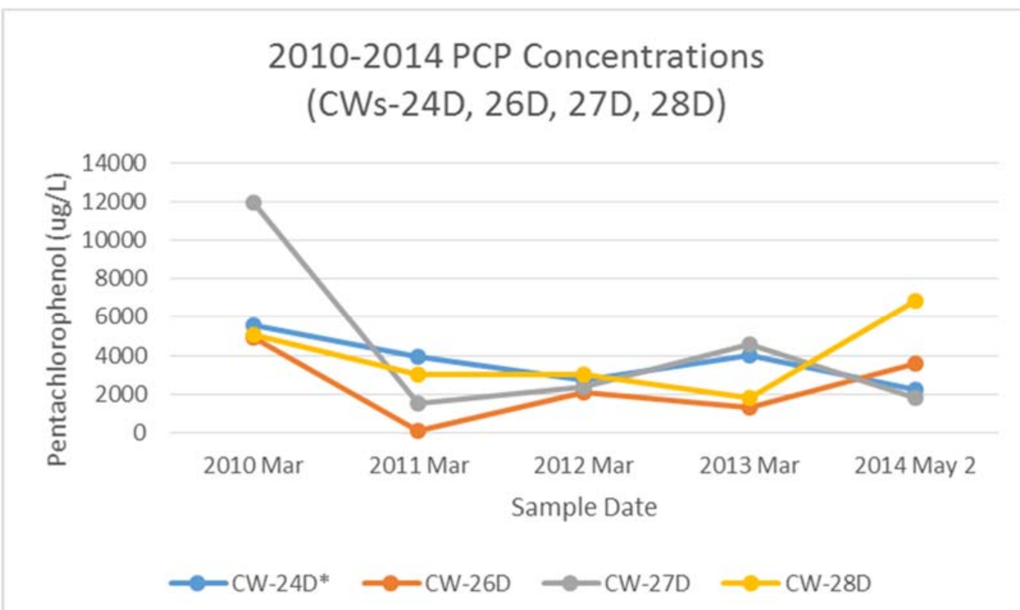
PCP concentrations in other adjacent wells near RW-5 fluctuated as follows between 2010 and 2014:

- CW-24D [3,900 μg/L (September 2011) to 2,700 ug/L (March 2012) to 4,000 μg/L (March 2013) to 2,230 μg/L (May 2014)].
- CW-26D [88 μg/L (March 2011) to 2,100 ug/L (March 2012) to 1,300 μg/L (March 2013) to 3,560 μg/L (May 2014)].
- CW-28D [3,000 μg/L (March 2011 and March 2012) to 1,800 μg/L (March 2013) to 6,830 μg/L (May 2014)].

It is important to note that the while the short-term (2010 to 2014) PCP trends for some of these monitoring wells remain stable or increased, the overall long-term trend (2010 to 2014) for the majority of the Site monitoring wells shows that concentrations are decreasing.

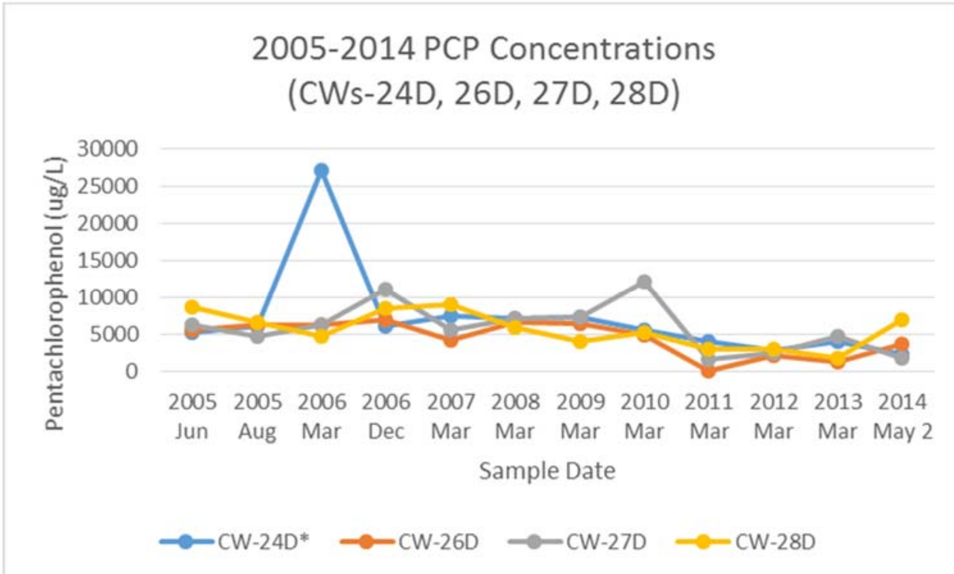
Figure H and I below displays the PCP concentrations in wells CW-24D, CW-26D, CW-27D and CW-28D from 2010 to 2014 and 2005 to 2014, respectively. Note that samples were not collected from every well during every sampling event over the past five years. These figures include those dates when all wells were sampled. Appendix A contains charts displaying PCP concentration trends for the entire Site operational history.

Figure H - 2010-2014 Concentration in Wells CW -24, 26D, 27D, and 28D



* - 2010 and 2011 samples were from September for CW-24D

Figure I - 2005-2014 PCP Concentrations in Wells CW-24D,26D, 27D, and 28D



Operation of deep extraction well RW-7 continued to affect PCP concentrations in deep wells in the vicinity of RW-7 as follows:

- CW-19D [2,400 μg/L (March 2011) to 1,800 ug/L (March 2012) to 1,300 μg/L (March 2013) to 1,030 μg/L (April 2014)].

PCP concentrations in other adjacent wells near RW-7 fluctuated as follows:

- CW-27D [4,800 μg/L (December 2011) to 2,400 ug/L (March 2012) to 4,600 μg/L (March 2013) to 1,810 μg/L (April 2014)].
- MW-3 [1,500 μg/L (March 2011) to 900 ug/L (March 2012) to 920 μg/L (March 2013) to 1,040 μg/L (April 2014)].
- CW-3D [220 μg/L (March 2011) to 120 ug/L (March 2012) to 140 μg/L (March 2013) to 552 μg/L (April 2014)].
- CW-4D [120 μg/L (March 2011) to ND (March 2012) 1,700 μg/L (March 2013) to 1,180 μg/L (April 2014)].
- CW-5D [ND (March 2011 and March 2012) to 16 μg/L (March 2013) to ND (April 2014)].
- CW-17D [2,500 μg/L (March 2011) to 2,700 ug/L (March 2012) to 1,800 μg/L (March 2013) to 3,780 μg/L (April 2014)].
- CW-18D [0.30 μg/L (March 2011) to 10 ug/L (March 2012) to ND (March 2013) to 52.6 μg/L (April 2014)].

Figure J and K below displays the PCP concentrations in wells MW-3, CW-17D and CW-19D from 2010 to 2014 and 2004 to 2014, respectively. Note that samples were not collected from every well during every sampling event over the past five years. These figures include those dates when all wells were sampled. Appendix A contains charts displaying PCP concentration trends for the entire Site operational history.

Figure J - 2010 -2014 PCP Concentrations in Wells MW-3, CW-17D, and CW-19D

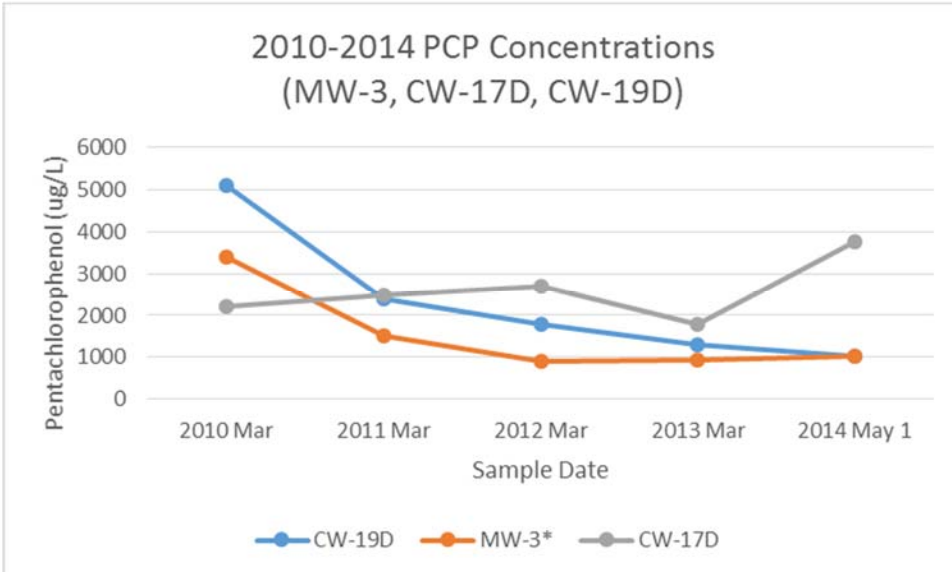
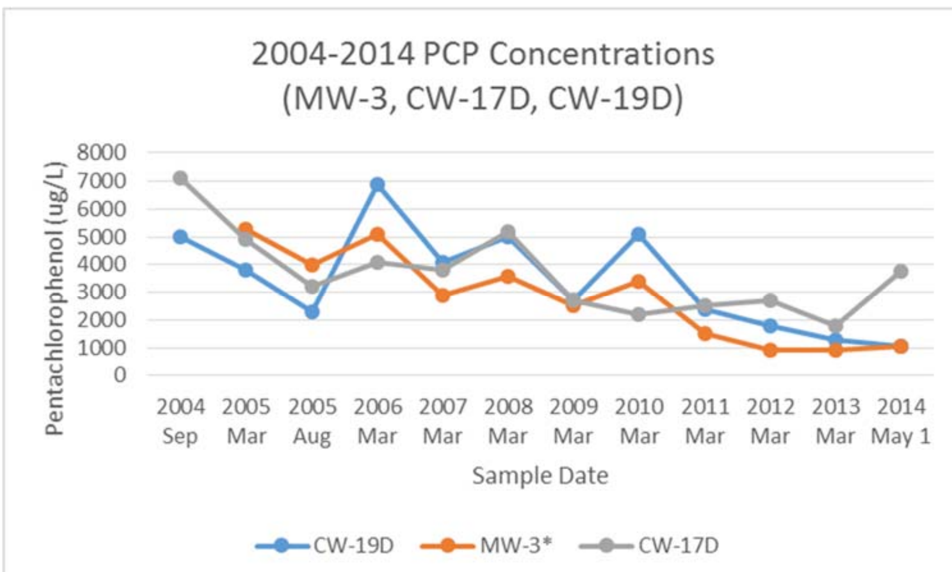


Figure K - 2005-2014 PCP Concentrations in Wells MW-3, CW-17D, and CW-19D



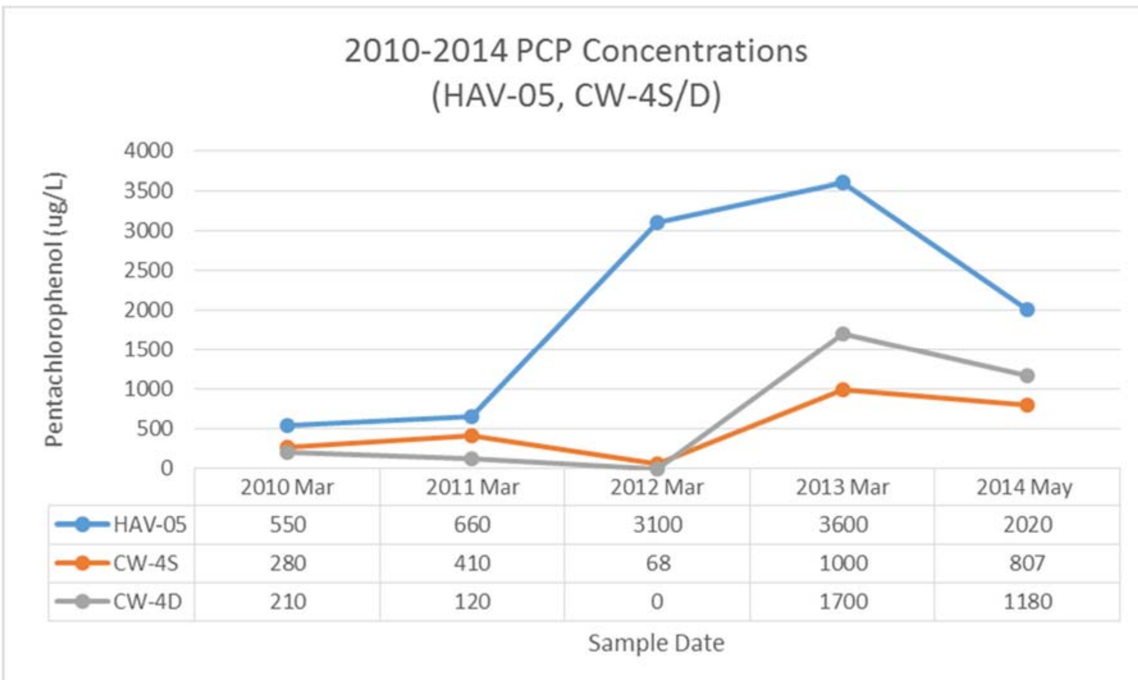
During YMCA building construction (ground breaking ceremony in May 2012 and opening in September 2013), wells HAV-02, CW-6D, 6I, and 6S were abandoned in mid-2012 and are no longer part of the groundwater monitoring program.

Operation of deep extraction well RW-6 continued to decrease in PCP concentrations in deep groundwater around the CTR area and downgradient wells. The PCP concentrations in well MW-1 decreased from 2.6 µg/L in March 2011 to 2.4 µg/L in March 2013 to ND in April 2014 and well MW-2 varied from 0.5 µg/L in March 2011 to ND in March 2013 to 4.3 µg/L in April 2014.

PCP concentrations at well CW-21D varied from 660 µg/L in March 2011 to 1,300 µg/L in March 2013 to 830 µg/L in April 2014. PCP concentrations at well HAV-05 varied from 660 µg/L in March 2011 to 3,600 µg/L in March November 2013 to 2,020 µg/L in April 2014.

Removal of significant paved areas during YMCA construction may have desorbed some contaminants from subsurface soils into groundwater, thus increasing PCP levels in some of monitoring wells (Figure L below). At HAV-05 PCP level increased from 500 ug/L in 2011 to 4,500 ug/L in 2012 and back to 2,600 ug/L in 2014. At CW-4D, PCP levels increased from 68 ug/L in 2012 to 1,700 ug/L in 2013 and 1,180 ug/L in 2014. Similarly PCP levels in CW-4S increased from ND in 2012 to 1,700 ug/L in 2013 and 1,180 in 2014.

Figure L - 2010-2014 PCP Concentrations in Wells HAV-05, and CW 4S/D



Between the source area and ROS area, PCP was contained in deep wells CW-12D (4 µg/L) and CW 13D (115 µg/L) during the 2014 annual sampling event. Both wells are located southeast of the main groundwater contaminant plume, and the 2014 PCP levels were the highest PCP concentrations reported for these wells since 2010 as follows:

- CW-12D [ranged from ND (September 2010) to 0.19 µg/L (September 2011) to 0.96 µg/L (September 2012) to 4 µg/L (April 2014)].
- CW-13D [fluctuated from ND in 2010 and 2011 to 63 µg/L (September 2012) to ND (December 2012) to 115 µg/L (April 2014)].

In-Situ Flushing System PCP Concentrations and Trends

Operation of the in-situ flushing system continued to influence PCP concentrations in injection wells and deep wells near the injection system. IW-4 and IW-5 were both operational during the monitoring period from July 2013 to July 2014. IW-1, IW-2, and IW-3 have been non-operational since June 2013.

PCP concentrations in the injection wells varied as follows between 2010 to 2014:

- IW-4 varied from an average of 193 µg/L (2012) to an average of 58 µg/L (2013) to 11 µg/L (April 2014),
- IW-5 varied from an average of 169 µg/L(2012) to an average of 2 µg/L(2013) to 33.2 µg/L (April 2014).
- Non-operational well IW-1 varied from 430 µg/L (March 2012) to ND (March 2013) to 358 µg/L (April 2014).
- IW-2 varied from 2,400 µg/L (March 2012) to 4,800 µg/L (March 2013) to 4,750 µg/L (April 2014)
- Non-operational well IW-3 varied from 1700 µg/L (March 2012) to 3,100 µg/L (June 2012) to 980 µg/L (April 2014).

Between 2011 and 2014, PCP concentrations varied in three deep wells: CW-26D (from 88 µg/L to 1,300 µg/L to 3,560 µg/L); CW-27D (from 1,500 µg/L to 4,600 µg/L to 1,810 µg/L); and CW-28D (from 3,000 µg/L to 1,800 µg/L to 6,830 µg/L). These wells received the majority of injection flow during the period. To compensate for this, the injection pumping system was turned off a minimum of one week prior to groundwater sampling event.

Other Groundwater Contaminants

Trichloroethene (TCE): As is indicated in the OU3 ROD, TCE is a contaminant that did not originate from the NWP property. However, the current array of recovery wells and collection trench do capture various contaminants and effectively treat the contaminants in the groundwater treatment facility.

During the reporting period, the concentrations in wells CW-1 S/D (upgradient of the Site) fluctuated from the previous year. TCE in CW-1S was detected at a concentration of 110 µg/L (2012), 430 µg/L (2013) and 160 µg/L (2014). TCE in CW-1D was detected at a concentration of 2.5 µg/L (2012), and 5.8 µg/L (2013), and 1.7 µg/L (2014). Vinyl chloride, a breakdown product of TCE, was also detected at these wells. Vinyl Chloride in CW-1S was detected at a concentration of 9.1 µg/L (2012), 30 µg/L (2013), and 12 µg/L (2014). Vinyl Chloride in CW-1D was detected at a concentration of 2.5 µg/L (2012), and 9 µg/L (2013), and 1.9 µg/L (2014).

TCE concentrations were detected in wells CW-10D and CW-13D (downgradient of the site) and source area recovery well RW-5 and RW-7 at concentrations ranging from 1.5 – 13 µg/L between 2011 and 2014. TCE concentrations detected in 2014 annual sampling event are reported in Table 10.

Benzene: Benzene was detected in wells CW-4D, CW-4I, CW-17D, CW-24D, CW-26D, CW-27D, and recovery well RW-5 exceeding its Remedial Goal (RG) of 5 µg/L. Benzene concentrations ranged from 5.1 µg/L contained in well CW-27D to 31.1 µg/L for well RW-5. Benzene concentrations detected in 2014 annual sampling event are reported in Table 10.

Naphthalene: Naphthalene was detected at 17 wells at concentrations ranging from 4.1 µg/L at well CW-27D to 698 µg/L at well CW-28D. These wells are part of the same source area and plume as associated with PCP concentrations. Naphthalene concentrations detected in 2014 annual sampling event are reported in Table 10.

Table 10 presents the historical trends of various COC in all wells at this site.

Summary of Treatment System Performance

- Total volume of groundwater treated from 2010 – 2014 is approximately 105.4 million gallons. Of this, approximately 68 million gallons were discharged into Naylors Run while remaining water was injected back into ground for in-situ flushing. This data is presented in Table 11.

- During this period, the treatment plant has removed approximately 2,620 pounds of Site related organic contaminants from the groundwater. A total of approximately 5,074 pounds of Site related organic contaminants has been removed since the startup of the treatment plant. This data is presented in Table 11.

Summary of Ecological Sampling Data

Through 2014 the results suggest surface water and sediments associated with Naylors Run continue to be impaired with SVOCs and pesticides. Surface water is also affected by metal concentrations, and sediments are impaired by dioxins and furans. In addition, the fish and benthic communities appear to be adversely affected, potentially due to a combination of contaminant concentrations, limited physical habitat, and wide fluctuations in stream flow and temperature.

However, while Naylors Run is still impaired, several monitoring endpoints clearly indicate improvement in Naylors Run since the remediation was completed:

1) Sediment concentrations of PCP, which spiked following remediation, have declined to levels substantially below the BTAG screening value;

2) Fish tissue concentrations, which were elevated in 2009 samples, have declined by two orders of magnitude in 2012 samples; and,

3) Benthic macroinvertebrate Index of Biological Integrity (IBI) scores have doubled or tripled between 2009 and 2012.

While these improvements demonstrate the efficacy of the remediation, it is not possible with the existing data to determine if the full potential of this stream has been reached. Naylors Run is an urban stream that no longer has the potential to achieve pristine reference conditions such as those present in Sixpenny Creek, which is the reference location used to gauge recovery of Naylors Run. The EPA *2009 - 2012 Ecological Monitoring Report* recommended including Ridley Creek in the next round of sampling, rather than Sixpenny Creek. Ridley Creek is a comparable urban stream that receives similar non-point source pollution without the influence of PCP and other site-specific contaminants. Comparison of the benthic macroinvertebrate and fish data between Ridley Creek and Naylors Run will demonstrate if Naylors Run capacity to recover has been achieved or if further improvements can be anticipated.

The most recent notable item from the ecological monitoring program was the detection of PCP in surface water at a concentration of 93.2 ug/L at Station #2 in September 2014. Historically, PCP has ranged from non-detect to 7 ug/L at this location. Subsequent resampling events at this location in December 2014 and April 2015 resulted in a PCP concentration of 1.2 ug/L and 5.1 ug/L, respectively. This is consistent with historical detected concentrations. As a result of this event, EPA and PADEP agreed that surface water and sediment sampling at Station 2 (as shown on Figure 2) be conducted on an annual basis for the next two years to verify that there is no issue with discharge to the creek or groundwater capture. Temperature and/or conductivity probing in the vicinity of Station #2 should be considered to identify likely locations of groundwater discharge for PCP sampling. Deployment of a passive sampling device to determine the equilibrium discharge concentration at the groundwater surface water interface is also recommended. EPA and PADEP plan to discuss the implementation of these potential options to identify the source of the PCP in the surface water near Station #2 as part of the ecological monitoring program.

The most recent ecological monitoring report (Tetra Tech, March 2015) addressed trends between 2009 and 2012, and recommended changes in the monitoring program. The most recent monitoring event was conducted in the spring of 2015. Preliminary evaluation of the monitoring results suggests improvement in the benthic and fish communities.

Conceptual Site Model (CSM) Development Process

An updated Conceptual Site Model (CSM) was prepared. The purpose of this updated CSM is to depict current site conditions and compare them with historical conditions. A previous CSM was generated in 2005, and was used as a baseline for the development of the new CSM.

The updated CSM was generated using ArcGIS technology along with the most recent available aerial photograph as a background. It should be noted that site conditions have changed since this aerial was taken in 2010, and the former Gum Factory has been replaced with a new YMCA. The overhead view of the CSM is shown on Figure 9. Note that Figure 9 also depict historical and 2014 PCP plume.

Once the updated CSM base map was generated, three cross-section alignments were chosen, as shown on Figure 9. These cross-sections were generated in AutoCAD to depict the subsurface conditions at key locations and include the following:

- Parallel to the flow direction (cross-section A-A’, Figure 10);
- Parallel to Eagle Road and perpendicular to the primary flow direction (cross-section B-B’, Figure 11); and,
- Perpendicular to primary flow direction in the vicinity of historic groundwater discharge to the stream (cross-section C-C’, Figure 12).

Conceptual Site Model Interpretation

Review of the data indicates that the primary contaminant demonstrating the extent of contamination is PCP. While other contaminants, such as naphthalene, are present at levels of concern, they do not have the overall lateral extent nor the consistently high concentrations of PCP. Therefore for mapping and visual interpretation purposes, PCP is the most appropriate/ conservative Site chemical to depict the extent of contamination.

Historical CSM interpretation of the site is that there are two distinct zones of contamination, a shallow zone and a deep zone. While it is possible to separate out the contamination into these zones, comparison of the two indicates that with the exception of the occasional “hot spots”, defined as points where concentrations exceed the site criteria at one or two points but are surrounded by points that are non-detect, plume morphology between depths is very similar. This is a result of the local geology which includes overburden, weathered rock which transition to bedrock in a heterogeneous manner across the site. However, with this in mind for the purposes of the CSM, the deep plume (which is the larger of the two plumes) was utilized to depict the overall extent of the contamination. The deep plume information generated during the 2014 sampling event also indicated the presence of two “hot spot” locations of contamination. This is the most conservative approach to depicting the current conditions of the CSM.

Review of pump test and boring log data at RW-5, RW-6, and RW-7 indicated a zone of vertical fracturing near the area shown on Figure 6. At this time, the fracture zone has not been fully delineated, and the approximate alignment shown on the map is the area estimated to have an impact on the wells currently included in the operation and maintenance (O&M) monitoring. Based on the alignment of Naylors Run, the rocks observed in the creek, and the approximate alignment of the fractures on the historic Naylors Run stream channel, it is probable that the fracture zone extends further north and south away from the approximate alignment shown on the map.

A capture zone analysis (CZA) was performed in August 2013 by Val F. Britton, using the existing groundwater model and updating with the most recent data. The purpose of this model was to determine the extent that groundwater is being captured by the existing pumping wells. Based on the available information, it appears as though the majority of the plume is being captured by the pumping wells. At the time the CZA was performed, the plume was entirely in the capture zone of the wells. The analytical data from the most recent sampling event in 2014 showed that a small amount of contamination may be extending beyond the capture zone in wells CW-12D and CW-13D. A review of the updated CSM clearly indicates that the vast majority of the plume is currently being captured by the existing remediation system. Certain events such as excessive rainfall, plant shutdown for maintenance, or increased infiltration by the removal of impermeable materials in the vicinity of the plume may cause increased groundwater flow, which could cause the migration of contamination beyond the capture zone.

Vertically, the extent of the plume is based on the groundwater model and analytical data, and the capture zone analysis indicates that groundwater capture extends below the bottom of the recovery wells as depicted in Figure 13 thru 15 (2013 Capture Zone Analysis Report). Cross-sections showing the estimated extent of vertical contamination are shown in Figures 10, 11, and 12.

Review of the cross-sections B-B' and C-C' indicate that while the contamination is migrating primarily in a northwest to southeast orientation, there is some migration away from the inferred source areas perpendicular to the primary regional flow direction. The CZA indicates that most of this migration is captured by the treatment system. However, recent analysis of surface water samples (specifically, Station #2) indicates that there may still be some remaining contaminant migration to Naylors Run, in the vicinity of cross-section C-C', as PCP has been detected in the creek. Until further confirmatory sampling, e.g., temperature/conductivity measurements, passive sampling as noted above, is performed and the location of this contamination discharge is identified, it cannot be determined if these surface water results are from direct discharge of contamination from the groundwater, or incidental discharge of contamination from some preferential pathway, such as the historical or current utility alignments.

Site Inspection

The site inspection for the Havertown PCP site was conducted on April 28, 2015. During the inspection, the treatment facility was in working order and in neat condition.

Josh Barber	EPA
Linda Watson	EPA
Mindy Snoparsky	EPA
Colin Wade	PADEP
John Zatyczyc	PADEP
Harish Mital	Tetra Tech
JB Moore	Tetra Tech
Kiran Pathak	Tetra Tech

The fence around the capped portion of the Site property was in good condition with the exception of a section behind the Swiss Farms. The fence in this area had deteriorated and subsequently had been torn down. The owner of the Swiss Farms installed a new fence in May 2015. The capped portion of the Site showed no signs of deterioration or settling, and the grass cover was growing over the entire surface.

The operation of the two businesses on the Site property near the capped portion of the Site does not impede the cleanup of the Site contamination. There are wells and piping located on the business' property, and the inspection revealed that all the equipment is in good working order. The businesses around the Site property still remain mostly automotive repair facilities and retail facilities. There has been no major change in land use since the previous review. However, there are plans for the construction of a storage facility on the main portion of the cap adjacent to the treatment building. Construction is expected to start in 2015. EPA and PADEP have been coordinating with the developer and will approve all plans for the new building prior to any construction activities.

Several monitoring wells and vault pits for the groundwater extraction force main are located within or adjacent to the parking lot of the Haverford YMCA. Sampling some of these wells and maintenance of the force main is challenging and potentially dangerous to the sampling crew, in particular, around VP-2 and VP-5. Surface water runoff is also infiltrating VP-5 in the parking lot near the Eagle Road main entrance. Up to three parking spots should be blocked off when sampling or maintenance is to be conducted in order to address these issues. PADEP has reached an agreement with the YMCA to allow PADEP's contractors access as needed.

Interviews

As part of the Five Year Review, the EPA Community Involvement Coordinator (CIC) conducted interviews with Haverford Township, a resident, and the local Environmental Advisory Committee (EAC). The results of those interviews are described in detail below.

On March 13, 3015, the CIC conducted a telephone interview with the Assistant Township Manager at Haverford Township. Overall, the Township feels that it has been well-informed of the Site's activities and remedial progress. The Township stated it was not aware of any problems with unusual or unexpected activities at the Site, nor changes to state laws or local regulations that might affect the protectiveness of the Site's remedy. The Township is aware of the land development plan for the public storage facility and mentioned that Continental Auto Parts is under agreement of sale with another property owner. The Township emphasized that it hopes EPA will continue its relationship with the EAC.

On March 27, 2015, the CIC conducted a telephone interview with a resident of Havertown that lives on Rittenhouse Circle. The resident could not stress enough how happy she was with the project and how she feels her tax dollars with EPA are well spent. The resident did mention there are some trespassing issues on Naylors Run, mostly children hanging out after school, but she is not aware if they are vandalizing the property. The resident stated that EPA has kept the community well informed of activities at the Site over the years, although it has slowed recently.

On April 2, 2015, the EPA CIC, the EPA Remedial Project Manager (RPM) and a Tetra Tech representative met with three members of the EAC. EPA and Tetra Tech answered numerous technical questions posed by the EAC. In relation to the Five-Year Review, the EAC felt as though the project has had its share of twists and turns, but that overall, they feel EPA has done a good job with the project. They also stated that they were not aware of any community concerns regarding the site or its operation and administration. The EAC asked several questions related to capture of the deep groundwater contamination and stormwater management. Specifically, there was concern about potential runoff from future buildings (such as the storage complex), and they suggested that EPA should look at the YMCA's stormwater infiltration points since it may be impacting the groundwater flow locally.

VII. Technical Assessment

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

Remedial Action Performance

The OU1 remedy is functioning as intended by the ROD. The ROD called for no action with regard to site soils with a monitoring program to identify any changes in the conditions at the site. The monitoring program effectively identified higher levels of contaminants, and it was determined that the risk was greater than originally calculated. In response to this greater risk, EPA placed a cap over three acres of the site that contained the contaminated soils, which met the RAO of the ROD to prevent wind entrainment of and access to the contaminated on-site soils. An oil/water separator was installed at the discharge point of the storm drain into Naylors Run. The oil/water separator was effective in reducing the concentration of contaminants being discharged into Naylors Run. EPA also lined the storm sewer, which prevented contaminated groundwater from infiltrating the storm sewer. The installation of the CTR as part of the OU2 remedy eliminated the need for the oil/water separator since the shallow groundwater was being effectively captured by the CTR. The oil/water separator has been removed.

The OU2 interim remedy was incorporated into the OU3 as a final groundwater remedy. The OU2/OU3 remedy, is functioning as intended by the RODs with modifications to the original design. The groundwater extraction and treatment facility effectively captures the contaminated shallow groundwater that is migrating from the site, treats it to the NPDES equivalent standards and then discharges it to Naylors Run. The shallow groundwater is captured by the groundwater collection trench. The modified OU2 extraction system is effective in impacting the nearby shallow monitoring wells and there have been no contaminants detected in the shallow zone boundary wells. Groundwater quality is on a path toward restoration as evidenced by (1) the consistent shrinking of the PCP contaminant plume in the shallow and deep aquifers, and (2) reduction of Site contaminants in treatment plant influent. However, concentrations in CW-12D and 13D have exhibited a recent increase in PCP concentrations. This bears further and more frequent monitoring to evaluate potential causes for these increases as well as the long-term effectiveness of the remedy in these areas. Currently, groundwater is not being extracted for potable use. ICs for the Site prevent future installation of any new groundwater wells.

The addition of RW-5 and RW-6 has provided some deep groundwater capture and treatment. Addition of RW-7 in 2010 has provided complete capture of the deep groundwater plume of contamination as was demonstrated by the updated capture zone analysis in 2013.

Operation of the three other ROS recovery wells (RW-8, RW-9, and RW-10) continued to contain and remediate the shallow plume in this area. Based on the 2013-2014 data, PCP and other Site COC concentrations at these wells have continued to be non-detect (ND) since December 2012.

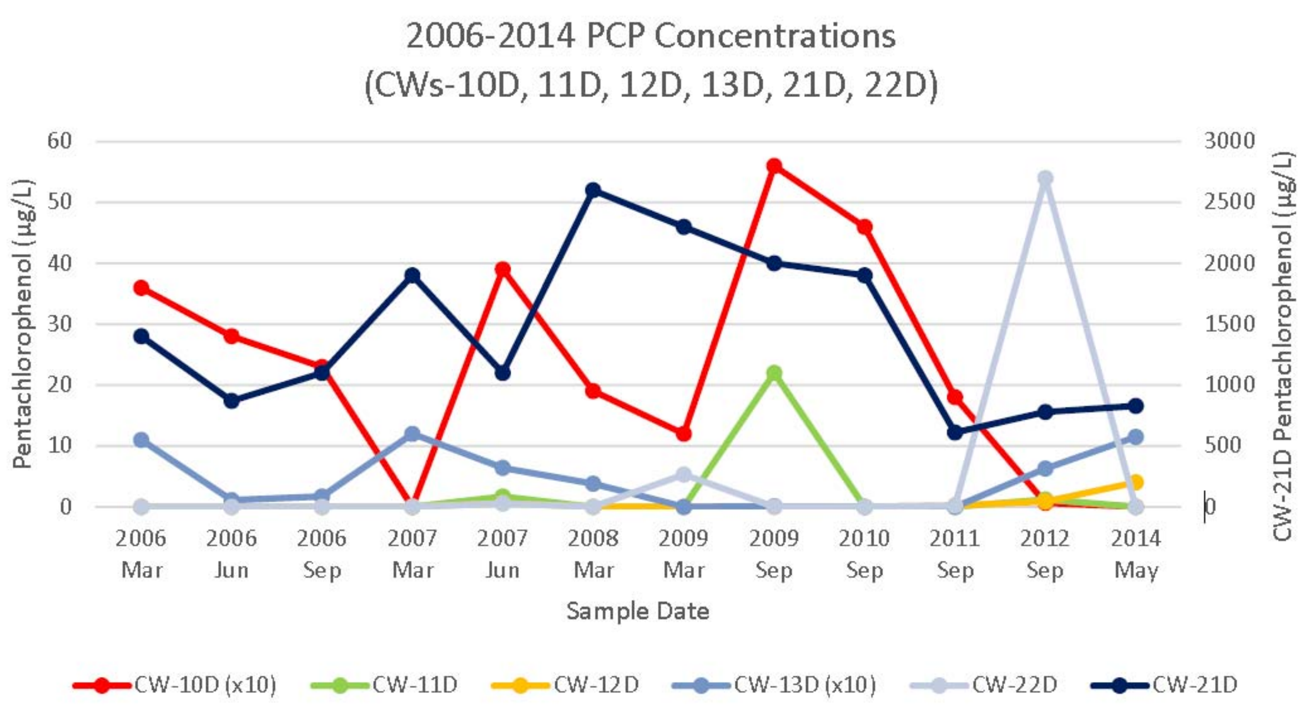
Systems Operation/O&M

The O&M procedures at the Havertown PCP site are effective in maintaining the remedial actions already implemented. A full-time qualified operator is on-site to run the groundwater extraction and treatment facility. A Programmable Logic Controller (PLC) monitors and records pertinent operational data for tracking and trouble shooting.

This anti-scaling system has reduced plant shutdown frequency from every 6 weeks to once every six months for cleaning, almost eliminated replacement of piping (was done once every quarter) and reduced maintenance cost substantially (estimated around $50,000/year).

Data review indicates that the facility is containing the shallow groundwater contamination and the deep groundwater contamination and the groundwater entering the system is being adequately treated. Recent samples of wells CW-12D and CW-13D have shown an increase in PCP. CW-13D is beyond the induced capture zone of the groundwater extraction system; CW-12D is located at that the approximate boundary of the ROS area induced groundwater capture zone. The exact reason for these increases is not clear at this time. The nearest upgradient deep aquifer monitoring well with elevated concentrations is CW-21D. CW-21D is just downgradient of the CTR and RW-6 and is within the induced capture zone, which suggests that contamination from CW-21D should not be moving further downgradient. This is supported by contaminant trends and concentrations in CW-10D, CW-11D and CW-12D (see Figure M below). Sporadic increases in groundwater contaminant concentrations similar to CW-13D have been noted in many other wells during the Site history, as discussed earlier in the report. These increases typically are temporary. Continued and more frequent monitoring of these two monitoring wells should be conducted to further evaluate contaminant trends and determine if any additional response is potentially warranted. Yearly Technical Assessment and Operations and Maintenance Reports are provided to EPA. These reports become part of the Site record.

Figure M - 2006 -2014 PCP Concentrations in Wells CW-10D, 11D, 13D, 21D, and 22D



Implementation of Institutional Controls and Other Measures

As called for in the OU3 ROD, an Institutional Control Implementation and Assurance Plan (ICIAP) has been completed for the Site. The ICIAP describes the implementation, monitoring, and assurance procedures to be carried out for institutional controls at the Havertown PCP Site. The ICIAP provides the following information.

- Site Details
- Contaminant Details
- IC Properties
- IC Instrument Categories
- IC Implementation
- IC Monitoring
- IC Enforcement
- IC Modification and Termination

The purpose of the ICs required for the Site are to prevent exposure to unacceptable risks associated with remaining Site-related contaminants and to protect the components of the remedy. The ICIAP outlines the ICs that are in place, such as the ordinance that restricts the installation of groundwater wells in the Township, which was enacted August 9, 2010, the easements in place to protect the integrity of the remedy and the use restrictions that were developed by the U.S. Army Corps of Engineers for the capped portion of the Site. The ICIAP identifies methods to enforce and monitor the ICs, which are in place and effective.

Is the remedy progressing as expected?

The remedy specified in the ROD for OU1 has been completed and the RAOs have been met. The installation of the cap provided a long-term mechanism to provide protection from direct contact with the site soils. The remedy constructed under the OU2 ROD eliminated the need for the oil/water separator and provided a more aggressive means of cleaning up the shallow groundwater.

The groundwater extraction and treatment facility is operating as expected. The extraction wells and CTR are capturing the contaminated shallow and deep groundwater. The rate of shallow groundwater cleanup is reduced because the deep groundwater is acting as a continuing source of contamination of the shallow groundwater. The deep groundwater contains source strength contamination in the fractures at approximately 35 feet below the water table. However, the spatial extent of the groundwater contamination in both the shallow and deep aquifers is shrinking. Further, there is an overall decreasing trend in contaminant concentrations in many of the shallow and deep monitoring and recovery wells. Contamination in the Source Area is being contained, and the remedy is progressing toward restoration of the aquifer. Continued and more frequent monitoring of CW-12D and CW-13D should be conducted.

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

Changes in Standards and To Be Considered (TBCs)

Have the standards identified in the ROD been revised, and would such revisions call into question the protectiveness of the remedy? Do newly promulgated standards call into question the protectiveness of the remedy? Have TBCs changed so as to call into question the protectiveness of the remedy?

The OU3 ROD is the final groundwater ROD for the Site. The OU3 ROD states that the remediation of the groundwater will continue until the Maximum Contaminant Levels (MCLs) or Site-Specific Risk-Based Criteria (Table 12) are attained, and the excess cancer risk associated with potential residential use of the groundwater is reduced to one in ten thousand (1.0E-04) and the Hazard Index (HI) is reduced to 1. This remediation goal is still considered protective.

The OU3 ROD developed remedial goal objectives for the ROS soils. The cleanup goals are a combination of Site-Specific Risk-Based cleanup levels for individual contaminants based on the direct contact pathway and Pennsylvania's Land Recycling and Environmental Remediation Standards Act, which promulgated Statewide Health Standards for soil (Table 13). EPA selected a cleanup action level of 1.2E-04 mg/kg (120 parts per trillion) for dioxin in lieu of the 1 part per billion cleanup action level suggested in the EPA's Office of Solid Waste and Emergency Response ("OSWER") Directive 9200.4-26 titled, "Approach for Addressing Dioxin in Soil at Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and Resource Conservation and Recovery Act (RCRA) Sites, issued April 1998.

Since the OU3 ROD was issued, EPA's dioxin reassessment has been developed and undergone review for many years, with the participation of scientific experts in EPA and other federal agencies, as well as scientific experts in the private sector and academia. The Agency followed current guidelines and incorporated the latest data and physiological/biochemical research into the reassessment. On February 17, 2012, EPA released the final human health non-cancer dioxin reassessment, publishing an oral non-cancer toxicity value, or reference dose (RfD), of $7x10^{-10}$ mg/kg-day for 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) in EPA's Integrated Risk Information System (IRIS). The dioxin cancer reassessment will follow thereafter. The dioxin RfD was approved for immediate use at Superfund sites to ensure protection of human health. Based on this RfD and default exposure factors, EPA's noncarcinogenic cleanup action level for residential exposure to soil (corresponding to an HI of 1) is 51 parts per trillion (ppt), more restrictive than the Remedial Goal Objective (RGO) of 120 ppt selected in the OU3 ROD. As part of this five-year review, confirmation sample data from the ROS Area excavation was evaluated to determine the protectiveness of the Site in its current state. All dioxin confirmation samples from excavated areas were less than 1 ppt. Therefore, although the RGO exceeded the current EPA residential cleanup action level, the actual cleanup levels achieved as part of the remedial action were well below this action level.

The MCL for dioxins has not changed since the promulgation of the non-cancer RfD. However, based on this new RfD, the corresponding non-cancer risk-based level for dioxins in tap water is 1.4E-05 µg/L, less than the MCL for dioxins (3E-05 µg/L). The HI from residential exposure to groundwater at this level is 2 and the upper-bound excess cancer risk is 5E-05, within the cancer risk range. Because the current RGO for dioxins in groundwater exceeds its target HI, determination of meeting the remedial action objectives (RAO) will continue to be performance-based. When preliminary cleanup standards are attained, EPA will evaluate the monitoring data to develop a trend analysis and risk assessment to demonstrate performance of the treatment system and compliance with the NCP.

<u>Changes in Exposure Pathways</u>

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

Land use on or near the site has changed. The Philadelphia Gum Company property has been purchased by the Township of Haverford and leased to the Freedom Valley YMCA. Construction of the new Haverford YMCA was completed in 2013. EPA worked with both the YMCA and the Township to ensure that any new facility complies with the easements in place to protect the infrastructure associated with the cleanup. Additionally, the YMCA included a vapor mitigation system as part of the new building's construction. This system is currently vented passively but can be converted to active ventilation, if necessary.

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

Due to the presence of TCE in CW-1S/I, there was concern that a vapor intrusion risk was present in the nearby residences. In 2011, EPA's Removal Program conducted a residential vapor intrusion investigation to determine whether TCE contamination in the groundwater presents an unacceptable risk via the vapor intrusion pathway. Air samples were collected from beneath building slabs along with paired indoor and ambient air samples. At some dwellings a crawlspace air sample was collected in lieu of a sub-slab air sample due to concern of a high water table. Results from the VI Report indicated that there was no vapor intrusion risk from TCE or its degradation products. No separate source of this TCE was identified and the existing ground-water treatment system for the Site continues to remove 99.9 percent of TCE in the treated groundwater, along with other chemical compounds.

As a precautionary measure, vapor intrusion testing was conducted by the YMCA in 2014 and 2015 in consultation with EPA. Five indoor, two outdoor, and two void space samples were collected at the YMCA on February 14, 2014 and analyzed for volatile organic compounds (VOCs) plus naphthalene. The void space is the area beneath the YMCA building foundation that is part of the Cupolex ® vapor mitigation system. These samples were analyzed using USEPA Method

TO-15. Additionally, one indoor air sample was collected from the Child Watch Area and submitted for naphthalene analysis using USEPA Method TO-17. Naphthalene and chloroform were detected above appropriate EPA regional screening levels (RSLs) in at least one sample. However, reporting limits were not low enough to compare against EPA RSLs for naphthalene and 1,2,4-trimethylbenzene in several samples. The chloroform was likely due to indoor air sources, e.g., the swimming pools. The source of the naphthalene could not be determined because reporting limits from the void space and several indoor air samples were too high.

EPA conducted a human health risk assessment using the results. All cancer and non-cancer risks were below or within EPA's acceptable risk criteria. However, it is important to note the potential cancer risk for the Adult Daycare Worker (Cumulative Risk (CR)=6.6E-05) was approaching the unacceptable threshold of EPA's cancer risk criteria (1.0E-4). Further, the issues with the elevated reporting limits for naphthalene noted above introduced additional uncertainty regarding potential risks from the void space or indoor air at other sampling locations.

This first sampling effort did not definitively demonstrate that naphthalene is not of concern at the YMCA building, nor did it show that the naphthalene that was detected in the indoor air was definitively due to an indoor air source and not vapor intrusion. EPA recommended that all of the sampling locations be resampled using EPA Method TO-17, and analyzed for naphthalene as well as 1,2,4-trimethylbenzene, benzene, toluene, ethylbenzene and xylene (BTEX) compounds.

To address this recommendation, a second round of sampling was conducted on December 23, 2014 in coordination with EPA. All samples were analyzed using Method TO-17 for the EPA requested compounds. Sampling results were provided to EPA on February 9, 2015. With the exception of two sample locations, all indoor, outdoor and void space samples were below EPA RSLs. Naphthalene was the only compound that exceeded its EPA RSL in those two samples, both of which were indoor air samples. Two indoor air concentrations of naphthalene (0.52 ug/m^3 and 1.2 ug/m^3) exceeded the EPA RSL of 0.31 ug/m^3. This suggests that there is an indoor source of naphthalene, not related to the Site. Vapor intrusion does not appear to be occurring in the building as the compounds detected in the void space of the YMCA are at lesser concentrations than were detected in the indoor air. Although vapor intrusion does not appear to be occurring, EPA conducted a risk assessment based on the maximum detected concentration of naphthalene in the indoor air. All risks were below or within EPA's acceptable threshold and criteria.

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

There are no new contaminants or contaminant sources that could affect the protectiveness of the remedy.

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

No.

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

No.

Changes in Toxicity and Other Contaminant Characteristics

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

The results of the Five-Year Review did not reveal that exposure pathways changed, but contaminant characteristics such as the non-cancer toxicity values for dioxins has changed in such a manner that could affect the appropriateness of the remedies selected to maintain protection of human health and the environment. None of the groundwater Remedial Goal Objectives (RGOs) based on MCLs/SMCLs have been revised and only one of the RGOs based on the PADEP soil-to-groundwater pathway was revised since the date of the OU3 ROD.

There have been a couple of minor revisions in the methodology for human health risk assessments, but changes in the updated documents are not expected to significantly change the overall conclusions of the risk assessment. While there were a few changes in carcinogenic and non-carcinogenic toxicity values, the toxicity of the primary risk drivers at the site and the overall decision to remediate or not remediate based on risk assessment results would not be affected, and the regulatory criteria selected for monitoring for most chemicals would still be the MCLs and PADEP standards.

Current toxicity values may change again in the coming years, and protectiveness of the groundwater cleanup levels is best assessed at the time when it is believed that groundwater cleanup has been achieved. Therefore, it is recommended that the groundwater risks be evaluated at the end of the remedy, (e.g., when maximum contaminant levels (MCLs) or the site-specific remedial goals have been achieved) to ensure protectiveness at that time.

The discharge from the groundwater extraction and treatment facility meets the NPDES discharge requirements. It is important to reiterate that no one drinks the groundwater at or around the Site.

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

No.

Changes in Risk Assessment Methods

Have standardized risk assessment methodologies changed in a way that could affect the protectiveness of the remedy?

In September 2011, EPA's National Center for Environmental Assessment, Office of Research and Development (ORD/NCEA) issued a substantive update to its exposure assessment recommendations, *Exposure Factors Handbook—2011 Edition*. As a result of the findings in this document, EPA issued OSWER Directive 9200.1-120 (*Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors*; dated February 6, 2014). This directive incorporates and adopts the updates recommended by an EPA risk assessment workgroup and updates OSWER Directive 9285.6-03. The EPA Regional Screening Levels (RSLs) were updated in May 2014 to reflect the changes in the default exposure factors. Updates to the default exposure factors generally resulted in increases to the RSLs, thus resulting in slight decreases in risk estimates for most chemicals. Therefore, this update is unlikely to affect the overall protectiveness of the remedies.

A final determination as to whether soil and groundwater performance standards are protective should be assessed when the OU3 performance standards and RGOs have been achieved.

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

No.

Technical Assessment Summary

According to the data reviewed, and the Site inspection, the remedy is functioning as intended by all the decision documents. Except for conversion of the former PCG facility to the YMCA, there have been no significant changes in the Site conditions that would call into question the protectiveness of the remedy. Removal of significant paved areas during YMCA construction may have desorbed some contaminants in subsurface thus temporarily increased contaminant concentration in groundwater.

The cleanup values that were selected at the time of the RODs are still valid, with the potential exception of dioxins. Since the last Five-Year Review, EPA has released the final non-cancer reference dose for 2,3,7,8-TCDD. The non-cancer risk levels for soil and groundwater are less than the RGOs for dioxins presented in the OU3 ROD. However, groundwater in the vicinity of the Site is not being extracted for potable use. Although the soil RGO for dioxins in the ROS Area is greater than the current EPA non-cancer cleanup action level, all areas excavated as part OU3 RA achieved a dioxin cleanup level of less than 1 ppt. Furthermore, all excavations extended several feet below the ground surface (in some instances going below the water table) and were backfilled. As such, there is no current exposure pathway. There have been no changes for the other contaminants of concern or to the standardized risk assessment methodology that affect the protectiveness of the remedy.

The assessment process for vapor intrusion was updated for naphthalene since the last Five-Year Review, but the new assessment of vapor intrusion did not identify any unacceptable risk.

Based on the data reviewed and the site inspection, the remedies are functioning as intended by the RODs. Except for conversion of former PCG facility to YMCA, there have been no significant changes in the Site conditions that would call into question the protectiveness of the remedy. Removal of significant paved areas and subsequent subsurface ground disturbance during YMCA construction may have desorbed some contaminants in subsurface and thus temporarily increased contaminant concentration in groundwater. The cleanup standards for groundwater contamination cited in the OU3 ROD have not been met throughout the shallow and deep plumes. However, progress toward achieving remedial goals and RAOs is being made. The September 2014 detection of an elevated PCP concentration in surface water at Station #2 indicates that there may still be some remaining contaminant migration to Naylors Run. However, subsequent resampling at this location in December 2014 and April 2015 resulted in a PCP concentration that is consistent with historical detected concentrations. More frequent surface water and sediment sampling is planned to further evaluate this area as part of the ecological monitoring program. The Source Area and groundwater contamination is being contained by the extraction well system, with the potential exception of CW-12D and CW-13D, which should be monitored with more frequency at least in the short term. EPA will also continue to monitor concentrations of naphthalene in groundwater to ensure the levels continue to decrease and the plume does not move, which could affect the protectiveness. The institutional controls in place are protective in the long term. The finalized ICIAP has provided a means of ensuring that the controls remain protective. There has been no other information that has come to light during this review that called into question the protectiveness of the remedy.

Overall, the plant operated successfully with minor exceedances of several permit limits on occasion. Usually, these exceedances were a result of either equipment failure which was repaired and the issue was resolved or due to GAC saturation causing some organics to exceed and that was fixed by replacing carbon.

VIII. Issues

Table 4 - Issues

Issues	Affects Current Protectiveness (Y/N)	Affects Future Protectiveness (Y/N)
Potential for naphthalene concentrations in groundwater to increase or migrate	N	Y
Potential of increased PCP levels in deep GW downgradient of CTR	N	Y

IX. Recommendations and Follow-Up Actions

Table 5 - Recommendations and Follow-up Actions

Issue	Recommendations and Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness (Y/N)	
					Current	Future
Potential for naphthalene concentrations in groundwater to increase or migrate	Monitor naphthalene levels in Source area groundwater	PADEP	EPA	08/31/2018	N	Y
Potential of increased PCP levels in deep GW downgradient of CTR	Monitor downgradient wells (CW-12D and CW-13D) on a quarterly basis for a minimum of one year. Monitoring frequency should be reevaluated after the first year as well as any other potential next steps, e.g., additional monitoring wells.	PADEP	EPA	08/31/2018	N	Y

X. Protectiveness Statement

The remedy for OU1 is protective in the long-term. The multi-layer geotextile cap prevents contact with or migration of contaminated soil in the Source. Institutional controls are in place to protect the integrity of the cap as is documented in the Institutional Control Implementation and Assurance Plan (ICIAP).

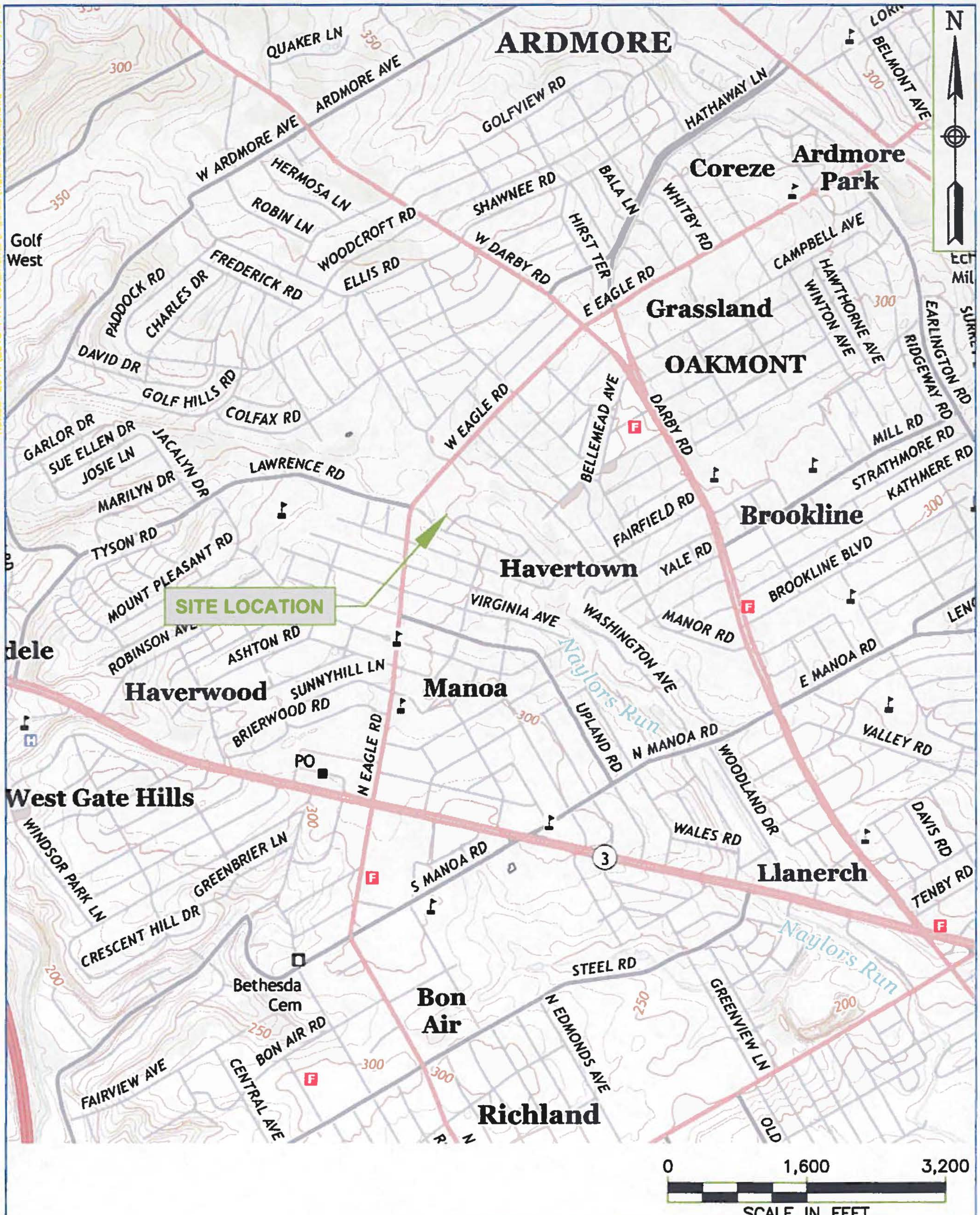
The remedy for OU2 was an interim remedy that was incorporated into the OU3 remedy as the final groundwater remedy. The OU2/OU3 final groundwater remedy currently protects human health and the environment because the groundwater extraction and treatment facility is operating as intended, and groundwater from the Source Area and ROS Area is being captured and effectively treated to discharge limits. The Institutional Control Implementation and Assurance Plan has been finalized and ICs are in-place, which prevent the installation of groundwater wells and protect the integrity of the remedy. The excavation and off-site disposal of the soils from the Recreation and Open Space area prevent exposure to contaminated soil in that portion of the Site. However, for the remedy to remain protective in the long-term, naphthalene levels in the groundwater should be monitored to ensure the levels continue to decrease and the naphthalene plume remains in the Source Area. Downgradient deep aquifer wells CW-12D and CW-13D should be monitored on a quarterly basis for a minimum of one year to determine if Site contaminant concentrations are increasing. Monitoring frequency should be reevaluated after the first year as well as any other potential next steps, e.g., additional monitoring wells. Finally, monitoring of groundwater and Naylors Run surface water and sediment downgradient of CTR coupled with the ongoing operation of the groundwater treatment system should continue until the groundwater cleanup standards are met.

The remedy at the Site is protective in the short term because the groundwater extraction and treatment facility is operating as intended, the multi-layer geotextile cap prevents contact with contaminated soil in the Source area, the excavation and off-site disposal of the soils from the Recreation and Open Space area prevent exposure to contaminated soil in that portion of the Site, and institutional controls are in place to maintain the integrity of the remedy and to prevent the installation of groundwater wells. However, for the remedy to remain protective in the long-term, naphthalene levels in the groundwater should be monitored to ensure the levels continue to decrease and the naphthalene plume remains in the Source Area. Downgradient deep aquifer wells CW-12D and CW-13D should be monitored on a quarterly basis for a minimum of one year to determine if Site contaminant concentrations are increasing. Monitoring frequency should be reevaluated after the first year as well as any other potential next steps, e.g., additional monitoring wells. The Institutional Control Implementation and Assurance Plan has been finalized and IC are in-place. Finally, monitoring of groundwater and Naylors Run surface water and sediment downgradient of CTR coupled with the ongoing operation of the groundwater treatment system should continue until the groundwater cleanup standards are met.

XI. Next Review

The next Five-Year Review for this site is required within five years of the signature date of this document.

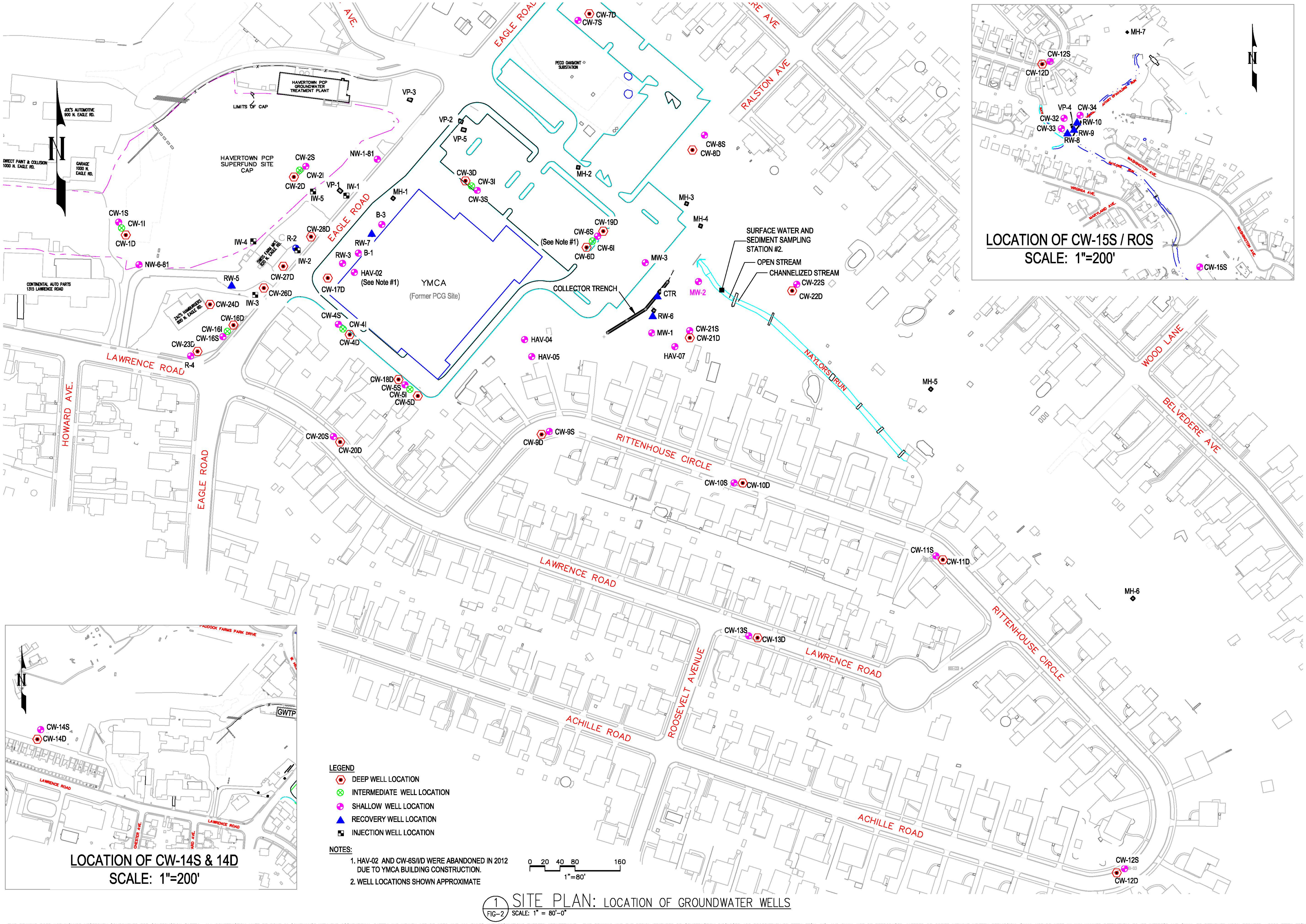
FIGURES



TETRA TECH

SITE LOCATION MAP
HAVERTOWN PCP SUPERFUND SITE
DELAWARE COUNTY
HAVERTOWN, PENNSYLVANIA

SCALE	AS NOTED
FILE	103IG2570013
REV 0	DATE 01/09/15
FIGURE NUMBER	1



1 FIG-2 SITE PLAN: LOCATION OF GROUNDWATER WELLS
SCALE: 1" = 80'-0"

REVISIONS

ISSUE DATES

CONSULTANTS

TETRA TECH
240 Continental Drive, Suite 200
Newark, Delaware 19713
ph: (302) 738-7551 fax: (302) 454-5988
WWW.TETRATECH-DE.COM

RCN:	112G00940
DRAWN BY:	CSG
CHECKED BY:	HKM
SCALE:	AS NOTED
APPROVED BY:	
DATE:	FEBRUARY 2015
CAD FILE:	..

ONE INCH — CHECK SCALE

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY (USEPA)

HAVERTOWN, PA
PCP SITE

Delaware County
Havertown, Pennsylvania

DRAWING TITLE: SITE PLAN WELL LOCATIONS

DRAWING NUMBER: FIGURE 2

9.5.2012

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0 250 500 Feet

TETRA TECH DELAWARE
56 West Main Street, Suite 400
Christiana, Delaware 19702-1501

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Figure 3
Source Area Plume Map

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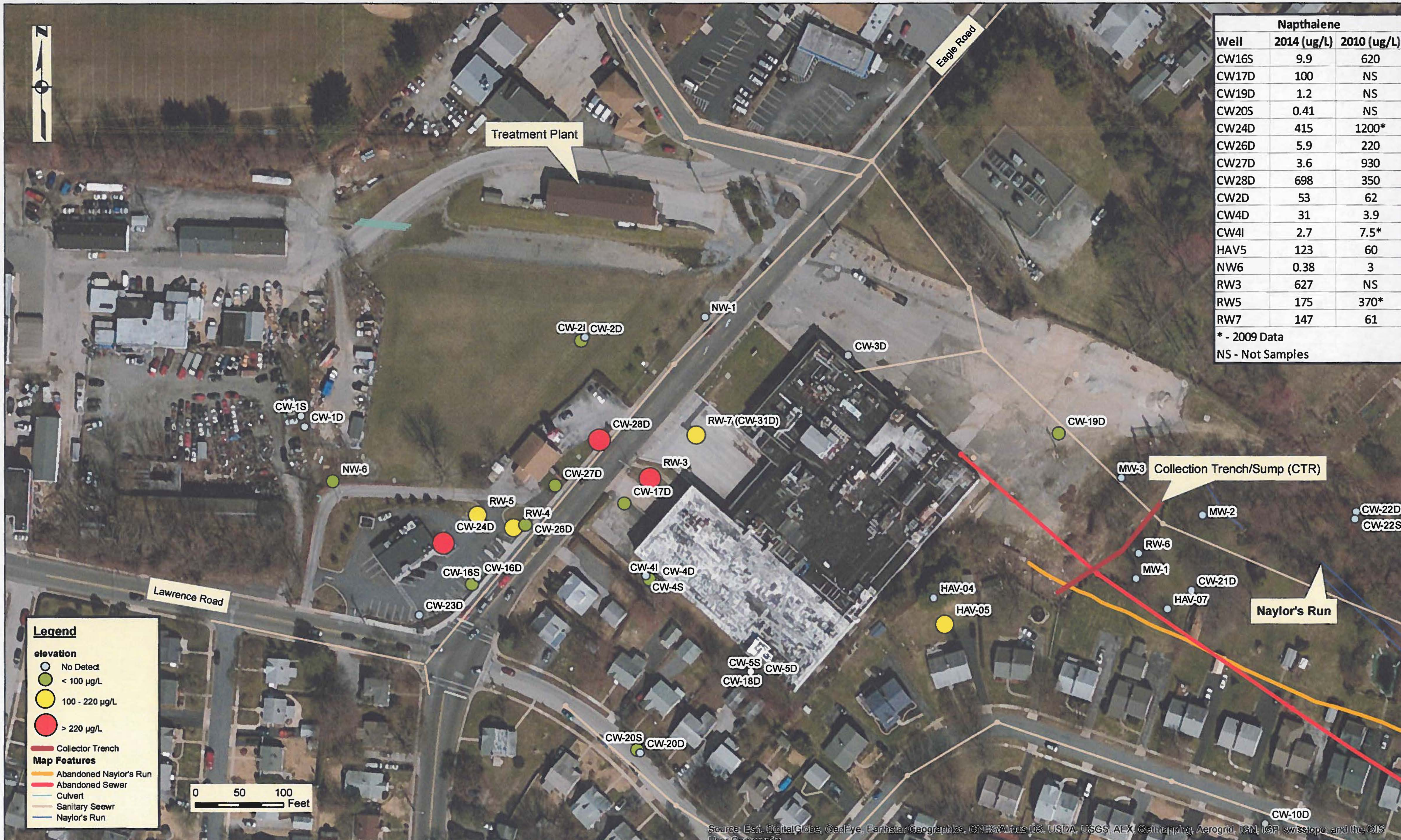

Napthalene		
Well	2014 (ug/L)	2010 (ug/L)
CW16S	9.9	620
CW17D	100	NS
CW19D	1.2	NS
CW20S	0.41	NS
CW24D	415	1200*
CW26D	5.9	220
CW27D	3.6	930
CW28D	698	350
CW2D	53	62
CW4D	31	3.9
CW4I	2.7	7.5*
HAV5	123	60
NW6	0.38	3
RW3	627	NS
RW5	175	370*
RW7	147	61

* - 2009 Data

NS - Not Samples

TETRA TECH
240 Continental Drive, Suite 200
Newark, Delaware 19713
Phone: 302.738.7551 Fax: 302.454.5980

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Figure 4
Naphthalene Detected in Groundwater - 2010 and 2014
Havertown PCP Site

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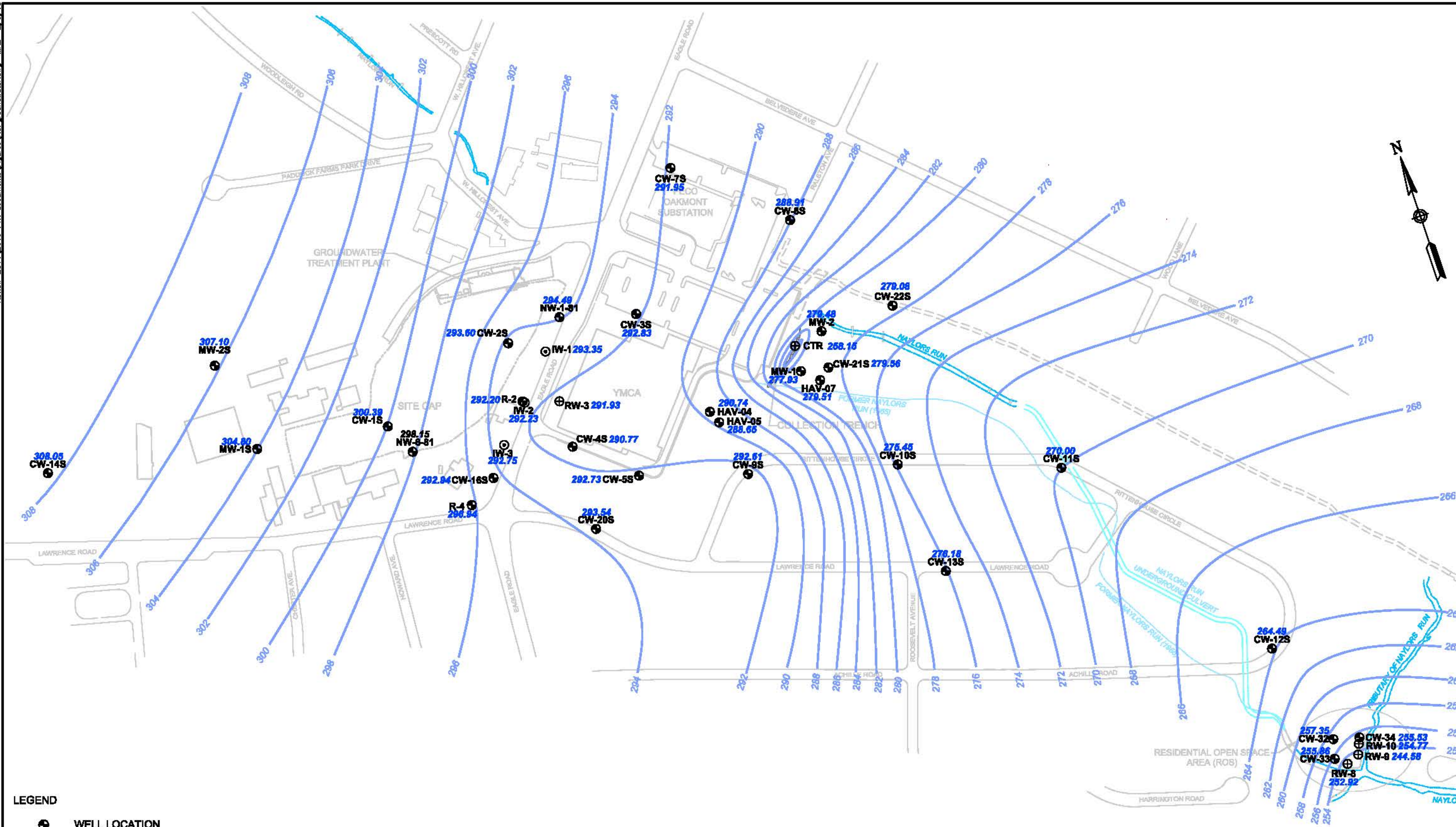


LEGEND

- WELL LOCATION
- RECOVERY WELL LOCATION
- INJECTION WELL LOCATION
- 292.73 GROUNDWATER ELEVATION (FEET, MSL)
- 290 GROUNDWATER CONTOUR

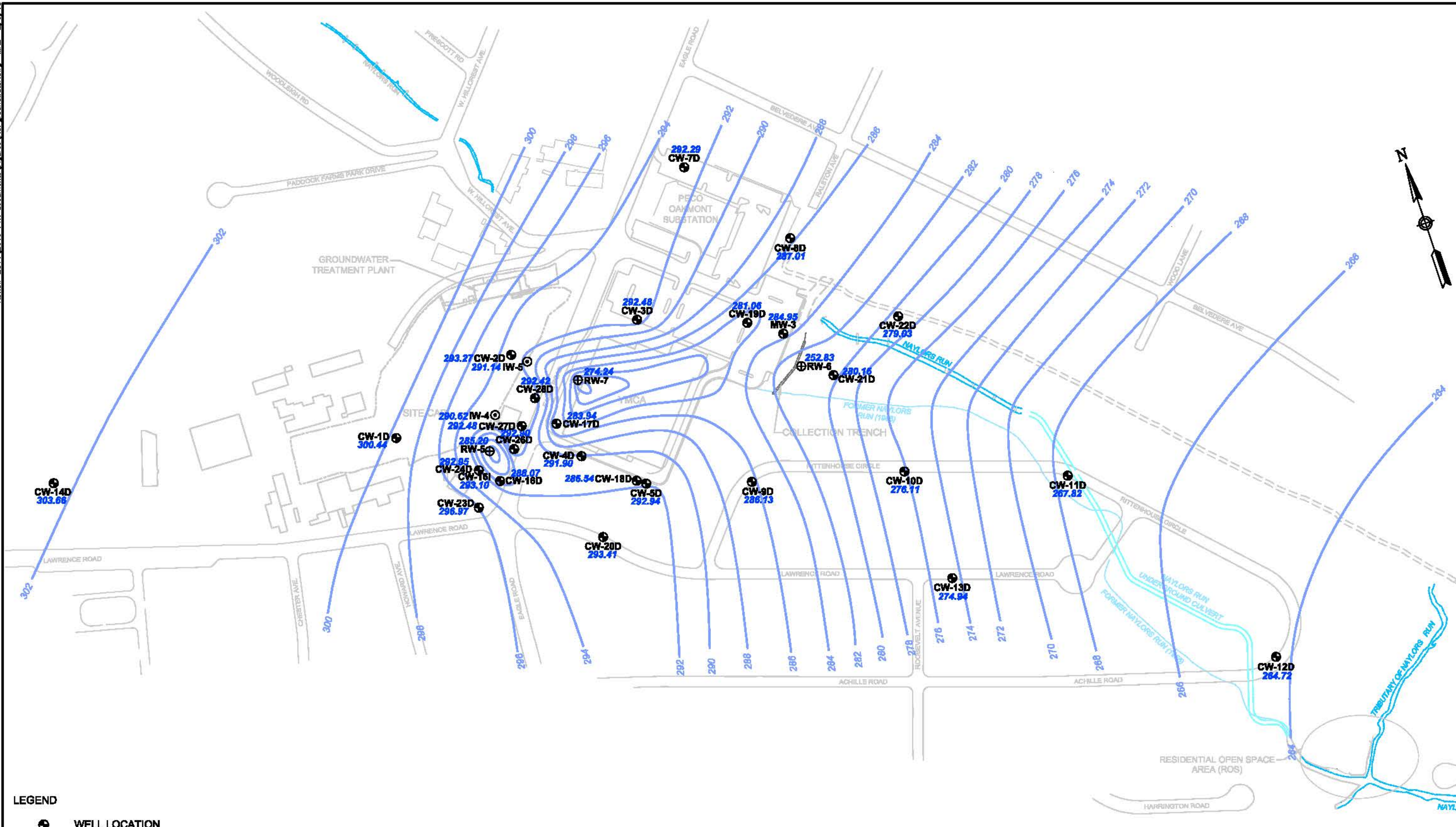
NOTES:
1. GROUNDWATER LEVEL MEASUREMENTS WERE COLLECTED ON APRIL 28, 2014.
2. COLLECTION TRENCH (CTR) AND RECOVERY WELLS (RW-5, RW-6, RW-7, RW-8, RW-9 AND RW-10) WERE ON-LINE.
3. ALL INJECTION WELLS WERE OFF-LINE.

0 220 440
SCALE IN FEET

TETRA TECH

FILE 112C05426GM02	SCALE AS NOTED	
FIGURE NUMBER 5	REV 0	DATE 11/13/14

SHALLOW GROUNDWATER CONTOURS
HAVERTOWN PCP SUPERFUND SITE
DELAWARE COUNTY
HAVERTOWN, PENNSYLVANIA



LEGEND

- WELL LOCATION
- RECOVERY WELL LOCATION
- INJECTION WELL LOCATION
- *276.11* GROUNDWATER ELEVATION (FEET, MSL)
- 278 GROUNDWATER CONTOUR

NOTES:
1. GROUNDWATER LEVEL MEASUREMENTS WERE COLLECTED ON APRIL 28, 2014.
2. COLLECTION TRENCH (CTR) AND RECOVERY WELLS (RW-5, RW-6, RW-7, RW-8, RW-9 AND RW-10) WERE ON-LINE.
3. ALL INJECTION WELLS WERE OFF-LINE.

0 220 440
SCALE IN FEET

TETRA TECH

FILE 112C05426GM02	SCALE AS NOTED	DEEP GROUNDWATER CONTOURS HAVERTOWN PCP SUPERFUND SITE DELAWARE COUNTY HAVERTOWN, PENNSYLVANIA
FIGURE NUMBER 6	REV 0 DATE 11/13/14	

S:\03-Projects\Federal\EPA R3 RAC Assignments\Havertown\103G2570013_Five Year Review-2014\2015 FYR documents\Figures\KOPgroundwater.dwg MKB 2/5/15

Figure 7
PCP - Plant Influent & Pretreatment Performance
February 2010 - December 2014

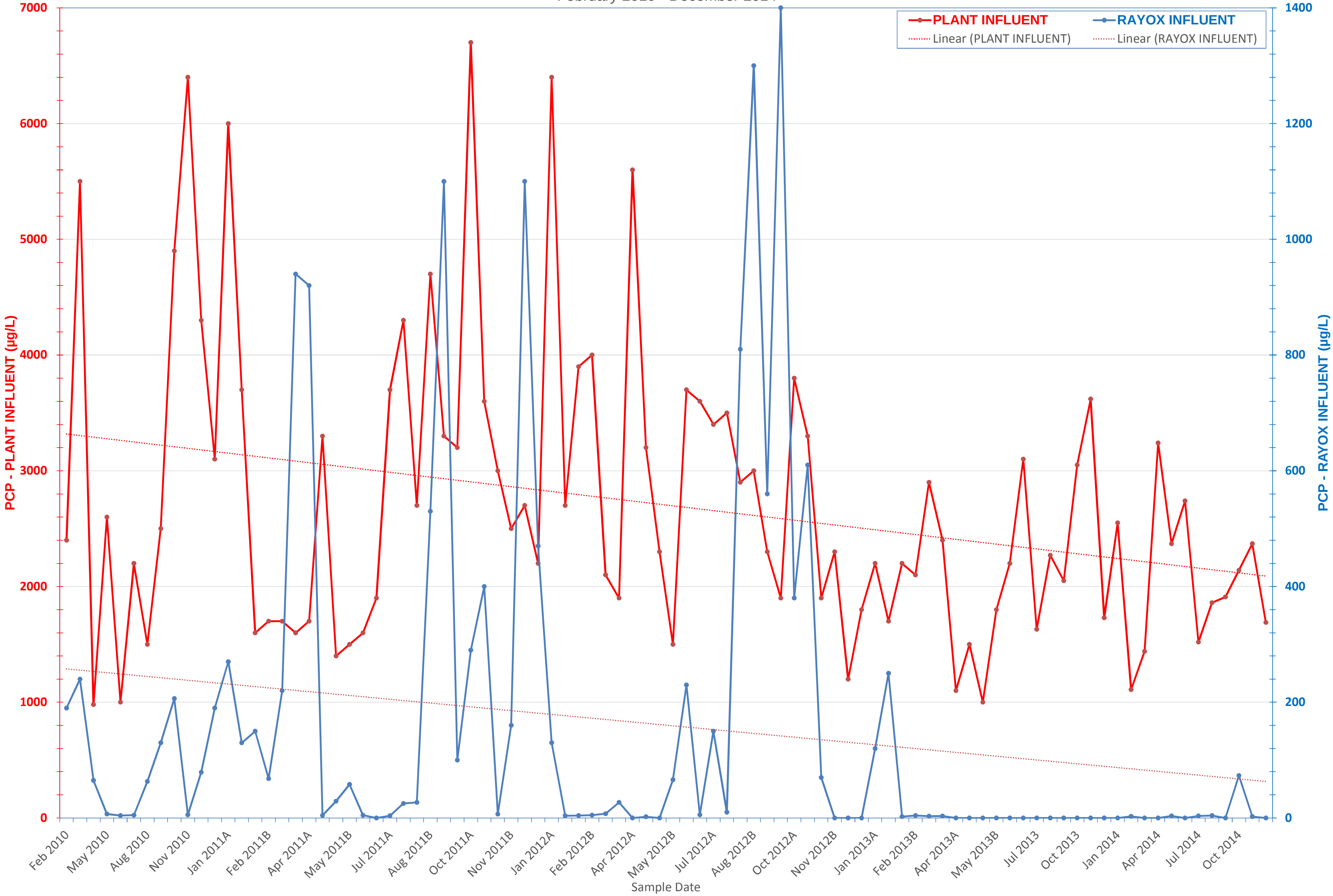


Figure 8
Napthalene - Plant Influent & Pretreatment Performance
February 2010 - November 2014

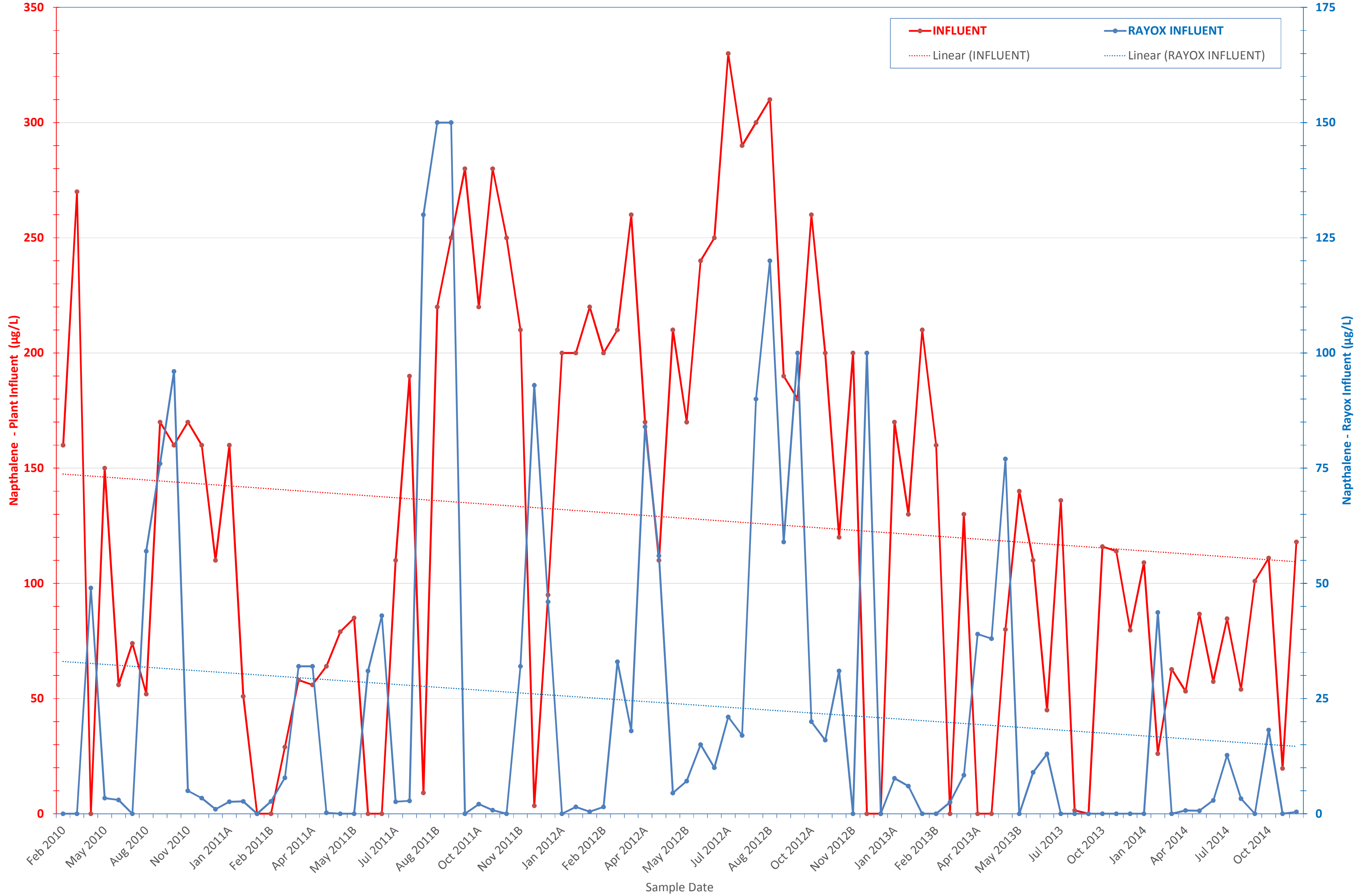


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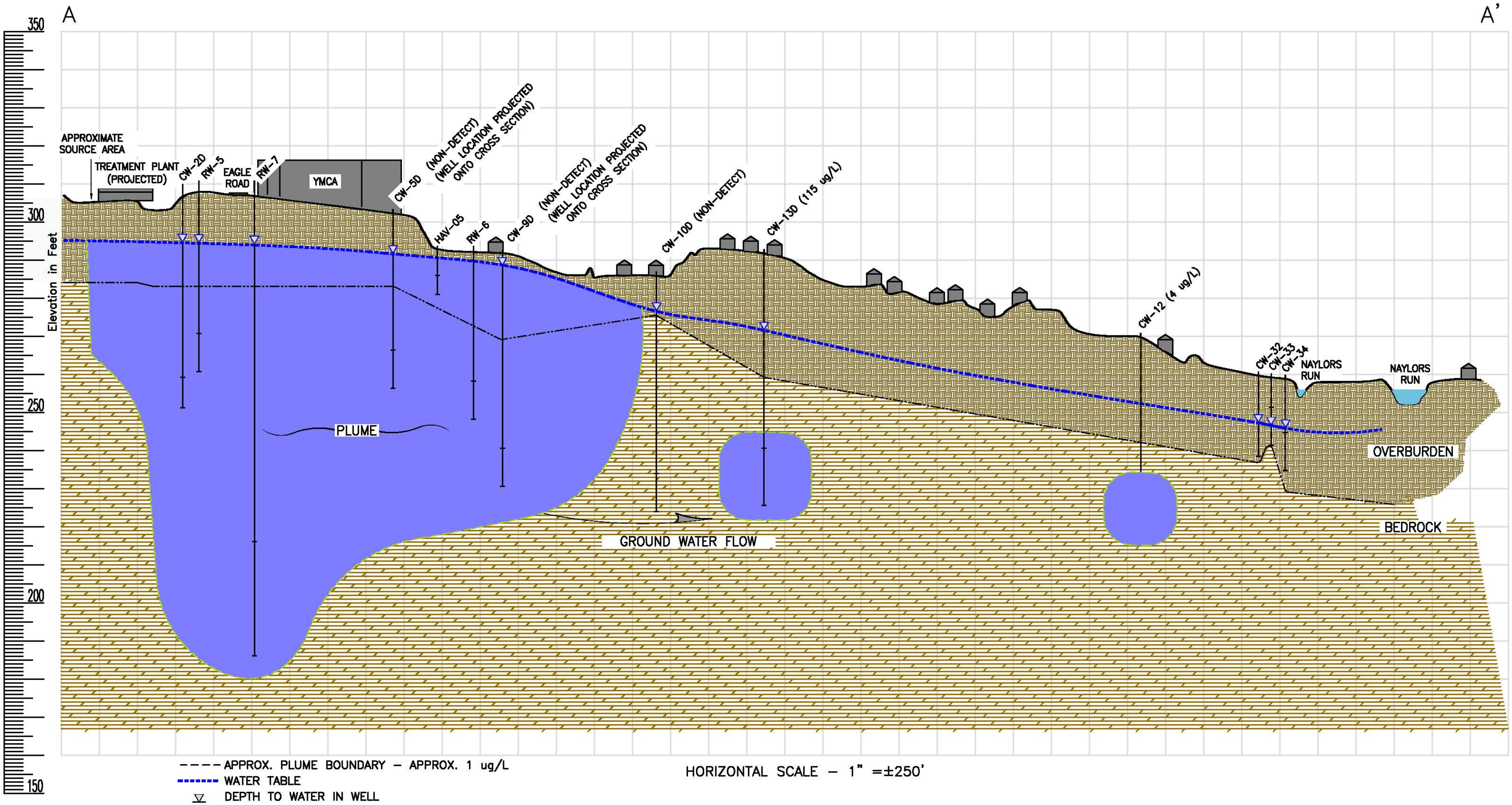
Figure 9 - Conceptual Site Model 2014
Current Site Conditions
Havertown PCP site

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY (USEPA)

FIGURE 10

CONCEPTUAL MODEL CROSS SECTION A–A'

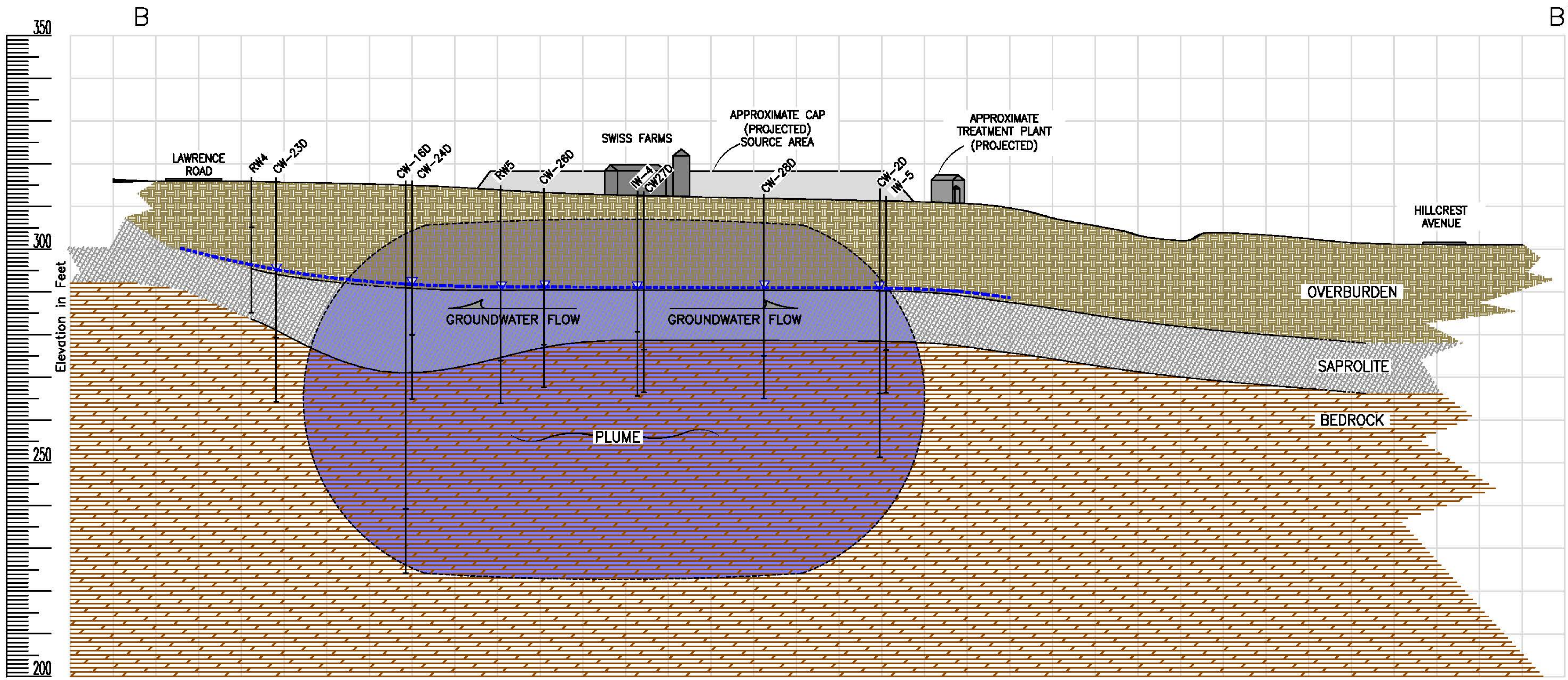


S:\03–Projects\Federal\EPA R3 RAC Assignments\Havertown\103IG2570013_Five Year Review–2014\2015 FYR documents\CSM\Fig ES–2 Conceptual Mode_2015I.dwg 04/06/2015 10:

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY (USEPA)

FIGURE 11

CONCEPTUAL MODEL CROSS SECTION B–B'

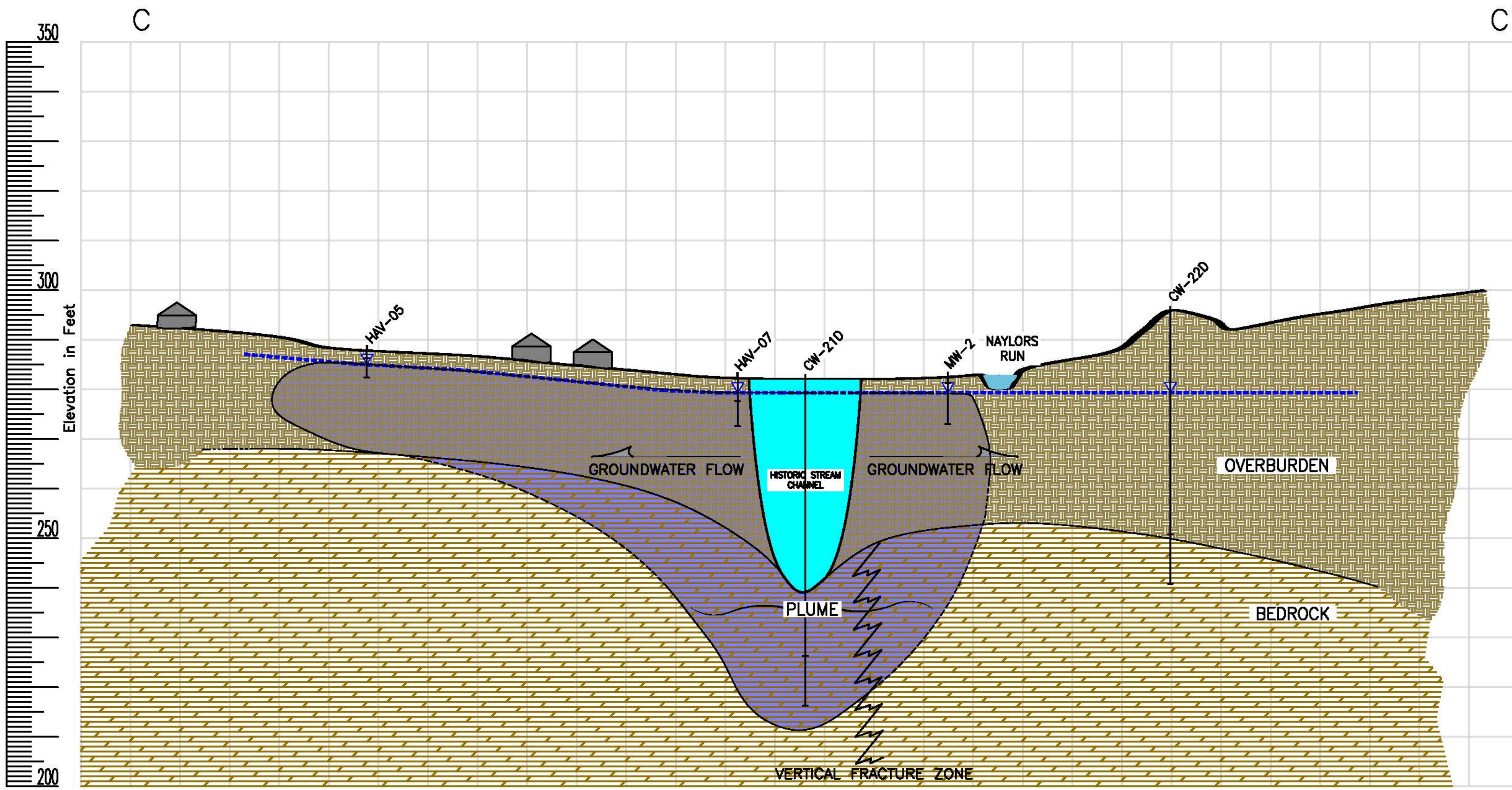


-------- APPROX. PLUME BOUNDARY
-------- WATER TABLE

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY (USEPA)

FIGURE 12

CONCEPTUAL MODEL CROSS SECTION C–C'

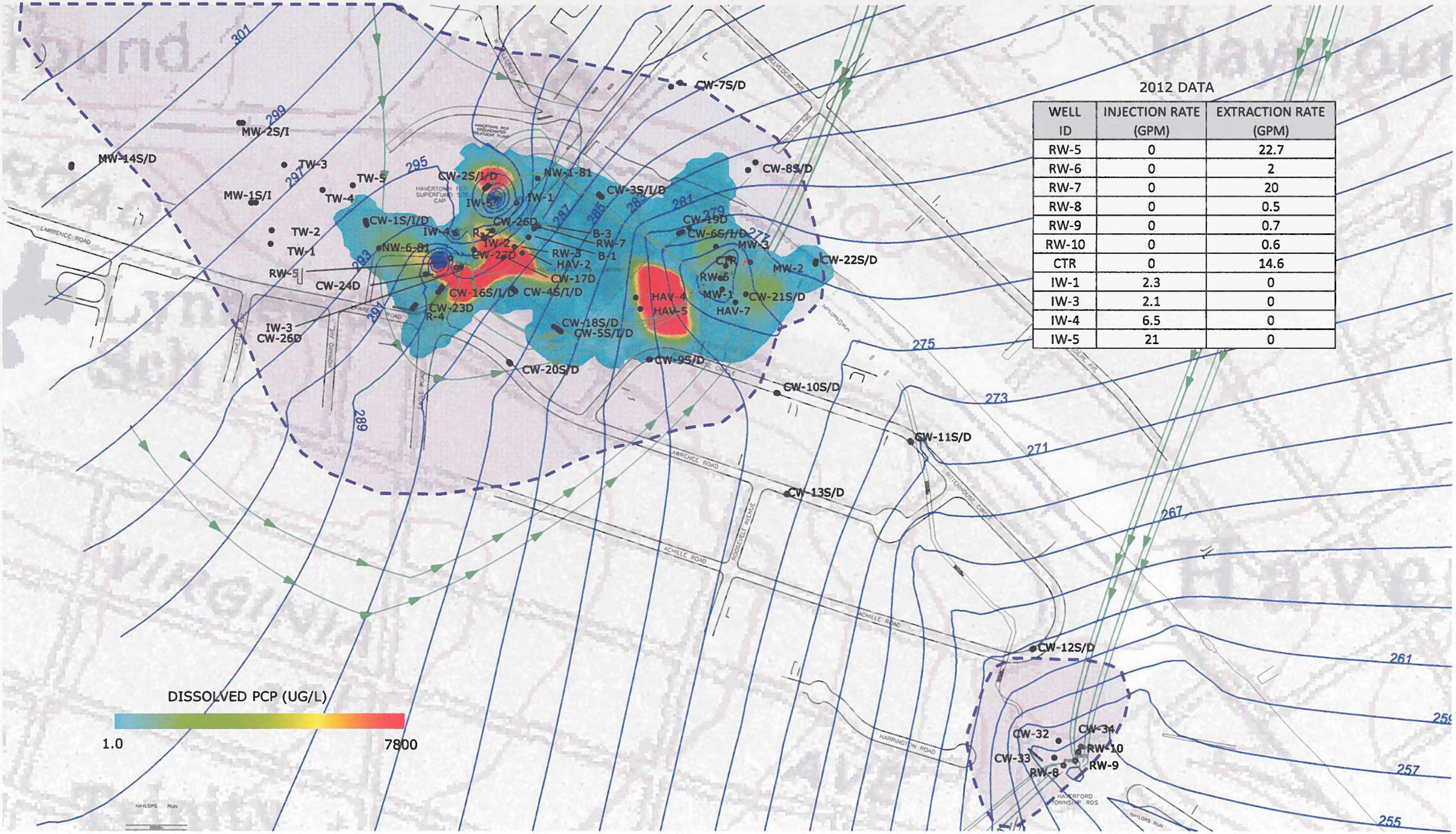


------- APPROX. PLUME BOUNDARY
------- WATER TABLE

HORIZONTAL SCALE – 1" =±65'

SECONDARY GROUNDWATER FLOW DIRECTION;
PRIMARY GROUNWATER FLOW DIRECTION
PERPENDICULAR TO B–B' CROSS SECTION.

S:\03–Projects\Federal\EPA R3 RAC Assignments\Havertown\103IG2570013_Five Year Review–2014\2015 FYR documents\CSM\Fig ES–2 Conceptual Model.dwg 02/09/2015 15:39



2012 DATA

WELL ID	INJECTION RATE (GPM)	EXTRACTION RATE (GPM)
RW-5	0	22.7
RW-6	0	2
RW-7	0	20
RW-8	0	0.5
RW-9	0	0.7
RW-10	0	0.6
CTR	0	14.6
IW-1	2.3	0
IW-3	2.1	0
IW-4	6.5	0
IW-5	21	0

NOTES

1. BASE MAP FROM USGS TOPOGRAPHIC QUADRANGLE
2. FOR CLARITY, NOT ALL PATH LINES ARE SHOWN.

EXPLANATION

275 GROUNDWATER ELEVATION CONTOUR (FT NAVD88)

WELL LOCATION

PARTICLE PATH LINE (10 YEARS BETWEEN ARROWS)

INDUCED CAPTURE ZONE

APPROXIMATE SCALE (FEET)

0 200 400 800

N

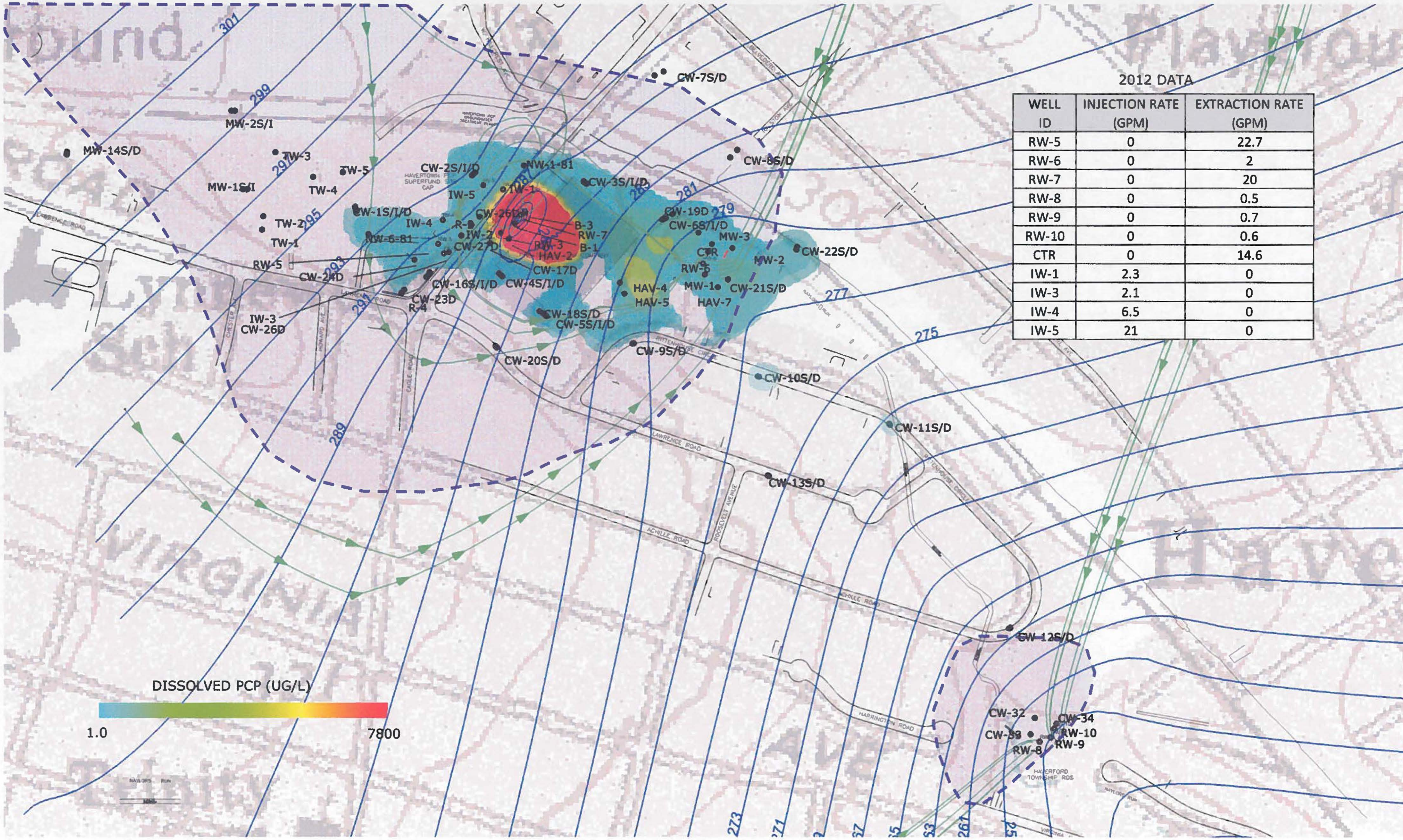
Val F. Britton, P.G.
ENVIRONMENTAL AND HYDROGEOLOGIC CONSULTING
326 Conestoga Road Wayne, PA 19087
610-964-1462
val@vbritton.com www.vbritton.com

ACTIVE RECOVERY SYSTEM
PARTICLE TRACKING EVALUATION
SHALLOW OVERBURDEN
WITH PCP PLUME

PROJECT LOCATION
HAVERTOWN PCP SITE
HAVERTOWN, PENNSYLVANIA

DRAWN BY VFB | DATE 07-31-13

FIGURE NUMBER
13



2012 DATA

WELL ID	INJECTION RATE (GPM)	EXTRACTION RATE (GPM)
RW-5	0	22.7
RW-6	0	2
RW-7	0	20
RW-8	0	0.5
RW-9	0	0.7
RW-10	0	0.6
CTR	0	14.6
IW-1	2.3	0
IW-3	2.1	0
IW-4	6.5	0
IW-5	21	0

NOTES

1. BASE MAP FROM USGS TOPOGRAPHIC QUADRANGLE
2. FOR CLARITY, NOT ALL PATH LINES ARE SHOWN.

EXPLANATION

275 GROUNDWATER ELEVATION CONTOUR (FT NAVD88)

WELL LOCATION

PARTICLE PATH LINE (10 YEARS BETWEEN ARROWS)

INDUCED CAPTURE ZONE

APPROXIMATE SCALE (FEET)

0 200 400 800

N

Val F. Britton, P.G.
ENVIRONMENTAL AND HYDROGEOLOGIC CONSULTING
326 Conestoga Road Wayne, PA 19087
610-964-1462
val@vbritton.com www.vbritton.com

ACTIVE RECOVERY SYSTEM
PARTICLE TRACKING EVALUATION
DEEP BEDROCK
WITH PCP PLUME

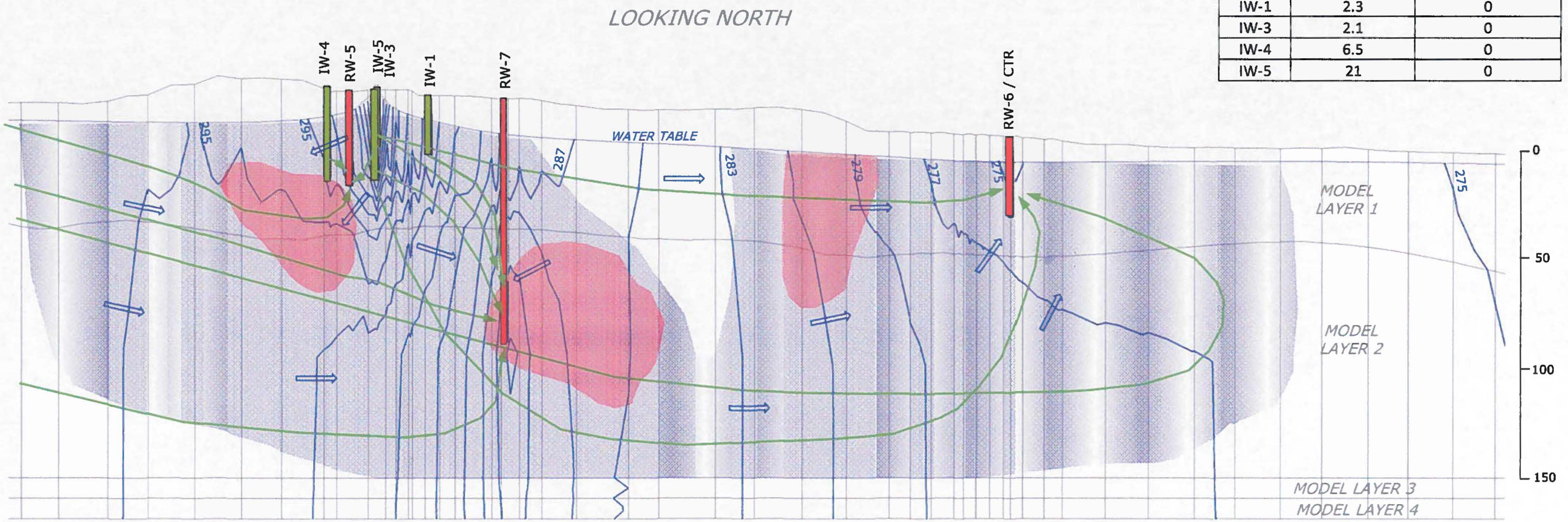
PROJECT LOCATION
HAVERTOWN PCP SITE
HAVERTOWN, PENNSYLVANIA

DRAWN BY VFB | DATE 07-31-13

FIGURE NUMBER
14

2012 DATA

WELL ID	INJECTION RATE (GPM)	EXTRACTION RATE (GPM)
RW-5	0	22.7
RW-6	0	2
RW-7	0	20
RW-8	0	0.5
RW-9	0	0.7
RW-10	0	0.6
CTR	0	14.6
IW-1	2.3	0
IW-3	2.1	0
IW-4	6.5	0
IW-5	21	0



NOTES

1. VERTICAL EXAGGERATION IS 2X
2. SEE FIGURES 7 AND 8 FOR LINE OF CROSS SECTION
3. CROSS SECTION IS ALONG A MODFLOW ROW AND MODPATH PARTICLE LINES ARE TRANSPOSED FROM DOMAIN IN AREA OF THE MODFLOW CROSS SECTION. AS A RESULT, NOT ALL PATH LINES ARE PERPENDICULAR TO THE CONTOURS.
4. FOR CLARITY, NOT ALL PATH LINES ARE SHOWN.

EXPLANATION

275 GROUNDWATER ELEVATION CONTOUR (FT NAVD88)

PARTICLE PATH LINE

FLOW DIRECTION

PCP CONCENTRATION

1 TO 2000 UG/L

>2000 UG/L

INJECTION WELL

EXTRACTION WELL

APPROXIMATE SCALE (FEET)

0 125 250 500

Val F. Britton, P.G.
ENVIRONMENTAL AND HYDROGEOLOGIC CONSULTING
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610-964-1462
val@vbritton.com www.vbritton.com

ACTIVE RECOVERY SYSTEM
PARTICLE TRACKING EVALUATION
SHALLOW OVERBURDEN

PROJECT LOCATION
HAVERTOWN PCP SITE
HAVERTOWN, PENNSYLVANIA

DRAWN BY VFB

DATE 07-31-13

FIGURE NUMBER
15

TABLES

Table 6

Havertown PCP Treatment Plant Influent Contaminant of Concern Concentrations
July 2010 to November 2014

Date	Benzene (µg/L)	BTEX (µg/L)	Trichloroethene (µg/L)	Naphthalene (µg/L)	Pentachlorophenol (µg/L)	Phenanthrene (µg/L)	Dioxins/Furans TEQ (ppq)	Iron (µg/L)	Manganese (µg/L)	Arsenic (µg/L)
Jan 2013a	2.7	20	4.1	170	2200	5.3	0.16	11300	6970	3.3
Feb 2013a	3.6	35	5.5	210	2200	7.4	0.66	13000	8560	0.0
Mar 2013a	4.2	33	5.0	0	2900	0.0	1.4	12100	8350	4.8
Apr 2013a	0.0	17	2.4	0	1100	0.0	23	12000	8120	0.0
May 2013a	0.0	34	5.8	80	1000	4.5	3.6	11400	7460	3.3
Jun 2013a	5.7	34	6.2	110	2200	5.3	1.2	NS	NS	NS
Jul 2013	2.9	31	6.7	136	1630	4.2	0.020	11600	6000	2.7
Aug 2013	2.0	26	6.1	2	2270	1.9	0.051	11400	6800	2.3
Sep 2013	1.8	30	5.8	0.0	2050	3.4	0.23	11200	6300	1.9
Oct 2013	1.6	22	4.7	116	3050	5.8	0.048	11300	6000	1.9
Nov 2013	6.4	35	6.1	114	3620	6.5	0.18	12000	6900	1.9
Dec 2013	1.9	25	4.9	80	1730	4.8	0.022	9800	5600	1.8
Jan 2014	1.6	21	4.6	109	2550	3.7	0.040	9700	5900	1.9
Feb 2014	1.9	27	5.1	26	1110	2.5	0.44	10300	6100	1.8
Mar 2014	2.7	35	6.3	63	1440	3.6	0.089	11500	6000	2.1
Apr 2014	4.4	42	6.6	53	3240	2.9	0.14	12700	6500	2.2
May 2014 [i]	2.2	30	5.8	87	2370	4.8	0.16	12100	5800	1.9
Jun 2014 [j]	9.3	43	4.0	57	2740	4.7	1.9	20600	11100	7.0
Jul 2014	9.5	54	4.0	85	1520	5.7	0.0021	10800	5900	3.4
Aug 2014 [k]	5.8	31	4.6	54	1860	5.7	0.18	10600	5500	2.2
Sep 2014 [l]	2.0	25	5.6	101	1910	5.5	0.68	11300	6000	2.1
Oct 2014	1.8	24	5.4	111	2140	6.6	0.031	12000	5300	2.7
Nov 2014	1.4	17	3.1	20	2370	3.3	0.16	9000	4200	3.0
2014 Average	**3.9**	**32**	**5.0**	**70**	**2114**	**4.5**	**0.35**	**11873**	**6209**	**2.8**
2013 Average	2.7	28	5.3	90	2142	3.8	2.6	11592	7015	2.0
2012 Average	4.5	38	7.8	202	2846	5.3	77	14208	8289	3.3
2011 Average	5.6	39	7.1	102	2929	4.5	1.2	11133	7333	5.1
2010 Average	11	52	8.1	127	2998	4.5	162	12176	7621	8.3
2009 Average	17	98	14	298	3945	11	300	15396	10539	11
2008 Average	16	89	12	238	2490	10	280	20170	10059	9.2
2007 Average	14	99	12	280	2948	10	38	14925	10680	13
2006 Average	18	142	14	287	3975	6.7	13	11517	9776	7.4
2005 Average	11	61	14	98	3382	5.3	135	8668	10253	4.2
2004 Average	13	67	14	199	3600	14	282	6679	10491	1.3
2003 Average	10	48	14	128	3730	23	510	5686	10459	1.7
2002 Average	9.1	64	8.5	469	4680	103	2064	4336	11100	0.38
2002 - 2014 Average	10.4	65	10.4	178	3083	10.4	216	11602	9126	5.5
2010 - 2014 Average	**4.6**	**35**	**6.5**	**125**	**2682**	**4.4**	**19**	**12192**	**7261**	**3.9**
2002 - 2014 High	31	182	22	1800	11000	400	4970	78700	12600	23
2010 - 2014 High	**13**	**59**	**12**	**330**	**6700**	**9.3**	**728**	**20600**	**11100**	**13**
2002 - 2014 Low	0.0	0.0	0.0	0.0	640	0.0	0.0	1310	2520	0.0
2010 - 2014 Low	**0.0**	**1.4**	**0.0**	**0.0**	**1000**	**0.0**	**0.0**	**1440**	**4200**	**0.0**

NS = not sampled

0 = ND (Not Detected)

[g] Beginning in December 2010 a second monthly influent sample was taken for SVOCs only .

[h] Beginning with July 24, 2013 sample a once monthly influent sample was taken for VOCs & SVOCs.

[i] May 2014 plant sampled June 2, 2014

[j] June 2014 plant sampled July 1, 2014

[k] August 2014 plant sampled September 4, 2014

[l] September 2014 plant sampled October 15, 2014

Table 7

Major Contaminants in Recovery Wells and Collection Trench

2010 - 2014

RW-5 (Online 2/20/06)

Date	Benzene (ug/L)	BTEX (ug/L)	Trichloroethene (ug/L)	Naphthalene (ug/L)	Pentachlorophenol (ug/L)	Phenanthrene (ug/L)	Dioxins/Furans TEQ (ppq)	Iron (ug/L)	Manganese (ug/L)	Arsenic (ug/L)
Sep-10	20	81	13	290	3200	11	0.14	17700	10300	16.7
Mar-11	10	57	9	130	1300	9	0.27	16300	8870	18.6
Sep-11	10	100	10	320	2900	10	NS	NS	NS	NS
Mar-12	20	113	13	330	1900	10	0.70	21200	11800	15
Sep-12	11	59	5.6	290	2000	11	1.72	NS	NS	NS
Mar-13	13	75	6.9	710	5200	13	0.13	19100	11300	8.3
Nov-13 [1]	6.4	94	7.3	285	4040	15	NS	NS	NS	NS
May-14 [3]	31	127	11	175	2860	15	3.3	21400	12400	7.9
Sep-14	6.8	53	9.0	126	2350	12	0.16	NS	NS	NS
2014 Average	19	90	10.0	151	2605	13	1.7	21400	12400	7.9
2013 Average	9.7	84	7.1	498	4620	14	0.13	19100	11300	8.3
2012 Average	16	86	9.3	310	1950	11	0.85	21200	11800	15
2011 Average	10	78	9.3	225	2100	9.3	0.27	16300	8870	19
2010 Average	20	81	13	290	3200	11	0.14	17700	10300	16.7
2009 Average	18	122	15	335	3650	11	455	19900	12100	17
2008 Average	21	144	16	490	3150	14	527	17800	11400	12
2007 Average	22	158	18	460	2800	13	ND	18800	12300	13
2006 Average	27	240	26	492	4550	12	ND	16200	11400	38

RW-6 (Online 4/17/06)

Date	Benzene (ug/L)	BTEX (ug/L)	Trichloroethene (ug/L)	Naphthalene (ug/L)	Pentachlorophenol (ug/L)	Phenanthrene (ug/L)	Dioxins/Furans TEQ (ppq)	Iron (ug/L)	Manganese (ug/L)	Arsenic (ug/L)
Sep-10	2.8	2.8	8.5	ND	990	ND	0.07	1800	2620	0.16
Mar-11	1.3	1.3	1.6	ND	310	ND	0.01	7400	1540	ND
Sep-11	1.8	52	3.1	0.2	780	0.22	NS	NS	NS	NS
Mar-12	1.7	1.7	3.0	ND	460	ND	NS	2740	2430	ND
Sep-12	1.5	1.5	1.7	ND	470	ND	NS	NS	NS	NS
Mar-13	2.3	2.3	ND	ND	700	ND	NS	2000	2140	ND
Nov-13 [1]	ND	ND	0.91	ND	289	ND	NS	NS	NS	NS
May-14 [3]	0.48	0.48	0.93	ND	306	ND	0.33	2000	2000	ND
Sep-14	0.34	0.34	0.61	ND	279	0.018	NS	NS	NS	NS
2014 Average	0.41	0.41	0.77	ND	293	0.009	0.33	2000	2000	ND
2013 Average	2.3	2.3	0.91	ND	495	ND	NS	2000	2140	ND
2012 Average	1.6	1.6	2.4	ND	465	ND	NS	2370	2285	ND
2011 Average	1.6	26.7	2.4	0.2	545	0.22	0.01	7400	1540	ND
2010 Average	2.8	2.8	8.5	ND	990	ND	0.07	1800	2620	0.16
2009 Average	3.7	14	6.5	ND	1400	0.09	236	20400	11400	ND
2008 Average	ND	ND	6.6	ND	1200	ND	30	1970	2650	ND
2007 Average	1.5	1.5	4.7	1.2	1200	0.48	0.0	2260	2630	ND
2006 Average	4.3	4.9	9.8	ND	1950	0.70	0.21	3280	2470	ND

Table 7
Major Contaminants in Recovery Wells and Collection Trench
2010 - 2014

Collection Trench

Date	Benzene (ug/L)	BTEX (ug/L)	Trichloroethene (ug/L)	Naphthalene (ug/L)	Pentachlorophenol (ug/L)	Phenanthrene (ug/L)	Dioxins/Furans TEQ (ppq)	Iron (ug/L)	Manganese (ug/L)	Arsenic (ug/L)
Sep-10	ND	ND	2.6	1.1	590	ND	4.3	2460	5310	0.29
Mar-11	0.9	2.2	1.4	0.3	330	ND	4.03	1510	4620	3.5
Sep-11	1.2	3.3	1.1	3.2	710	0.3	NS	NS	NS	NS
Mar-12	0.85	2.4	0.90	ND	420	ND	2.32	2420	5860	ND
Sep-12	2.2	6.4	1.3	9.8	1200	ND	0.031	NS	NS	NS
Mar-13	ND	ND	ND	ND	500	ND	2.3	3330	6170	ND
Nov-13 [1]	ND	0.89	0.93	ND	775	ND	NS	NS	NS	NS
May-14 [3]	0.59	1.3	0.72	ND	415	ND	0.18	2500	4900	ND
Sep-14	0.47	1.3	0.69	ND	509	0.014	9.6	NS	NS	NS
2014 Average	0.53	1.3	0.71	ND	462	0.007	4.9	2500	4900	ND
2013 Average	ND	0.45	0.47	ND	638	ND	2.3	3330	6170	ND
2012 Average	1.5	4.4	1.1	9.8	810	ND	1.2	2420	6015	ND
2011 Average	1.1	2.8	1.3	1.7	520	0.30	4.0	1510	4620	3.5
2010 Average	ND	ND	2.6	1.1	590	ND	4.3	2460	5310	0.29
2009 Average	2.9	7.8	3.8	2.6	1600	ND	0.46	9990	11400	2.2
2008 Average	ND	2.0	2.0	ND	920	ND	152	1740	1430	ND
2007 Average	4.0	15	2.7	4.0	1125	ND	ND	1840	2230	ND
2006 Average	7.5	25	5.3	21	1450	1.4	1.6	6620	10200	ND

RW-7 (Online 10/7/10)

Date	Benzene (ug/L)	BTEX (ug/L)	Trichloroethene (ug/L)	Naphthalene (ug/L)	Pentachlorophenol (ug/L)	Phenanthrene (ug/L)	Dioxins/Furans TEQ (ppq)	Iron (ug/L)	Manganese (ug/L)	Arsenic (ug/L)
Mar-10 (CW-31D)	1.2	11	7.1	61	3600	ND	--	16700	7810	4.3
Dec-10	4.2	42	12	270	3700	9.4	0.03	14600	6310	3.8
Mar-11	3.7	38.7	9.6	190	2300	7.4	NS	13900	4980	ND
Sep-11	3.9	51.8	8.6	200	3700	8.3	NS	NS	NS	NS
Mar-12	2.2	29	6.1	150	2900	7.2	NS	15000	6400	ND
Sep-12	2.0	27	5.2	220	2300	7.6	NS	NS	NS	NS
Mar-13	2.8	29	6.0	260	3200	11	NS	16100	6880	ND
Nov-13 [1]	1.1	30	5.2	218	2850	10	NS	NS	NS	NS
May-14 [3]	2.0	34	4.5	147	2580	8.4	NS	18100	5300	ND
Sep-14	0.95	24	3.2	123	2680	7.8	NS	NS	NS	NS
2014 Average	1.5	29	3.9	135	2630	8.1	NS	18100	5300	ND
2013 Average	2.0	29	5.6	239	3025	11	NS	16100	6880	ND
2012 Average	2.1	28	5.7	185	2600	7.4	NS	15550	6400	ND
2011 Average	3.8	45	9.1	195	3000	7.9	NS	13900	4980	ND
2010 Average	2.7	26	9.6	166	3650	4.7	0.03	15650	7060	4.1

Table 7

Major Contaminants in Recovery Wells and Collection Trench

2010 - 2014

RW-8 (Online 8/16/10)

Date	Benzene (ug/L)	BTEX (ug/L)	Trichloroethene (ug/L)	Naphthalene (ug/L)	Pentachlorophenol (ug/L)	Phenanthrene (ug/L)	Dioxins/Furans TEQ (ppq)	Iron (ug/L)	Manganese (ug/L)	Arsenic (ug/L)
Sep-10	ND	ND	ND	ND	1.3	ND	0.11	39200	1020	0.85
Dec-10	ND	ND	ND	ND	3.3	ND	0.18	128	3860	ND
Mar-12	ND	ND	ND	ND	ND	ND	NS	ND	865	ND
Sep-12	ND	ND	ND	ND	ND	ND	NS	NS	NS	NS
Dec-12	ND	ND	ND	ND	ND	ND	NS	NS	NS	NS
Mar-13	ND	ND	ND	ND	ND	ND	NS	456	48	ND
Jun-13	ND	ND	ND	ND	ND	ND	NS	NS	NS	NS
Nov-13 [1]	ND	ND	ND	ND	ND	ND	NS	NS	NS	NS
Jan-14 [2]	ND	ND	ND	ND	ND	ND	NS	NS	NS	NS
May-14 [3]	ND	ND	ND	ND	ND	ND	NS	23	760	3.0
Jun-14	ND	ND	ND	ND	ND	ND	NS	NS	NS	NS
Sep-14	ND	ND	ND	ND	ND	ND	NS	NS	NS	NS
2014 Average	ND	ND	ND	ND	ND	ND	NS	23	760	3.0
2013 Average	ND	ND	ND	ND	ND	ND	NS	456	48	ND
2012 Average	ND	ND	ND	ND	ND	ND	NS	ND	865	ND
2011 Average	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
2010 Average	ND	ND	ND	ND	2.3	ND	0.14	19664	2440	0.43

RW-9 (Online 8/16/10)

Date	Benzene (ug/L)	BTEX (ug/L)	Trichloroethene (ug/L)	Naphthalene (ug/L)	Pentachlorophenol (ug/L)	Phenanthrene (ug/L)	Dioxins/Furans TEQ (ppq)	Iron (ug/L)	Manganese (ug/L)	Arsenic (ug/L)
Sep-10	ND	ND	ND	ND	3.2	ND	ND	686	5240	0.15
Dec-10	ND	ND	ND	0.13	4.3	ND	0.03	63	4080	ND
Mar-12	ND	ND	ND	ND	ND	ND	NS	ND	1940	ND
Sep-12	ND	ND	ND	ND	ND	ND	NS	NS	NS	NS
Dec-12	ND	0.75	ND	ND	ND	ND	NS	NS	NS	NS
Mar-13	ND	ND	ND	ND	ND	ND	NS	ND	364	ND
Jun-13	ND	ND	ND	ND	ND	ND	NS	NS	NS	NS
Nov-13 [1]	ND	ND	ND	ND	ND	ND	NS	NS	NS	NS
Jan-14 [2]	ND	ND	ND	ND	ND	ND	NS	NS	NS	NS
May-14 [3]	ND	ND	ND	ND	ND	ND	NS	19	730	3.0
Jun-14	ND	ND	ND	ND	ND	ND	NS	NS	NS	NS
Sep-14	ND	0.50	ND	ND	ND	ND	NS	NS	NS	NS
2014 Average	ND	0.17	ND	ND	ND	ND	NS	19	730	3.0
2013 Average	ND	ND	ND	ND	ND	ND	NS	ND	364	ND
2012 Average	ND	0.75	ND	ND	ND	ND	NS	ND	1940	ND
2011 Average	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
2010 Average	ND	ND	ND	0.07	3.8	ND	0.015	375	4660	0.075

Table 7
Major Contaminants in Recovery Wells and Collection Trench
2010 - 2014

RW-10 (Online 8/16/10)

Date	Benzene (ug/L)	BTEX (ug/L)	Trichloroethene (ug/L)	Naphthalene (ug/L)	Pentachlorophenol (ug/L)	Phenanthrene (ug/L)	Dioxins/Furans TEQ (ppq)	Iron (ug/L)	Manganese (ug/L)	Arsenic (ug/L)
Sep-10	6.3	6.3	9.3	ND	12	ND	0.58	366	3620	ND
Dec-10	ND	0.10	ND	ND	3.0	ND	0.20	180	4160	ND
Mar-12	ND	ND	ND	ND	ND	ND	NS	ND	1600	ND
Sep-12	ND	ND	ND	13	160	0.5	NS	NS	NS	NS
Dec-12	ND	1.2	ND	ND	ND	ND	NS	NS	NS	NS
Mar-13	ND	ND	ND	ND	ND	ND	NS	2850	1240	ND
Jun-13	ND	ND	ND	ND	ND	ND	NS	NS	NS	NS
Nov-13 [1]	ND	ND	ND	ND	ND	ND	NS	NS	NS	NS
Jan-14 [2]	ND	ND	ND	ND	ND	ND	NS	NS	NS	NS
May-14 [3]	ND	ND	ND	ND	ND	ND	NS	390	1400	3.0
Jun-14	ND	ND	ND	ND	ND	ND	NS	NS	NS	NS
Sep-14	ND	ND	ND	ND	ND	ND	NS	NS	NS	NS
2014 Average	ND	ND	ND	ND	ND	ND	NS	390	1400	3.0
2013 Average	ND	ND	ND	ND	ND	ND	NS	2850	1240	ND
2012 Average	ND	1.2	ND	4.3	53	0.17	NS	ND	1600	ND
2011 Average	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
2010 Average	3.2	3.2	4.7	ND	7.5	ND	0.39	273	3890	ND

NS = not sampled

0 = ND (Not Detected)

[1] September quarterly sampled 11/11/13 to 11/13/13

[2] December quarterly sampled 1/27/14 to 1/29/14

[3] March annual sampled 4/29/14 to 5/7/14

Table 8A
Rayox Performance Data - VOC Removal
July 2010 to November 2014

Date	Lamp No./Hours	Benzene (µg/L) [NPDES Permit Maximum Daily Effluent = 2 µg/L]						BTEX (µg/L) [NPDES Permit Maximum Daily Effluent = None]						Trichloroethene (µg/L) [NPDES Permit Maximum Daily Effluent = 10 µg/L]					
		INF	UV IN	UV OUT	PV1 OUT	PV2 OUT	EFF	INF	UV IN	UV OUT	PV1 OUT	PV2 OUT	EFF	INF	UV IN	UV OUT	PV1 OUT	PV2 OUT	EFF
Jul 2010	#1/1103	10	0	0	0	0	0	44	0	0	0	0	0	7.2	4.9	0	0	0	0
Aug 2010	#3/306	13	5.1	0	NS	0	0	59	22	0	NS	0	0	8.9	2.9	0	NS	0	0
Sep 2010	#3/983	0	4.9	0	NS	0	0	1.4	13	0	NS	0	0	2.6	3.6	0	NS	0.30	0
Oct 2010	#3/1710	8.5	4.4	0.99	NS	0	0	45	23	2.7	NS	0	0	9.7	5.9	1.5	NS	0.28	0
Nov 2010	#3/2134	9.9	0	0.78	NS	0	0	49	0	2.2	NS	0	0	12	4.2	1.7	NS	0.62	0
Dec 2010A	#1/1453	6.1	2.7	0	NS	0	0	37	2.7	0	NS	0	0	10.0	5.2	0	NS	0.24	0
Jan 2011A	#1 / 2057	5.9	2.5	0	0	NS	0	38	2.5	0	0	NS	0	11	5.0	1.6	0	NS	0
Feb 2011A	#1 / 2637	0	1.7	0	0	NS	0	25	1.7	0	0	NS	0	8.1	4.2	0.67	0	NS	0
Mar 2011A	#2 / 654	5.3	4.2	0	0	NS	0	25	15	0	0	NS	0	8.1	6.4	1.1	0	NS	0
Apr 2011A	#2 / 1313	4.7	1.5	0	0	NS	0	31	7.7	1.3	0	NS	0	6.3	1.2	0.36	0	NS	0
May 2011A	#2 / 1973	7.8	3.7	0	0	0	0	43	4	0	0	0	0	6.8	0	0	0	0	0
Jun 2011A	#2 / 2737	4.0	0	0	0	NS	0	28	0	2.8	2.7	NS	0	5.6	0	0	0	NS	NS
Jul 2011A	#3 / 217	7.9	0	0	0	NS	0	46	0	0	0	NS	0	8.6	3.1	0	0	NS	0
Aug 2011A	#3 / 468	4.6	0	0	0	NS	0	38	0	0	0	NS	0	8.7	3.9	0	0	NS	0
Sep 2011A	#3 / 1050	4.1	3.4	0	0	NS	0	36	23	0.32	0	NS	0	7.7	6.0	0	0	NS	0
Oct 2011A	#3 / 1767	5.7	2.0	0.68	0	NS	0	59	2.0	1.6	0	NS	0	7.4	5.8	0.93	0.39	NS	0
Oct 2011B	#3 / 2207	5.2	3.0	0	NS	0	0	40	0	0.93	NS	0.04	0	7.0	ND	0	NS	0	0
Nov 2011A	#3 / 2483	7.8	0	0.29	NS	0	0	56	0	1.27	NS	0	0	6.4	2.9	1.0	NS	0	0
Dec 2011A	#1 / 1	9.0	5.7	0	NS	0	0	49	9.5	0.0	NS	0	0	0	ND	0	NS	0	0
Jan 2012A	#1 / 250	7.2	1.9	0	NS	0	0	44	1.9	0	NS	0	0	7.0	3.8	0	NS	0	0
Feb 2012A	#1 / 850	6.8	1.9	0	NS	0	0	49	1.9	0	NS	0	0	10	4.1	0	NS	0	0
Mar 2012A	#1 / 1432	4.2	0	0	NS	0	0	35	0	0	NS	0	0	7.5	4.0	0	NS	0	0
Apr 2012A	#1 / 2111	0.0	ND	0	NS	0	0	33	0	0	NS	0	0	6.4	2.5	0	NS	0	0
May 2012A	#1 / 2763	4.3	0	0	NS	0	0	41	0	0	NS	0	0	11	3.2	0	NS	0	0
Jun 2012A	#2 / 613	3.6	0	0	NS	0	0	36	0	0	NS	0	0	8.9	1.8	0	NS	0	0
Jul 2012A	#2 / 1270	5.8	2.9	0	NS	0	0	50	2.9	0	0	0	0	8.2	4.2	0	0	0	0
Aug 2012A	#2 / 1936	5.8	3.6	0	NS	0	0	42	3.6	0	NS	0	0	7.3	4.5	0	NS	0	0
Sep 2012A	#2 / 2754	2.5	1.6	0	NS	0	0	35	10	0	NS	0	0	6.7	2.7	0	NS	0	0
Oct 2012A	#3 / 535	5.9	2.4	0	NS	0	0	41	2.4	0	NS	0	0	6.8	2.3	0	NS	0	0
Nov 2012A	#3 / 1245	3.3	2.0	0	NS	0	0	30	2.0	0	NS	0	0	5.6	3.7	0	NS	0	0
Dec 2012A	#3 / 1876	0.0	0.0	0	NS	0	0	19	0	0	NS	0	0	0	ND	0	NS	0	0
Jan 2013A	#1 / 57	2.7	0	0	NS	0	0	20	0	0	NS	0	0	4.1	2.5	0	NS	0	0
Feb 2013A	#1 / 846	3.6	0	0	NS	0	0	35	0	0	NS	0	0	5.5	ND	0	NS	0	0
Mar 2013A	#1 / 1404	4.2	0	0	NS	0	0	33	0	0	NS	0	0	5.0	1.5	0	NS	0	0
Apr 2013A	#3 / 353	0.0	0	0	NS	0	0	17	0	0	NS	0	0	2.4	ND	0	NS	0	0
May 2013A	#3 / 955	0.0	0	0	NS	0	0	34	0	0	NS	0	0	5.8	3.8	0	NS	0	0
Jun 2013A	#1 / 97	5.7	0	0	NS	0	0	34	0	0	NS	0	0	6.2	1.7	0	NS	0	0
Jul 2013	#1 / 911	2.9	0.53	0	NS	0	0	31	0.53	0	NS	0	0	6.7	3.4	0	NS	0	0
Aug 2013	#1 / 1384	2.0	0.48	0	NS	0	0	26	0.48	0	NS	0	0	6.1	3.7	0	NS	0	0
Sep 2013	#1 / 1977	1.8	0.35	0	NS	0	0	30	0.35	0	NS	0	0	5.8	2.9	0	NS	0	0
Oct 2013	#1 / 2550	1.6	0	0	NS	0	0	22	0	0	NS	0	0	4.7	2.2	0	NS	0	0
Nov 2013	#1 / 252	6.4	2.8	0	NS	0	0	35	2.8	0	NS	0	0	6.1	ND	0	NS	0	0
Dec 2013	#1 / 508	1.9	0	0	NS	0	0	25	0	0	NS	0	0	4.9	1.7	0	NS	0	0
Jan 2014	#1 / 915	1.6	0.40	0	NS	0	0	21	0.40	0	NS	0	0	4.6	3.2	0	NS	0	0
Feb 2014	#1 / 1562	1.9	1.2	0	NS	0	0	27	12	0	NS	0	0	5.1	3.2	0	NS	0	0
Mar 2014	#2 / 522	2.7	0	0	NS	0	0	35	0	0	NS	0	0	6.3	3.6	0	NS	0	0
Apr 2014	#2 / 1208	4.4	1.5	0	NS	0	0	42	1.5	0	NS	0	0	6.6	4.5	0	NS	0	0
May 2014 [1]	#2 / 2011	2.2	0.75	0	NS	0	0	30	0.8	0	NS	0	0	5.8	2.0	0	NS	0	0
Jun 2014 [2]	#2 / 2591	9.3	2.2	0	NS	0	0	43	2.2	0	NS	0	0	4.0	1.5	0	NS	0	0
Jul 2014	#2 / 184	9.5	2.7	0	NS	0	0	54	2.7	0	NS	0	0	4.0	1.4	0	NS	0	0
Aug 2014 [3]	#2 / 1046	5.8	3.6	0	NS	0	0	31	3.6	0	NS	0	0	4.6	3.2	0	NS	0	0
Sep 2014 [4]	#2 / 1962	2.0	0.62	0	NS	0	0	25	0.62	0	NS	0	0	5.6	2.7	0	NS	0	0
Oct 2014	#3 / 1957	1.8	1.0	0	NS	0	0	24	1.0	0	NS	0	0	5.4	2.5	0	NS	0	0
Nov 2014	#3 / 2416	1.4	0.33	0	0	NS	0	17	0.33	0	0	NS	0	3.1	2.2	0	0	NS	0
2010-2015 Average		4.5	1.5	0.051	0	0	0	35	3.4	0.24	0.21	0	0	6.4	3.2	0.16	0.030	0.033	0

0 = Not Detected
NS = Not Sampled
GAC Carbon changeout completed prior to sampling

ug/L = micrograms per liter or parts per billion (ppb)
pq/L = picograms per liter or parts per quadrillion (ppq)

INF = Plant Influent
UV IN = RayOx Influent
UV OUT = RayOx Effluent
EFF = Plant Effluent
NPDES Permit Maximum Daily Effluent Concentration Exceeded

[1] May plant sampled June 2, 2014
[2] June plant sampled July 1, 2014
[3] August plant sampled September 4, 2014
[4] September plant sampled October 15, 2014

Table 8A
Rayox Performance Data - VOC Removal
July 2010 to November 2014

		Carbon Tetrachloride (µg/L) [NPDES Permit Maximum Daily Effluent = 10 µg/L]						Methylene Chloride (µg/L) [NPDES Permit Maximum Daily Effluent = 10 µg/L]						Chloroform (µg/L) [NPDES Permit Maximum Daily Effluent = None]					
Date	Lamp No./Hours	INF	UV IN	UV OUT	PV1 OUT	PV2 OUT	EFF	INF	UV IN	UV OUT	PV1 OUT	PV2 OUT	EFF	INF	UV IN	UV OUT	PV1 OUT	PV2 OUT	EFF
Jul 2010	#1/1103	0	69	16	0	13	2.2	0	1.2	0	0	0	0	0	310	310	250	160	99
Aug 2010	#3/306	0	0	ND	NS	0.0	0	0	0	0	NS	0	0	1.1	32	29	NS	190	4.8
Sep 2010	#3/983	0	0	6.5	NS	3.3	0	0	0	0	NS	0	0	0	140	130	NS	88	46
Oct 2010	#3/1710	0	0	0.26	NS	3.5	0.50	0.99	NS	0.54	NS	0.38	0	14	22	32	NS	93	60
Nov 2010	#3/2134	0	2.0	11	NS	11	1.8	0.85	0.78	0.72	NS	0.57	0	29	310	260	NS	230	97
Dec 2010A	#1/1453	0	0.9	5.8	NS	6.7	1.7	1.2	0.5	0.5	NS	0.5	0.44	32	200	81	NS	120	90
Jan 2011A	#1 / 2057	0	0	8.2	7.3	NS	0	1.0	0.66	0.60	0.72	NS	0	16	94	100	170	NS	4.8
Feb 2011A	#1 / 2637	0	0.80	13	7.5	NS	0	0.87	0.56	0.56	0.60	NS	0	16	110	130	150	NS	26
Mar 2011A	#2 / 654	0	0	3.8	0	NS	0.35	0	0	0	0	NS	0.26	16	88	88	0.0	NS	39
Apr 2011A	#2 / 1313	0	0	ND	2.9	NS	0.65	0	0	0	0	NS	0.35	11	27	24	56	NS	47
May 2011A	#2 / 1973	0	0.75	19	13	NS	2.7	0	0	0	0	NS	0.86	8.5	140	160	170	NS	117
Jun 2011A	#2 / 2737	0	0	21	15	NS	4.8	13	0	12	13	NS	1.0	12	130	180	160	NS	140
Jul 2011A	#3 / 217	0	1.5	15	13	NS	5.5	0	0	0	0	NS	1.4	14	220	220	190	NS	200
Aug 2011A	#3 / 468	0	0	ND	0	NS	4.1	0	0	0	0	NS	0.82	30	210	280	170	NS	150
Sep 2011A	#3 / 1050	0	0.14	12	11	NS	7.4	1.7	1.5	1.4	1.5	NS	1.5	32	160	200	190	NS	170
Oct 2011A	#3 / 1767	0	0.48	25	17	NS	3.5	0	0	0	0	NS	0.78	29	230	280	240	NS	69
Oct 2011B	#3 / 2207	0	0.10	8.5	NS	9.8	0	2.0	1.6	1.7	NS	1.6	0	27	100	110	NS	170	0
Nov 2011A	#3 / 2483	0	47	31	NS	14	0	2.0	3.3	1.7	NS	1.3	0.39	27	360	310	NS	210	0.79
Dec 2011A	#1 / 1	0	0	12	NS	0	0.59	6.5	8.7	8.1	NS	7.5	0.66	19	170	160	NS	180	38
Jan 2012A	#1 / 250	0	0.46	18	NS	11	1.0	0	0	0	NS	0	0.47	17	130	140	NS	140	52
Feb 2012A	#1 / 850	0	0.74	25	NS	11	2.6	0	0	0	NS	0	0.45	24	280	200	NS	130	72
Mar 2012A	#1 / 1432	0	0	22	NS	12	4.7	0	0	0	NS	0	0	22	260	260	NS	160	180
Apr 2012A	#1 / 2111	0	0	14	NS	7.9	12	0	0	0	NS	0	1.4	22	150	200	NS	130	240
May 2012A	#1 / 2763	0	0.75	22	NS	0	5.0	3.2	2.3	1.9	NS	1.6	1.7	31	210	210	NS	150	170
Jun 2012A	#2 / 613	0	1.5	22	NS	16	7.4	3.0	2.2	1.5	NS	1.4	1.1	0	270	270	NS	230	250
Jul 2012A	#2 / 1270	0	0	6.5	NS	12	9.1	3.7	2.4	2.2	NS	0	2.8	33	110	110	NS	160	240
Aug 2012A	#2 / 1936	0	0.63	11	NS	9.5	4.8	0	0	0	NS	0	1.3	36	140	130	NS	140	140
Sep 2012A	#2 / 2754	0	0.44	3.4	NS	0	7.5	0	0	0	NS	0	3.6	40	82	75	NS	110	150
Oct 2012A	#3 / 535	0	0	2.9	NS	7.1	6.1	3.6	0	0	NS	0	1.6	26	89	62	NS	110	130
Nov 2012A	#3 / 1245	0	0	6.1	NS	7.8	4.9	0	0	0	NS	0	2.5	30	110	77	NS	120	110
Dec 2012A	#3 / 1876	0	0	4.4	NS	4.2	6.1	0	3.6	0	NS	0	4.1	0	100	62	NS	62	140
Jan 2013A	#1 / 57	0	0.64	9.1	NS	0	5.6	3.7	3.0	1.8	NS	1.7	5.4	24	130	88	NS	120	120
Feb 2013A	#1 / 846	0	0	11	NS	12	6.8	4.6	2.8	2.3	NS	2.0	2.9	25	150	150	NS	150	160
Mar 2013A	#1 / 1404	0	0	27	NS	14	6.3	8.6	0	0	NS	0	2.1	21	140	170	NS	120	120
Apr 2013A	#3 / 353	0	2.1	10	NS	8.3	6.1	0	0	0	NS	0	4.9	0	120	93	NS	93	110
May 2013A	#3 / 955	0	0	10	NS	0	0	5.3	6.5	2.7	NS	2.2	0.37	20	200	120	NS	0	5.3
Jun 2013A	#1 / 97	0	0	27	NS	0	0	3.3	4.0	3.1	NS	1.4	0	15	210	230	NS	17	0
Jul 2013	#1 / 911	0	0	0	NS	0	0	1.0	0.50	0	NS	0	0	12	168	178	NS	160	13
Aug 2013	#1 / 1384	0	0.49	0	NS	12	0.72	0	3.2	1.4	NS	2.5	2.4	11	285	280	NS	184	73
Sep 2013	#1 / 1977	0	0	43	NS	13	0	0	0	0	NS	0	0	9.7	242	312	NS	267	143
Oct 2013	#1 / 2550	0	0	14	NS	11	0	0	0	0.77	NS	1.1	1.6	7.5	203	94	NS	143	198
Nov 2013	#1 / 252	0	0	37	NS	29	6.4	1.8	0	0.79	NS	0.80	0	11	233	285	NS	272	238
Dec 2013	#1 / 508	0	0.89	19	NS	18	4.6	1.3	0	0	NS	0	3.0	11	193	210	NS	258	239
Jan 2014	#1 / 915	0	0	0	NS	0	0	0.8	1.3	1.1	NS	0	0	8.7	253	327	NS	245	226
Feb 2014	#1 / 1562	0	0	23	NS	19	9.4	0	0	0	NS	0	0.53	11	295	313	NS	253	242
Mar 2014	#2 / 522	0	0.45	34	NS	20	14	0	0	0	NS	0	0.63	11	177	237	NS	211	254
Apr 2014	#2 / 1208	0	0	0	NS	0	0	0.53	0	0	NS	0	0	8.9	233	312	NS	298	206
May 2014 [1]	#2 / 2011	0	0	17	NS	22	24	1.0	1.3	0	NS	0	0.86	10	198	187	NS	245	323
Jun 2014 [2]	#2 / 2591	0	2.2	17	NS	18	21	0.89	0	3.7	NS	5.0	0.47	6.7	225	219	NS	224	293
Jul 2014	#2 / 184	0	0	0	NS	28	20	0	1.5	1.5	NS	0	0	5.1	199	186	NS	264	289
Aug 2014 [3]	#2 / 1046	0	0	0	NS	0	0	0	0	0	NS	0	0	7.1	199	224	NS	244	273
Sep 2014 [4]	#2 / 1962	0	1.4	39	NS	33	24	1.2	0.75	1.0	NS	0.55	0	23	277	338	NS	305	304
Oct 2014	#3 / 1957	0	0	24	NS	32	24	0	0	0	NS	0	0	24	134	187	NS	258	273
Nov 2014	#3 / 2416	0	0	0	0	NS	0	3.9	0	3.5	0	NS	0	17	171	152	15	NS	48
2010-2015 Average		0	2.5	14	7.2	10	5.2	1.5	1.0	1.1	1.3	0.75	1.0	17	176	179	147	172	132

0 = Not Detected
NS = Not Sampled
GAC Carbon changeout completed prior to sampling

ug/L = micrograms per liter or parts per billion (ppb)
pg/L = picograms per liter or parts per quadrillion (ppq)

INF = Plant Influent   UV OUT = RayOx Effluent
UV IN = RayOx Influent   EFF = Plant Effluent
NPDES Permit Maximum Daily Effluent Concentration Exceeded

[1] May plant sampled June 2, 2014
[2] June plant sampled July 1, 2014
[3] August plant sampled September 4, 2014
[4] September plant sampled October 15, 2014

Table 8B
Rayox Performance Data - SVOC Removal
July 2010 to November 2014

		Naphthalene (µg/L) [NPDES Permit Maximum Daily Effluent = 60 µg/L]						Pentachlorophenol (µg/L) [NPDES Permit Maximum Daily Effluent = 2 µg/L]					
Date	Lamp No./Hours	INF	UV IN	UV OUT	PV1 OUT	PV2 OUT	EFF	INF	UV IN	UV OUT	PV1 OUT	PV2 OUT	EFF
Jul 2010	#1/1103	74	0	0	0	0	0	2200	5.0	1.6	25	0	1.5
Aug 2010	#3/306	52	57	0	NS	0	0	1500	1500	3.3	NS	0.70	0
Sep 2010	#3/983	170	76	0	NS	0	0	2500	130	1.2	NS	0	0.57
Oct 2010	#3/1710	160	96	15	NS	8.0	0	4900	3600	950	NS	370	0.20
Nov 2010	#3/2134	170	5.0	8.3	NS	0	0	6400	5.5	61	NS	20	0.28
Dec 2010A	#1/1453	160	3.4	0	NS	0	0	4300	79	1.5	NS	4.7	0
Dec 2010B	#1/1735	110	1.0	1.1	0	NS	0	3100	190	51	0.52	NS	0
Jan 2011A	#1 / 2057	160	2.6	1.2	NS	NS	0	6000	270	58	3.7	NS	0
Jan 2011B	#1 / 2380	51	2.7	0	0	NS	NS	3700	130	39	3.2	NS	0
Feb 2011A	#1 / 2637	0	0	0.61	0	NS	0	1600	150	14	3.4	NS	0
Feb 2011B	#2 / 319	0	2.7	0	0	NS	0	1700	68	11	1.3	NS	0
Mar 2011A	#2 / 654	29	7.8	1.1	0	NS	0	1700	220	87	8.1	NS	0
Mar 2011B	#2 / 891	58	32	1.5	0	NS	0	1600	940	170	25	NS	0
Apr 2011A	#2 / 1313	56	32	5.6	0.24	NS	0	1700	920	130	9.5	0	0.24
Apr 2011B	#2 / 1646	64	0.22	0	0	NS	0	3300	4.4	0	5.2	NS	0
May 2011A	#2 / 1973	79	0	0.17	0.07	NS	0	1400	29	0.90	2.4	NS	0
May 2011B	#2 / 2310	85	0	0.11	0	NS	0.035	1500	58	1.7	2.2	NS	0
Jun 2011A	#2 / 2737	0	31	0	0	NS	0	1600	4.8	0	0	NS	0
Jun 2011B	#1 / 20	0	43	0	0	NS	0	1900	0	0	0	NS	0
Jul 2011A	#3 / 217	110	2.6	0	0	NS	0	3700	3.8	0.59	0.49	NS	0
Jul 2011B	#3 / 207	190	2.8	0	0	NS	0	4300	25	2.8	0.98	NS	0
Aug 2011A	#3 / 468	9.1	130	11	0	NS	0	2700	27	16	5.5	NS	0
Aug 2011B	#3 / 853	220	150	0	0	NS	0	4700	530	46	21	NS	0.57
Sep 2011A	#3 / 1050	250	150	0.90	0	NS	0	3300	1100	38	22	NS	0.66
Sep 2011B	#3 / 1446	280	0	0.75	0.095	NS	0	3200	100	6.3	8.4	NS	0.82
Oct 2011A	#3 / 1767	220	2.1	7.8	0	NS	0	6700	290	240	13	NS	0.56
Oct 2011B	#3 / 2207	280	0.79	4.2	NS	0.062	0	3600	400	160	NS	9.2	0.54
Nov 2011A	#3 / 2483	250	0	2.8	NS	0	0	3000	6.6	1.9	NS	1.4	0
Nov 2011B	#3 / 2759	210	32	0	NS	0	0	2500	160	23	NS	9.5	2.3
Dec 2011A	#1 / 1	3.5	93	0	NS	0	0	2700	1100	11	NS	0	0
Dec 2011B	#1 / 338	95	46	0	NS	0	0	2200	470	5.9	NS	21	0
Jan 2012A	#1 / 250	200	0	0.23	NS	0.25	0	6400	130	0.26	NS	0.41	0
Jan 2012B	#1 / 531	200	1.5	0.20	NS	0.16	0	2700	3.8	0.45	NS	0.57	0
Feb 2012A	#1 / 850	220	0.43	0	NS	0	0	2100	4.3	0	NS	0.41	0
Feb 2012B	#1 / 1181	200	1.5	0	NS	0	0	3500	4.9	0	NS	0	0
Mar 2012A	#1 / 1432	210	33	0	NS	0	0	2100	7.4	2.0	NS	1.4	0
Mar 2012B	#1 / 1752	260	18	0	NS	0	0	1900	27	6.9	NS	9.7	0
Apr 2012A	#1 / 2111	170	84	0	NS	0	0	470	0	0	NS	0	0
Apr 2012B	#1 / 2422	110	56	0	NS	0	0	3200	2.2	0	NS	0	0
May 2012A	#1 / 2763	210	4.5	0	NS	0	0	2300	0	0	NS	0	0
May 2012B	#2 / 193	170	7.1	0	NS	0	0.018	1500	66	0	NS	0	0
Jun 2012A	#2 / 613	240	15	0	NS	0	0	3700	230	0	NS	0	0
Jun 2012B	#2 / 968	250	10	0	NS	0	0	3600	5.5	0.69	NS	0.65	0
Jul 2012A	#2 / 1270	330	21	0	NS	0	0	3400	150	0	NS	0	0
Jul 2012B	#2 / 1594	290	17	0	NS	0	0	3500	10	0	NS	0	0.020
Aug 2012A	#2 / 1936	300	90	0	NS	0	0	2900	810	0	NS	0	0
Aug 2012B	#2 / 2259	310	120	0	NS	0	0	3000	1300	0	NS	0	0
Sep 2012A	#2 / 2754	190	59	0	NS	0	0.022	2300	560	0	NS	0	0
Sep 2012B	#3 / 309	180	100	0	NS	0	0	1900	1400	5.0	NS	2.4	0
Oct 2012A	#3 / 535	260	20	0	NS	0	0	3800	380	0	NS	0	0
Oct 2012B	#3 / 993	200	16	0	NS	0	0	3300	610	0	NS	1.9	0
Nov 2012A	#3 / 1245	120	31	0	NS	0	0.061	1900	70	0.97	NS	0	0
Nov 2012B	#3 / 1557	200	0	0	NS	0	0	2300	0	0	NS	0.61	0
Dec 2012A	#3 / 1876	0.0	100	0	NS	0	0	1200	0	4.3	NS	18	0.069
Dec 2012B	#3 / 2218	0	0	0	NS	0	0	1800	0	0	NS	0	0.058
Jan 2013A	#1 / 57	170	7.7	3.1	NS	0	0	2200	120	4.1	NS	0	0
Jan 2013B	#1 / 535	130	6.0	NS	NS	0	0	1700	250	NS	NS	0.97	0
Feb 2013A	#1 / 846	210	0	0	NS	0	0.012	2200	2.3	0	NS	0	0.055
Feb 2013B	#1 / 1184	160	0	0	NS	0	0.053	2100	4.2	0	NS	0	0.068
Mar 2013A	#1 / 1404	0	2.5	0	NS	0	0.036	2900	3.1	0	NS	0.53	0.039
Mar 2013B	#2 / 2831	130	8.4	0	NS	0	0.036	2400	3.4	0	NS	0	0.039
Apr 2013A	#3 / 353	0	39	0	NS	0	0	1100	0	0	NS	0	0
Apr 2013B	#3 / 678	0	38	0	NS	0	0	1500	0	2.2	NS	11	0
May 2013A	#3 / 955	80	77	0	NS	0	0	1000	0	0	NS	0	0
May 2013B	#3 / 1262	140	0	0	NS	0	0.19	1800	0	0	NS	0	0
Jun 2013A	#1 / 97	110	9.0	0	NS	0	0	2200	0	0	NS	0	0
Jun 2013B	#1 / 336	45	13	0	NS	0	0	3100	0	0	NS	0	0
Jul 2013	#1 / 911	136	0	0	NS	0	0	1630	0	0	NS	0	0
Aug 2013	#1 / 1384	1.5	0	0	NS	0	0	2270	0	0	NS	0	0
Sep 2013	#1 / 1977	0.0	0	0	NS	0	0	2050	0	0	NS	0	0
Oct 2013	#1 / 2550	116	0	0	NS	0	0	3050	0	0	NS	0	0
Nov 2013	#1 / 252	114	0	0	NS	0	0	3620	0	0	NS	0	0
Dec 2013	#1 / 508	80	0	0	NS	0	0	1730	0	0	NS	0	0
Jan 2014	#1 / 915	109	0	0.72	NS	0	0	2550	0	0	NS	0	0
Feb 2014	#1 / 1562	26	44	0	NS	0	0	1110	2.8	0	NS	0	0
Mar 2014	#2 / 522	63	0	0	NS	0	0	1440	0	0	NS	0	0
Apr 2014	#2 / 1208	53	0.71	0	NS	0	0	3240	0	0	NS	0	0
May 2014 [1]	#2 / 2011	87	0.65	3.5	NS	0	0	2370	3.6	20	NS	6.3	3.0
Jun 2014 [2]	#2 / 2591	57	2.9	0	NS	0	0	2740	0	0	NS	0	0
Jul 2014	#2 / 184	85	13	0	NS	0	0	1520	3.5	0	NS	0	0
Aug 2014 [3]	#2 / 1046	54	3.3	0	NS	0	0	1860	4.3	0	NS	2.4	0
Sep 2014 [4]	#2 / 1962	101	0	0	NS	0	0	1910	0	0	NS	0	0
Oct 2014	#3 / 1957	111	18	0	NS	0	0	2140	73	0	NS	0	0
Nov 2014	#3 / 2416	20	0	0	0	NS	0	2370	2.5	0	0	NS	0
2010-2014 Average		129	25	0.84	0.019	0.13	0.0056	2640	223	26	7.3	7.7	0.14

0 = Not Detected
NS = Not Sampled
ug/L = micrograms per liter or parts per billion (ppb)
pg/L = picograms per liter or parts per quadrillion (ppq)
GAC Carbon changeout completed prior to sampling

INF = Plant Influent
UV IN = RayOx Influent
UV OUT = RayOx Effluent
EFF = Plant Effluent

[1] May plant sampled June 2, 2014
[2] June plant sampled July 1, 2014
[3] August plant sampled September 4, 2014
[4] September plant sampled October 15, 2014
NPDES Permit Maximum Daily Effluent Concentration Exceeded

Table 8B
Rayox Performance Data - SVOC Removal
July 2010 to November 2014

Date	Lamp No./Hours	Phenanthrene (µg/L) [NPDES Permit Maximum Daily Effluent = 6 µg/L] INF	UV IN	UV OUT	PV1 OUT	PV2 OUT	EFF	Dioxins/Furans TEQ (ppq) [NPDES Permit Limit = < 4.4 ppq] INF	UV IN	UV OUT	PV1 OUT	PV2 OUT	EFF
Jul 2010	#1/1103	0	0	0	0	0	0	**28**	NS	NS	NS	NS	0
Aug 2010	#3/306	0	2.7	0	NS	0	0	2.6	NS	NS	NS	NS	0
Sep 2010	#3/983	0	3.6	0	NS	0	0	0.53	NS	0	NS	NS	0
Oct 2010	#3/1710	7.9	3.8	0.63	NS	0.55	0	**5.0**	NS	NS	NS	NS	0.0015
Nov 2010	#3/2134	5.5	0	0	NS	0	0	**9.8**	NS	NS	NS	NS	0.11
Dec 2010A	#1/1453	0	0	0	NS	0	0	**9.3**	NS	1.2	NS	NS	0
Dec 2010B	#1/1735	4.0	0	0	0	NS	0	NS	NS	NS	NS	NS	NS
Jan 2011A	#1 / 2057	**6.8**	0	0	0	NS	0	0.18	NS	NS	NS	NS	0.072
Jan 2011B	#1 / 2380	3.6	0	0	0	NS	0	NS	NS	NS	NS	NS	NS
Feb 2011A	#1 / 2637	0	0	0	0	NS	0	3.04	0	0	0	0	0
Feb 2011B	#2 / 319	0	0	0	0	NS	0	NS	NS	NS	NS	NS	NS
Mar 2011A	#2 / 654	4.0	0.59	0	0	NS	0	0.13	NS	0.25	NS	NS	0
Mar 2011B	#2 / 891	5.2	2.7	0	0	NS	0	NS	NS	NS	NS	NS	NS
Apr 2011A	#2 / 1313	4.9	2.6	0.41	0	NS	0	0.50	NS	NS	NS	NS	0.11
Apr 2011B	#2 / 1646	4.7	0	0	0	NS	0	NS	NS	NS	NS	NS	NS
May 2011A	#2 / 1973	5.7	0	0	0	NS	0	0.31	NS	NS	NS	NS	0.001
May 2011B	#2 / 2310	**6.2**	0	0	0	NS	0	NS	NS	NS	NS	NS	NS
Jun 2011A	#2 / 2737	0	0	0	0	NS	0	0.002	NS	0.002	NS	NS	0
Jun 2011B	#1 / 20	0	2.2	0	0	NS	0	NS	NS	NS	NS	NS	NS
Jul 2011A	#3 / 217	3.2	0	0	0	NS	0	0.304	NS	NS	NS	NS	0
Jul 2011B	#3 / 207	**7.0**	0.18	0	0	NS	0	NS	NS	NS	NS	NS	NS
Aug 2011A	#3 / 468	0	4.4	0	0	NS	0	1.9	NS	NS	NS	NS	0
Aug 2011B	#3 / 853	**7.0**	5.2	0	0	NS	0.091	NS	NS	NS	NS	NS	NS
Sep 2011A	#3 / 1050	0	**6.0**	0	0	NS	0	1.9	NS	0.36	NS	NS	0.22
Sep 2011B	#3 / 1446	**9.1**	0	0	0	NS	0	NS	NS	NS	NS	NS	NS
Oct 2011A	#3 / 1767	**7.1**	0	0.32	0	NS	0	**5.2**	NS	NS	NS	NS	0.0006
Oct 2011B	#3 / 2207	**8.8**	0	0.14	NS	0	0	NS	NS	NS	NS	NS	NS
Nov 2011A	#3 / 2483	**7.2**	0	0	NS	0	0	0.34	NS	NS	NS	NS	0.015
Nov 2011B	#3 / 2759	**7.4**	1.1	0	NS	0	0	NS	NS	NS	NS	NS	NS
Dec 2011A	#1 / 1	5.7	3.4	0	NS	0	0	0.144	NS	1.2	NS	NS	0.0040
Dec 2011B	#1 / 338	5.2	2.1	0	NS	0	0	NS	NS	NS	NS	NS	NS
Jan 2012A	#1 / 250	5.7	0.32	0	NS	0	0	0.54	NS	NS	NS	NS	1.2
Jan 2012B	#1 / 531	**6.8**	0.27	0	NS	0	0	NS	NS	NS	NS	NS	NS
Feb 2012A	#1 / 850	**8.9**	0	0	NS	NS	0	0.30	NS	NS	NS	NS	0
Feb 2012B	#1 / 1181	5.8	0	0	NS	0	0	NS	NS	NS	NS	NS	NS
Mar 2012A	#1 / 1432	0	0	0	NS	0	0	0.22	NS	0.058	NS	NS	0.060
Mar 2012B	#1 / 1752	0	0	0	NS	0	0	NS	NS	NS	NS	NS	NS
Apr 2012A	#1 / 2111	5.6	0	0	NS	0	0	0.26	NS	NS	NS	NS	0
Apr 2012B	#1 / 2422	2.3	2.2	0	NS	0	0	NS	NS	NS	NS	NS	NS
May 2012A	#1 / 2763	**6.6**	0	0	NS	0	0	**729**	NS	NS	NS	NS	0
May 2012B	#2 / 193	5.5	0	0	NS	0	0.017	NS	NS	NS	NS	NS	NS
Jun 2012A	#2 / 613	**6.5**	0.52	0	NS	0	0	**197**	NS	0	NS	NS	0
Jun 2012B	#2 / 968	**7.5**	0.39	0	NS	0	0	NS	NS	NS	NS	NS	NS
Jul 2012A	#2 / 1270	**6.4**	0	0	NS	0	0	0	NS	NS	NS	NS	0
Jul 2012B	#2 / 1594	**8.6**	0	0	NS	0	0.020	NS	NS	NS	NS	NS	NS
Aug 2012A	#2 / 1936	**9.3**	0	0	NS	0	0	0.17	NS	NS	NS	NS	0
Aug 2012B	#2 / 2259	**8.9**	5.2	0	NS	0	0	NS	NS	NS	NS	NS	NS
Sep 2012A	#2 / 2754	5.5	2.3	0	NS	0	0	0	NS	0.00037	NS	NS	0
Sep 2012B	#3 / 309	4.8	2.9	0	NS	0	0.21	NS	NS	NS	NS	NS	NS
Oct 2012A	#3 / 535	**7.8**	1.0	0	NS	0	0	0.34	NS	NS	NS	0	0.014
Oct 2012B	#3 / 993	**6.4**	0	0	NS	0	0	NS	NS	NS	NS	NS	NS
Nov 2012A	#3 / 1245	3.5	1.0	0	NS	0	0	0.11	NS	NS	NS	NS	0.008
Nov 2012B	#3 / 1557	5.6	0	0	NS	0	0	NS	NS	NS	NS	NS	NS
Dec 2012A	#3 / 1876	0	5.2	0	NS	0	0	0.47	NS	0.055	NS	NS	0.035
Dec 2012B	#3 / 2218	0	0	0	NS	0	0	NS	NS	NS	NS	NS	NS
Jan 2013A	#1 / 57	5.3	0.30	0	NS	0	0	0.16	NS	NS	NS	NS	0
Jan 2013B	#1 / 535	0	0.29	NS	NS	0	0	NS	NS	NS	NS	NS	NS
Feb 2013A	#1 / 846	**7.4**	0	0	NS	0	0.015	0.66	NS	NS	NS	NS	0
Feb 2013B	#1 / 1184	**6.8**	0	0	NS	0	0	NS	NS	NS	NS	NS	NS
Mar 2013A	#1 / 1404	0	0	0	NS	0	0	1.4	NS	0.017	NS	NS	0.071
Mar 2013B	#2 / 2831	**4.9**	0	0	NS	0	0	NS	NS	NS	NS	NS	NS
Apr 2013A	#3 / 353	0	0	0	NS	0	0	**23**	NS	NS	NS	0	0
Apr 2013B	#3 / 678	0	0	0	NS	0	0	NS	NS	NS	NS	NS	NS
May 2013A	#3 / 955	4.5	5.9	0	NS	0	0	3.6	NS	NS	NS	NS	0.065
May 2013B	#3 / 1262	5.9	0	0	NS	0	0	NS	NS	NS	NS	NS	NS
Jun 2013A	#1 / 97	5.3	0	0	NS	0	0	1.2	NS	0.037	NS	NS	0
Jun 2013B	#1 / 336	1.9	0	0	NS	0	0	NS	NS	NS	NS	NS	NS
Jul 2013	#1 / 911	4.2	0	0	NS	0	0	0.020	NS	NS	NS	NS	0.0027
Aug 2013	#1 / 1384	1.9	0	0	NS	0	0	0.051	NS	NS	NS	NS	0.0055
Sep 2013	#1 / 1977	3.4	0	0	NS	0	0	0.23	NS	NS	NS	NS	0.17
Oct 2013	#1 / 2550	5.8	0	0	NS	0	0	0.048	NS	NS	NS	NS	0.034
Nov 2013	#1 / 252	**6.5**	0	0	NS	0	0	0.18	NS	NS	NS	NS	0.037
Dec 2013	#1 / 508	4.8	0	0	NS	0	0	0.022	NS	NS	NS	NS	0.015
Jan 2014	#1 / 915	3.7	0	0	NS	0	0.011	0.040	NS	NS	NS	NS	0
Feb 2014	#1 / 1562	2.5	2.4	0	NS	0	0	0.44	NS	NS	NS	NS	0.82
Mar 2014	#2 / 522	3.6	0	0	NS	0	0.0097	0.089	NS	NS	NS	NS	0.012
Apr 2014	#2 / 1208	2.9	0	0	NS	0	0	0.14	NS	NS	NS	NS	0.0035
May 2014 [1]	#2 / 2011	4.8	0	0	NS	0	0	0.16	NS	NS	NS	NS	0.14
Jun 2014 [2]	#2 / 2591	4.7	0	0	NS	0	0	1.9	NS	NS	NS	NS	0.33
Jul 2014	#2 / 184	5.7	0	0	NS	0	0.011	0.0021	NS	NS	NS	NS	0.0090
Aug 2014 [3]	#2 / 1046	5.7	0	0	NS	0	0	0.18	NS	NS	NS	NS	0.058
Sep 2014 [4]	#2 / 1962	5.5	0	0	NS	0	0	0.68	NS	NS	NS	NS	0.61
Oct 2014	#3 / 1957	**6.6**	0	0	NS	0	0	0.031	NS	NS	NS	NS	0.017
Nov 2014	#3 / 2416	3.3	0	0	0	NS	0.020	0.16	NS	NS	NS	NS	0.043
2010-2014 Average		4.4	0.84	0.018	0	0.0089	0.0048	**19**	0	0.24	0	0	0.080

0 = Not Detected
NS = Not Sampled
ug/L = micrograms per liter or parts per billion (ppb)
pg/L = picograms per liter or parts per quadrillion (ppq)
GAC Carbon changeout completed prior to sampling

INF = Plant Influent
UV IN = RayOx Influent
UV OUT = RayOx Effluent
EFF = Plant Effluent

[1] May plant sampled June 2, 2014
[2] June plant sampled July 1, 2014
[3] August plant sampled September 4, 2014
[4] September plant sampled October 15, 2014

NPDES Permit Maximum Daily Effluent Concentration Exceeded

Table 9
Plant Effluent Data
July 2010 to November 2014

Date	Benzene (ug/L)	BTEX (ug/L)	Carbon Tetrachloride (ug/L)	Methylene Chloride (ug/L)	Trichloroethene (ug/L)	Naphthalene (ug/L)	Pentachlorophenol (ug/L)	Phenanthrene (ug/L)	Dioxins/Furans TEQ (ppq)	Iron (ug/L)	Manganese (ug/L)	Arsenic (ug/L)
Jul 2010A	ND	ND	**2.2**	ND	ND	ND	**1.5**	ND	ND	**35**	**94**	**3.5**
Jul 2010B	NS	NS	NS	NS	NS	ND	ND	ND	NS	NS	NS	NS
Aug 2010	ND	ND	ND	ND	ND	ND	ND	ND	ND	**34**	**173**	ND
Sept 2010	ND	ND	ND	ND	ND	ND	**0.57**	ND	ND	**26**	**69**	ND
Oct 2010	ND	ND	**0.50**	ND	ND	ND	**0.20**	ND	ND	ND	**431**	ND
Nov 2010	ND	ND	**1.8**	ND	ND	ND	**0.28**	ND	**0.106**	**23**	**98**	ND
Dec 2010A	ND	ND	**1.7**	**0.44**	ND	ND	ND	ND	ND	**41**	**41**	ND
Dec 2010B	NS	NS	NS	NS	NS	ND	ND	ND	NS	NS	NS	NS
Jan 2011A	ND	ND	ND	ND	ND	ND	ND	ND	**0.073**	ND	**39**	ND
Jan 2011B	NS	NS	NS	NS	NS	ND	ND	ND	NS	NS	NS	NS
Feb 2011A	ND	ND	ND	ND	ND	ND	ND	ND	ND	**16**	**57**	ND
Feb 2011B	NS	NS	NS	NS	NS	ND	ND	ND	NS	NS	NS	NS
Mar 2011A	ND	ND	**0.35**	**0.26**	ND	ND	ND	ND	ND	ND	**46**	ND
Mar 2011B	NS	NS	NS	NS	NS	ND	ND	ND	NS	NS	NS	NS
Apr 2011A	ND	ND	**0.65**	**0.35**	ND	ND	**0.24**	ND	**0.108**	**20**	**24**	ND
Apr 2011B	NS	NS	NS	NS	NS	ND	ND	ND	NS	NS	NS	NS
May 2011A	ND	ND	**2.7**	**0.86**	ND	ND	ND	ND	**0.001**	ND	**20**	ND
May 2011B	NS	NS	NS	NS	NS	**0.035**	ND	ND	NS	NS	NS	NS
Jun 2011A	ND	ND	**4.8**	**1.0**	ND	ND	ND	ND	ND	ND	ND	ND
Jun 2011B	NS	NS	NS	NS	NS	ND	ND	ND	NS	NS	NS	NS
Jul 2011A	ND	ND	**5.5**	**1.4**	ND	ND	ND	ND	ND	ND	**7**	ND
Jul 2011B	NS	NS	NS	NS	NS	ND	ND	ND	NS	NS	NS	NS
Aug 2011A	ND	ND	**4.1**	**0.82**	ND	ND	ND	ND	ND	ND	**112**	ND
Aug 2011B	NS	NS	NS	NS	NS	ND	**0.57**	**0.091**	NS	NS	NS	NS
Sept 2011A	ND	ND	**7.4**	**1.5**	ND	ND	**0.66**	ND	**0.219**	ND	**186**	ND
Sept 2011B	NS	NS	NS	NS	NS	ND	**0.82**	ND	NS	NS	NS	NS
Oct 2011A	ND	ND	**3.5**	**0.78**	ND	ND	**0.56**	ND	**0.0006**	ND	**58**	ND
Oct 2011B	NS	NS	NS	NS	NS	ND	**0.54**	ND	NS	NS	NS	NS
Nov 2011A	ND	ND	ND	**0.39**	ND	ND	ND	ND	**0.015**	ND	**64**	**3.5**
Nov 2011B	NS	NS	NS	NS	NS	ND	**2.3**	ND	NS	NS	NS	NS
Dec 2011A	ND	ND	**0.59**	**0.66**	ND	ND	**0.58**	ND	**0.004**	ND	**95**	ND
Dec 2011B	NS	NS	NS	NS	NS	ND	ND	ND	NS	NS	NS	NS
NPDES Permit Max. Effluent Requirements	**2.0**	**None**	**10.0**	**10.0**	**10.0**	**60**	**2.0**	**6.0**	**<4.400**	**1000 ***	**600 ***	**50**

ND = Not Detected

NS = Not Sampled

Table 9
Plant Effluent Data
July 2010 to November 2014

Date	Benzene (ug/L)	BTEX (ug/L)	Carbon Tetrachloride (ug/L)	Methylene Chloride (ug/L)	Trichloroethene (ug/L)	Naphthalene (ug/L)	Pentachlorophenol (ug/L)	Phenanthrene (ug/L)	Dioxins/Furans TEQ (ppq)	Iron (ug/L)	Manganese (ug/L)	Arsenic (ug/L)
Jan 2012A	ND	ND	1.0	0.47	ND	ND	ND	ND	1.168	ND	168	ND
Jan 2012B	NS	NS	NS	NS	NS	ND	ND	ND	NS	NS	NS	NS
Feb 2012A	ND	ND	2.6	0.45	ND	ND	ND	ND	ND	ND	53	ND
Feb 2012B	NS	NS	NS	NS	NS	ND	ND	ND	NS	NS	NS	NS
Mar 2012A	ND	ND	4.7	ND	ND	ND	ND	ND	0.06	ND	33	ND
Mar 2012B	NS	NS	NS	NS	NS	ND	ND	ND	NS	NS	NS	NS
Apr 2012A	ND	ND	12	1.4	ND	ND	ND	ND	ND	ND	22	ND
Apr 2012B	NS	NS	NS	NS	NS	ND	ND	ND	NS	NS	NS	NS
May 2012A	ND	ND	5.0	1.7	ND	0.023	ND	ND	ND	ND	135	ND
May 2012B	NS	NS	NS	NS	NS	0.018	ND	0.017	NS	NS	NS	NS
Jun 2012A	ND	ND	7.4	1.1	ND	ND	ND	ND	ND	ND	29	ND
Jun 2012B	NS	NS	NS	NS	NS	ND	ND	ND	NS	NS	NS	NS
Jul 2012A	ND	ND	9.1	2.8	ND	ND	ND	ND	ND	ND	82	ND
Jul 2012B	NS	NS	NS	NS	NS	0.029	0.02	0.02	NS	NS	NS	NS
Aug 2012A	ND	ND	4.8	1.3	ND	ND	ND	ND	ND	ND	35	ND
Aug 2012B	NS	NS	NS	NS	NS	ND	ND	ND	NS	NS	NS	NS
Sept 2012A	ND	ND	7.5	3.6	ND	0.022	ND	ND	ND	ND	17	ND
Sept 2012B	NS	NS	NS	NS	NS	0.15	0.07	0.19	NS	NS	NS	NS
Oct 2012A	ND	ND	6.1	1.6	ND	ND	ND	ND	0.014	ND	94	ND
Oct 2012B	NS	NS	NS	NS	NS	ND	ND	ND	NS	NS	NS	NS
Nov 2012A	ND	ND	4.9	2.5	ND	0.061	ND	ND	0.008	ND	71	ND
Nov 2012B	NS	NS	NS	NS	NS	ND	ND	ND	NS	NS	NS	NS
Dec 2012A	ND	ND	6.1	4.1	ND	ND	0.07	ND	0.035	ND	97	NS
Dec 2012B	NS	NS	NS	NS	NS	ND	ND	ND	NS	NS	NS	NS
Jan 2013A	ND	ND	5.6	5.4	ND	ND	ND	ND	ND	64	107	ND
Jan 2013B	NS	NS	NS	NS	NS	ND	ND	ND	NS	NS	NS	NS
Feb 2013A	ND	ND	6.8	2.9	ND	0.012	0.055	0.015	ND	ND	23	ND
Feb 2013B	NS	NS	NS	NS	NS	0.053	0.068	ND	NS	NS	NS	NS
Mar 2013A	ND	ND	6.3	2.1	ND	ND	0.12	ND	0.071	133	180	ND
Mar 2013B	NS	NS	NS	NS	NS	0.036	0.039	ND	NS	NS	NS	NS
Apr 2013A	ND	ND	6.1	4.9	ND	ND	ND	ND	ND	ND	27	ND
Apr 2013B	NS	NS	NS	NS	NS	ND	ND	ND	NS	NS	NS	NS
May 2013A	ND	ND	ND	0.37	ND	ND	ND	ND	0.065	ND	7.9	ND
May 2013B	NS	NS	NS	NS	NS	0.19	ND	ND	NS	NS	NS	NS
Jun 2013A	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS	NS
Jul 2013 [1]	ND	ND	ND	ND	ND	ND	ND	ND	0.0027	ND	2.9	ND
Aug 2013	ND	ND	0.72	2.4	ND	ND	ND	ND	0.0055	26	5.4	ND
Sep 2013	ND	ND	ND	ND	ND	ND	ND	ND	0.17	20	9.9	ND
Oct 2013	ND	ND	ND	1.6	ND	ND	ND	ND	0.034	ND	5.7	ND
Nov 2013	ND	ND	6.4	ND	ND	ND	ND	ND	0.037	31	9.8	ND
Dec 2013	ND	ND	4.6	3.0	ND	ND	ND	ND	0.015	2.2	ND	ND
Jan 2014	ND	ND	ND	ND	ND	ND	ND	0.011	ND	22	ND	ND
Feb 2014	ND	ND	9.4	0.53	ND	ND	ND	ND	0.82	66	11	ND
Mar 2014	ND	ND	14	0.63	ND	ND	ND	0.0097	0.012	ND	2.2	ND
Apr 2014	ND	ND	ND	ND	ND	ND	ND	ND	0.0035	ND	13	ND
May 2014	ND	ND	24	0.86	ND	ND	3.0	ND	0.14	87	36	ND
Jun 2014	ND	ND	21	0.47	ND	ND	ND	ND	0.33	ND	16	ND
Jul 2014	ND	ND	20	ND	ND	ND	ND	0.011	0.009	110	4.1	ND
Aug 2014	ND	ND	ND	ND	ND	ND	ND	ND	0.058	240	65	ND
Sep 2014	ND	ND	24	ND	ND	ND	ND	ND	0.61	23	8	ND
Oct 2014	ND	ND	24	ND	ND	ND	ND	ND	0.017	35	12	ND
NPDES Permit Max. Effluent Requirements	2.0	None	10.0	10.0	10.0	60	2.0	6.0	<4.400	1000 *	600 *	50

ND = Not Detected
NS = Not Sampled

Table 10
Havertown PCP Superfund Site
Major Contaminants in Monitoring Wells 1990-2014

CW-1S Continental Auto Parts off Lawrence Road (Extended for landfill cap)

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
1990 Nov	ND	ND	ND	ND	630	--	ND	250	0.7	ND
2000 Dec	1.3	ND	ND	ND	800	12	ND	190	ND	3.3
2002 Oct	--	ND	ND	ND	1400	15	ND	310	ND	ND
2004 Mar	2.5	0.59	ND	0.59	930	14	ND	100	ND	ND
2005 Mar	0.24	0.46	ND	0.46	250	5.2	ND	31	ND	ND
2006 Mar	--	0.64	ND	0.64	370	6.2	ND	210	ND	--
2007 Mar	--	ND	ND	ND	470	4.2	1.2	79	ND	ND
2008 Mar	--	ND	ND	ND	740	6.3	ND	280	ND	ND
2009 Mar	--	ND	0.79	1.2	720	4.5	ND	160	ND	3.1
2010 Mar	--	1.1	ND	1.1	560	3.5	ND	110	ND	3.8
2011 Mar	--	ND	ND	ND	420	2.7	ND	180	ND	ND
2012 Mar	--	0.37	ND	8.17	130	0.65	ND	13	ND	ND
2013 Mar	--	ND	ND	ND	430	2.6	ND	160	ND	ND
2014 May [1]	--	0.45	ND	0.45	160	1.6	ND	145	ND	ND

[1] March annual sampled 4/29/14 to 5/7/14

CW-1I Continental Auto Parts off Lawrence Road (Extended for landfill cap)

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
1990 Nov	ND	ND	ND	ND	430	--	ND	54	ND	ND
2000 Dec	0.76	ND	ND	ND	63	2	ND	56	ND	5.5
2002 Oct	--	ND	ND	ND	970	12	ND	190	ND	ND
2004 Mar	0.085	0.18	ND	0.18	160	16	ND	34	ND	ND
2005 Mar	--	ND	ND	ND	35	4.1	ND	21	ND	--
2006 Mar	--	0.24	ND	0.24	76	2.4	ND	40	ND	--
2007 Mar	--	ND	ND	ND	90	ND	2.8	28	ND	ND
2008 Mar	--	ND	ND	ND	260	1.6	ND	49	ND	ND
2009 Mar	--	ND	0.58	0.97	200	0.98	ND	62	ND	2.8

BTEX: Benzene + Toluene + Ethylbenzene + Total Xylenes
MTBE: Methyl tert-Butyl Ether
TCE: Trichloroethylene PCP: Pentachlorophenol
Total Dioxins based on 1989 TEQ
"--": Not sampled ND: Not Detected

Revised 8/27/15

Table 10
Havertown PCP Superfund Site
Major Contaminants in Monitoring Wells 1990-2014

CW-1D Continental Auto Parts off Lawrence Road (Extended for landfill cap)

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
1990 Nov	ND	ND	ND	ND	390	--	ND	57	ND	ND
2000 Dec	32	ND	ND	17	ND	ND	ND	83	ND	2.6
2002 Oct	--	ND	ND	ND	170	7	ND	69	ND	ND
2004 Mar	0.67	0.42	ND	0.54	20	0.93	ND	77	ND	ND
2005 Mar	--	0.36	ND	0.53	18	0.55	ND	54	ND	--
2006 Mar	--	0.25	ND	0.5	12	0.48	ND	72	ND	--
2007 Mar	--	ND	ND	ND	8.4	ND	2.0	63	ND	ND
2008 Mar	--	ND	ND	ND	20	ND	ND	54	ND	ND
2009 Mar	--	ND	0.85	1.3	7.1	ND	ND	58	ND	3.2
2010 Mar	0.81	ND	ND	ND	4.9	0.54	ND	40	ND	ND
2011 Mar	0.26	ND	ND	ND	9.1	0.62	ND	30	ND	ND
2012 Mar	--	0.11	ND	12.11	2.5	0.43	ND	20	ND	ND
2013 Mar	--	ND	ND	ND	5.8	ND	ND	8.9	ND	ND
2014 May [1]	0.040	ND	ND	ND	1.7	0.38	ND	11	ND	ND

[1] March annual sampled 4/29/14 to 5/7/14

CW-2S GWTP Property, NE corner of cap (Extended for landfill cap)

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
1990 Nov	4464	ND	110	110	ND	--	2700	6800	310	ND
2000 Dec	--	ND	85	97	ND	66	780	8600	ND	8.2
2001 Feb	4599	--	--	--	--	--	--	--	--	--
2004 Mar	3332	ND	0.62	0.73	ND	ND	1.7	1500	2.9	--
2005 Mar	DRY									
2006 Mar	DRY									
2007 Mar	DRY									
2008 Mar	DRY									
2009 Mar	DRY									

BTEX: Benzene + Toluene + Ethylbenzene + Total Xylenes
MTBE: Methyl tert-Butyl Ether
TCE: Trichloroethylene PCP: Pentachlorophenol
Total Dioxins based on 1989 TEQ
"--": Not sampled ND: Not Detected

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Table 10
Havertown PCP Superfund Site
Major Contaminants in Monitoring Wells 1990-2014

CW-2I GWTP Property, NE corner of cap (Extended for landfill cap)

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
1990 Nov	4	ND	79	79	ND	--	650	3000	ND	2.3
2000 Dec	52	ND	60	68	ND	85	910	10000	13	ND
2001 Nov	1.7	51	26	107.5	1.0	--	600	7700	6	--
2002 Feb	80	0.3	59	67.3	1.0	--	770	28000	ND	--
2002 May	85	0.2	37	42	0.8	--	230	3900	ND	--
2002 Aug	43	0.2	48	54.2	0.9	--	170	5700	6	--
2003 Mar	ND	ND	79	89	1	27	560	8700	7	ND
2004 Mar	0.73	0.37	74	84	1.3	20	700	18000	10	ND
2005 Mar	--	0.25	73	85	0.96	11	810	12000	9.0	--
2006 Mar	--	ND	46	52	0.43	3	830	12000	17	--
2007 Mar	--	ND	60	66	ND	3.5	450	6800	9.9	3.5
2008 Mar	--	ND	55	62	ND	4.7	620	15000	8.9	1.8
2009 Mar	--	ND	41	45	ND	2.7	300	7000	6.8	ND
2011 Jun	--	ND	58	67	ND	ND	ND	4200	ND	ND
2012 Mar	--	ND	24	47	ND	ND	110	2800	2.7	ND
2013 Mar	--	ND	16	16	ND	ND	100	2500	2.4	ND
2014 May [1]	--	ND	14	14	0.64	ND	ND	602	ND	ND

[1] March annual sampled 4/29/14 to 5/7/14

DUP-05 Field Duplicate of CW-2I

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
2014 May [1]	--	ND	14	14	ND	ND	ND	711	ND	ND

[1] March annual sampled 4/29/14 to 5/7/14

BTEX: Benzene + Toluene + Ethylbenzene + Total Xylenes
MTBE: Methyl tert-Butyl Ether
TCE: Trichloroethylene PCP: Pentachlorophenol
Total Dioxins based on 1989 TEQ
"--": Not sampled ND: Not Detected

Table 10
Havertown PCP Superfund Site
Major Contaminants in Monitoring Wells 1990-2014

CW-2D GWTP Property, NE corner of cap (Extended for landfill cap)

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
1990 Nov	4	1	3	6	3	--	220	3300	ND	ND
2004 Mar	250	1.2	42	55	49	11	710	7400	9.2	ND
2005 Mar	382	1.9	90	124	80	8.9	1200	8600	6.4	28
2006 Mar	28	0.56	13	14	14	5.4	280	7800	4.4	--
2007 Mar	49	ND	9.4	9.4	20	7.0	130	2500	4.2	ND
2008 Mar	478	ND	8.8	8.8	19	7.6	72	3500	3.7	ND
2009 Mar	286	ND	4.9	4.9	9.2	4.9	57	2300	3.4	ND
2010 Mar	106	ND	7.3	7.3	7.7	5.8	62	3100	3.8	ND
2011 Mar	1.3	ND	5.6	5.9	6.9	5.0	80	1800	4.2	3.5
2012 Mar	--	ND	10.3	28	5.5	4.0	3.2	1700	ND	ND
2013 Mar	--	ND	4.0	4.0	2.5	3.6	6.9	1800	ND	ND
2014 May [1]	0.38	ND	6.7	7.0	4.1	2.8	53	2310	0.47	ND

[1] March annual sampled 4/29/14 to 5/7/14

BTEX: Benzene + Toluene + Ethylbenzene + Total Xylenes
MTBE: Methyl tert-Butyl Ether
TCE: Trichloroethylene PCP: Pentachlorophenol
Total Dioxins based on 1989 TEQ
"--": Not sampled ND: Not Detected

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Table 10
Havertown PCP Superfund Site
Major Contaminants in Monitoring Wells 1990-2014

CW-3S PCG parking lot, NW building corner

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
1990 Nov	1.0	ND	ND	ND	ND	--	ND	ND	ND	ND
2000 Dec	6.2	ND	ND	12	ND	ND	ND	ND	ND	ND
2003 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2004 Mar	0.69	0.44	ND	0.44	ND	ND	ND	ND	ND	ND
2005 Mar	--	0.14	0.26	0.74	ND	0.25	ND	ND	ND	ND
2006 Mar	DRY									
2007 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2008 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2009 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	2.1
2011 Jun	--	ND	ND	ND	ND	ND	ND	3.1	ND	ND
2012 Mar	--	ND	ND	0.16	0.13	0.70	ND	54	ND	ND
2013 Mar	--	ND	ND	ND	ND	ND	ND	2.3	ND	ND
2014 May [1]	--	ND	ND	ND	ND	ND	ND	ND	ND	ND

[1] March annual sampled 4/29/14 to 5/7/14

CW-3I PCG parking lot, NW building corner

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
1990 Nov	1.0	ND	ND	ND	ND	--	ND	ND	ND	ND
1992 Jan	239	0.8	ND	0.8	ND	--	ND	ND	ND	ND
2000 Dec	10.3	ND	ND	2	ND	ND	ND	2.0	ND	ND
2002 Oct	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2004 Mar	4.8	3.5	ND	3.5	ND	ND	ND	ND	ND	ND
2005 Mar	2.3	0.30	0.68	1.3	ND	0.23	ND	ND	ND	ND
2006 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	--
2007 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2008 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2009 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND

BTEX: Benzene + Toluene + Ethylbenzene + Total Xylenes
MTBE: Methyl tert-Butyl Ether
TCE: Trichloroethylene PCP: Pentachlorophenol
Total Dioxins based on 1989 TEQ
"--": Not sampled ND: Not Detected

Table 10
Havertown PCP Superfund Site
Major Contaminants in Monitoring Wells 1990-2014

CW-3D PCG parking lot, NW building corner

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
1990 Nov	ND	220	ND	297	1	--	ND	560	ND	ND
1992 Jan	16	3.0	14	18	1.0	--	ND	630	ND	ND
2000 Dec	27	ND	ND	3.0	ND	14	ND	1300	13	2.2
2001 Nov	8.5	ND	0.09	0.3	0.06	--	ND	1600	4	--
2002 Feb	49	0.2	0.8	0.6	0.04	--	3.0	220	ND	--
2002 May	2.9	0.6	1.0	2.5	ND	--	ND	760	3	--
2002 Aug	4.8	0.08	0.2	0.4	0.05	--	ND	330	ND	--
2003 Mar	0.03	ND	1.0	1.0	1	7.0	ND	1700	4.0	ND
2004 Mar	0.57	0.75	1.1	2.1	2.8	5.9	ND	2600	3.5	ND
2005 Mar	--	0.26	0.23	0.55	0.45	1.6	ND	470	2.6	ND
2006 Mar	--	ND	ND	ND	ND	0.51	ND	310	ND	--
2007 Mar	--	ND	ND	ND	ND	ND	ND	290	ND	ND
2008 Mar	--	ND	ND	ND	ND	1.4	ND	390	ND	ND
2009 Mar	--	ND	ND	ND	ND	ND	ND	350	ND	4.2
2010 Mar	9.9	ND	ND	ND	ND	1.1	ND	260	ND	ND
2011 Mar	2.1	ND	ND	0.35 B	ND	0.26	0.19	220	0.17	ND
2012 Mar	--	ND	ND	0.17	0.1	0.39	ND	120	ND	ND
2013 Mar	--	ND	ND	ND	ND	ND	ND	140	ND	ND
2014 May [1]	0.56	ND	ND	ND	ND	0.50	ND	552	ND	ND

[1] March annual sampled 4/29/14 to 5/7/14

BTEX: Benzene + Toluene + Ethylbenzene + Total Xylenes
MTBE: Methyl tert-Butyl Ether
TCE: Trichloroethylene PCP: Pentachlorophenol
Total Dioxins based on 1989 TEQ
"--": Not sampled ND: Not Detected

Revised 8/27/15

Table 10
Havertown PCP Superfund Site
Major Contaminants in Monitoring Wells 1990-2014

CW-4S PCG parking lot, SW building corner

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
1990 Nov	776	120	97	217	50	-	150	3300	ND	ND
2000 Dec	1830	4	13	17	37	ND	100	3300	ND	17
2002 Oct	338	9	20	29	15	ND	35	1900	2	66
2004 Mar	5.1	41	110	151	5	ND	440	4800	ND	ND
2005 Mar	--	54	230	289	3.9	ND	300	3900	5.4	5.4
2006 Mar	--	46	370	417	1.9	0.67	150	4700	6.6	--
2007 Mar	--	20	77	97	4.0	ND	ND	2600	ND	ND
2008 Mar	--	ND	ND	ND	1.8	ND	ND	740	ND	ND
2009 Mar	--	2.6	ND	2.8*	1.3	ND	11	690	ND	ND
2010 Mar	--	1.1	ND	1.1	ND	ND	ND	280	ND	ND
2011 Mar	--	2.4	ND	2.8	0.36	ND	0.26	410	ND	ND
2012 Mar	--	0.29	ND	ND	0.18	ND	ND	68	ND	ND
2013 Mar	--	ND	ND	ND	ND	ND	ND	1000	ND	ND
2014 May [1]	--	1.4	0.46	1.9	1.3	ND	ND	807	ND	3.0

[1] March annual sampled 4/29/14 to 5/7/14

* Includes toluene

BTEX: Benzene + Toluene + Ethylbenzene + Total Xylenes
MTBE: Methyl tert-Butyl Ether
TCE: Trichloroethylene   PCP: Pentachlorophenol
Total Dioxins based on 1989 TEQ
"--": Not sampled   ND: Not Detected

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Table 10
Havertown PCP Superfund Site
Major Contaminants in Monitoring Wells 1990-2014

CW-4I PCG parking lot, SW building corner

Date	Total Dioxins (pg/L)	Benzene (μg/L)	Total Xylenes (μg/L)	BTEX Total (μg/L)	TCE (μg/L)	MTBE (μg/L)	Naphthalene (μg/L)	PCP (μg/L)	Phenanthrene (μg/L)	Arsenic (μg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
1990 Nov	439	270	540	902	25	--	620	3400	ND	15
2000 Dec	161	20	82	108	24	ND	450	5100	10	12
2002 Oct	--	200	250	535	11	ND	600	4500	9	12
2004 Mar	9.5	77	250	363	4.1	ND	930	6000	11	39
2005 Mar	7.6	68	570	883	2.2	ND	200	3500	5.9	12
2006 Mar	23	50	600	773	2.5	1.1	87	2900	3.9	--
2007 Mar	--	34	91	124	2.0	ND	ND	3600	ND	18
2008 Mar	--	30	16	46	2.1	ND	18	3000	ND	28
2009 Mar	--	19	4.8	25*	1.1	ND	7.5	2200	2.4	33
2011 Jun	--	7	9.2	16	ND	ND	ND	640	ND	28
2012 Mar	--	4.5	1.8	28	0.35	ND	ND	740	ND	19
2013 Mar	--	6.9	ND	6.9	ND	ND	35	1400	2.8	19
2014 May [1]	--	20	20	51	0.66	0.35	2.7	956	ND	6.9

[1] March annual sampled 4/29/14 to 5/7/14

* Includes Ethylebenzene and tolulene

BTEX: Benzene + Toluene + Ethylbenzene + Total Xylenes
MTBE: Methyl tert-Butyl Ether
TCE: Trichloroethylene   PCP: Pentachlorophenol
Total Dioxins based on 1989 TEQ
"--": Not sampled   ND: Not Detected

Revised 8/27/15

Table 10
Havertown PCP Superfund Site
Major Contaminants in Monitoring Wells 1990-2014

CW-4D PCG parking lot, SW building corner

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
1990 Nov	84	220	340	637	19	--	140	3700	ND	26
2000 Dec	222	19	95	120	21	1	ND	5500	10	7.8
2002 Oct	--	200	300	610	10	ND	770	5200	9	8.5
2004 Mar	9.6	110	240	411	3.8	ND	730	4700	11	ND
2005 Mar	--	54	380	640	1.2	1.3	40	1600	5.5	4.6
2006 Mar	--	21	220	380	ND	ND	19	850	6.4	--
2007 Mar	--	9.2	300	583	ND	ND	3.1	480	2.3	ND
2008 Mar	--	10	351	837	ND	ND	6.3	370	2.9	2.9
2009 Mar	--	13	520	907*	1.9	ND	16	460	3.2	6.6
2010 Mar	1.8	3.5	35.3	210	ND	ND	3.9	210	ND	3.7
2011 Mar	0.37	3.0	11	56	0.29	ND	0.36	120	0.83	ND
2012 Mar	--	2.5	55	169	0.29	ND	1.6	ND	ND	ND
2013 Mar	--	14	183	297	2.7	ND	150	1700	3.7	ND
2014 May [1]	0.25	31	105	222	0.99	0.46	31	1180	3.0	5.7

[1] March annual sampled 4/29/14 to 5/7/14

BTEX: Benzene + Toluene + Ethylbenzene + Total Xylenes
MTBE: Methyl tert-Butyl Ether
TCE: Trichloroethylene PCP: Pentachlorophenol
Total Dioxins based on 1989 TEQ
"--": Not sampled ND: Not Detected

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Table 10
Havertown PCP Superfund Site
Major Contaminants in Monitoring Wells 1990-2014

CW-5S PCG parking lot, SE building corner

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
1990 Nov	12	7	260	427	ND	--	4	88	6	28
2000 Dec	139	120	73	261	2	ND	4	1500	9	25
2001 Nov	9	0.4	0.9	1.67	0.4	--	ND	1500	4	--
2002 Feb	89	50	18	96.4	1	--	ND	1200	ND	--
2002 May	69	43	23	89.4	1	--	ND	730	ND	--
2002 Aug	43	60	45	153.9	1	--	ND	1100	5	--
2003 Mar	23	110	220	517	3	ND	ND	2300	ND	49
2004 Mar	14	50	15	101	ND	ND	ND	850	7.8	25
2005 Mar	5.1	12	1.0	24	ND	1	ND	72	3.6	22
2006 Mar	25	3.7	0.18	7.6	ND	0.38	ND	190	2.5	--
2007 Mar	0.45	ND	ND	3.3	ND	ND	ND	12	ND	8.5
2008 Mar	5.1	ND	ND	2.5	ND	ND	ND	ND	ND	20
2009 Mar	26	3.0	1.9	14	ND	ND	ND	17	ND	20
2011 Jun	--	ND	ND	ND	ND	ND	ND	ND	ND	8.8
2012 Mar	--	ND	ND	0.12	ND	ND	ND	ND	ND	ND
2013 Mar	--	1.8	ND	1.8	ND	ND	18	240	ND	ND
2014 May [1]	--	ND	ND	ND	ND	ND	ND	3.3	ND	ND

[1] March annual sampled 4/29/14 to 5/7/14

BTEX: Benzene + Toluene + Ethylbenzene + Total Xylenes
MTBE: Methyl tert-Butyl Ether
TCE: Trichloroethylene PCP: Pentachlorophenol
Total Dioxins based on 1989 TEQ
"--": Not sampled ND: Not Detected

Table 10
Havertown PCP Superfund Site
Major Contaminants in Monitoring Wells 1990-2014

CW-5I PCG parking lot, SE building corner

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
1990 Nov	84	7	190	197	ND	--	10	140	5	3.1
2000 Dec	54	240	370	807	3	5	10	2900	14	5.2
2002 Oct	--	190	390	890	4	ND	78	2700	12	ND
2004 Mar	ND	40	26	122	0.23	ND	ND	760	11	ND
2005 Mar	--	12	0.53	24	0.11	ND	ND	130	4.1	7.6
2006 Mar	--	6.3	0.39	7.61	ND	0.94	ND	320	2	--
2007 Mar	--	2.1	ND	2.1	ND	ND	ND	47	1.1	ND
2008 Mar	--	ND	ND	ND	ND	ND	ND	2.7	ND	ND
2009 Mar	--	ND	ND	ND	ND	ND	ND	0.88	ND	6.0

BTEX: Benzene + Toluene + Ethylbenzene + Total Xylenes
MTBE: Methyl tert-Butyl Ether
TCE: Trichloroethylene PCP: Pentachlorophenol
Total Dioxins based on 1989 TEQ
"--": Not sampled ND: Not Detected

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Table 10
Havertown PCP Superfund Site
Major Contaminants in Monitoring Wells 1990-2014

CW-5D PCG parking lot, SE building corner

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
1990 Nov	20	13	390	403	ND	--	12	75	3	ND
2000 Dec	29	170	140	424	2	ND	ND	1700	11	1.7
2001 Nov	1.7	ND	0.2	0.34	0.3	--	ND	1300	6	--
2002 Feb	20	48	44	123	0.5	--	ND	55	ND	--
2002 May	126	38	28	89	0.4	--	ND	290	3	--
2002 Aug	45	13	9	29	0.4	--	ND	140	ND	--
2003 Mar	0.024	84	110	345	ND	ND	ND	760	ND	ND
2004 Mar	ND	28	12	96	ND	ND	ND	320	8.9	ND
2005 Mar	--	5.0	0.3	12	ND	0.84	ND	22	1.7	4.8
2006 Mar	--	7.7	0.1	8.1	0.12	1.3	ND	85	2.1	--
2007 Mar	--	4.0	ND	4.0	ND	ND	ND	38	ND	ND
2008 Mar	--	ND	ND	ND	ND	ND	ND	1.7	ND	ND
2009 Mar	--	ND	ND	ND	ND	ND	ND	1.2	ND	3.5
2010 Mar	1.00	0.51	ND	ND	ND	ND	ND	11	ND	ND
2011 Mar	0.34	ND	ND	ND	ND	0.33	ND **	ND **	ND **	ND
2012 Mar	--	ND	0.1	33.2*	ND	0.23	ND	ND	ND	ND
2013 Mar	--	ND	ND	ND	ND	ND	ND	16	ND	ND
2014 May [1]	0.21	0.30	ND	0.30	ND	ND	ND	ND	ND	2.1

[1] March annual sampled 4/29/14 to 5/7/14

* Toluene ** CW-5D SVOCs were resampled on 4/19/11 due to out of range results received from the 3/21/11 sample.

DUP-03 Field Duplicate of CW-5D

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
2014 May [1]	0.16	0.28	ND	0.28	ND	ND	ND	ND	ND	2.0

[1] March annual sampled 4/29/14 to 5/7/14

BTEX: Benzene + Toluene + Ethylbenzene + Total Xylenes
MTBE: Methyl tert-Butyl Ether
TCE: Trichloroethylene PCP: Pentachlorophenol
Total Dioxins based on 1989 TEQ
"--": Not sampled ND: Not Detected

Revised 8/27/15

Table 10
Havertown PCP Superfund Site
Major Contaminants in Monitoring Wells 1990-2014

CW-6S PCG parking lot, NE building corner Abandoned August 2012

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
1990 Nov	1	ND	ND	ND	ND	--	ND	98	ND	2.8
2000 Dec	0.85	ND	ND	81	ND	12	ND	6	ND	21
2002 Feb	--	0.2	0.2	0.65	0.09	--	--	--	--	--
2002 May	53	0.1	ND	0.2	0.06	--	ND	8	ND	--
2003 Mar	1319	ND	ND	ND	ND	1	ND	ND	ND	ND
2004 Mar	4.6	ND	ND	ND	ND	1.5	ND	ND	ND	42
2005 Mar	0.09	ND	ND	0.17	ND	1.1	ND	ND	ND	12
2006 Mar	--	ND	ND	ND	ND	1.1	ND	ND	ND	--
2007 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	5.4
2008 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2009 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	6.6
2011 Jun	--	ND	ND	ND	ND	ND	ND	ND	ND	26
2012 Mar	--	ND	ND	0.17	ND	0.19	ND	ND	ND	ND

CW-6I PCG parking lot, NE building corner Abandoned August 2012

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
1990 Nov	ND	4	56	60	30	--	180	3000	4	ND
1992 Jan	238	3.0	33	36	15	--	160	3300	ND	ND
2000 Dec	255	1	5	6	3	29	ND	4300	7	ND
2002 Oct	--	ND	ND	ND	1	22	2	1500	4	ND
2004 Mar	1.7	0.99	1.5	2.7	3.9	15	ND	3800	5.1	ND
2005 Mar	--	0.74	2.4	3.5	3.1	9.6	1.6	1300	4.1	ND
2006 Mar	--	0.65	0.33	1.2	2.2	6.2	ND	1300	1.8	--
2007 Mar	--	ND	ND	ND	ND	5.2	ND	1100	0.97	1.9
2008 Mar	--	ND	ND	ND	ND	3.5	ND	840	2.0	ND
2009 Mar	--	ND	ND	ND	1.5	ND	ND	670	1.3	ND

BTEX: Benzene + Toluene + Ethylbenzene + Total Xylenes
MTBE: Methyl tert-Butyl Ether
TCE: Trichloroethylene PCP: Pentachlorophenol
Total Dioxins based on 1989 TEQ
"--": Not sampled ND: Not Detected

Table 10
Havertown PCP Superfund Site
Major Contaminants in Monitoring Wells 1990-2014

CW-6D PCG parking lot, NE building corner Abandoned August 2012

Date	Total Dioxins	Benzene	Total Xylenes	BTEX Total	TCE	MTBE	Naphthalene	PCP	Phenanthrene	Arsenic
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
1990 Nov	12	3	34	37	17	--	400	3500	ND	ND
1992 Jan	3708	7.0	76	93	ND	--	460	4100	ND	ND
2000 Dec	88	1	11	45	2	24	80	3200	7	ND
2004 Mar	1.3	1	8.6	9.9	2.8	17	9.2	3600	7.6	ND
2005 Mar	--	0.93	14	17	5.0	12	5.4	1800	5.4	ND
2006 Mar	--	0.75	2.7	3.9	1.5	4.3	1.5	2300	5.3	--
2007 Mar	--	ND	ND	ND	ND	4.2	0.96	1000	3.8	ND
2008 Mar	--	ND	1.4	1.4	ND	1.9	ND	1200	5.2	ND
2009 Mar	--	ND	2.1	2.7	1.8	2.9	ND	1900	4.0	2.1
2010 Mar	13	0.53	ND	0.53	1.3	2.5	ND	1200	ND	ND
2011 Mar	0.73	ND	ND	0.54 B	ND	0.81	0.29	440	0.49	ND
2012 Mar	--	0.11	0.24	0.55	ND	0.50	ND	150	ND	ND

CW-7S PECO Oakmont substation property

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
1992 Jan	2	2.0	1.0	3	3.0	--	ND	ND	ND	ND
2000 Dec	ND	ND	ND	60	ND	3200	ND	4	ND	27
2002 Oct	--	ND	ND	ND	ND	2900	ND	11	ND	ND
2004 Mar	ND	2.3	ND	2.3	0.93	2300	ND	5.6	ND	ND
2005 Mar	--	0.47	ND	0.47	1.1	550	ND	ND	ND	ND
2006 Mar	--	2.0	ND	2.0	0.5	580	ND	ND	ND	--
2007 Mar	--	ND	ND	ND	ND	310 +	ND	ND	ND	ND
2008 Mar	--	ND	ND	ND	ND	220 +	ND	ND	ND	ND
2009 Mar	--	ND	ND	ND	ND	130	ND	2.3	ND	ND
2010 Mar	--	ND	ND	ND	ND	30	0.58	4.3	ND	ND
2012 Mar	--	ND	0.56	0.56	0.18	4.3	ND	ND	ND	ND
2014 May [1]	--	ND	ND	ND	ND	22	ND	ND	ND	3.0

[1] March annual sampled 4/29/14 to 5/7/14

BTEX: Benzene + Toluene + Ethylbenzene + Total Xylenes
MTBE: Methyl tert-Butyl Ether
TCE: Trichloroethylene PCP: Pentachlorophenol
Total Dioxins based on 1989 TEQ
"--": Not sampled ND: Not Detected

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Table 10
Havertown PCP Superfund Site
Major Contaminants in Monitoring Wells 1990-2014

CW-7D PECO Oakmont substation property

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
1992 Jan	1	2.0	ND	2	1.0	--	ND	5.0	ND	ND
2000 Dec	--	ND	ND	ND	ND	280	ND	80	ND	ND
2002 Oct	4.4	ND	ND	ND	ND	69	ND	140	ND	ND
2004 Mar	ND	7.0	ND	7.0	0.49	1000	ND	27	ND	ND
2005 Mar	--	0.79	ND	0.79	ND	130	ND	1.6	ND	ND
2006 Mar	--	0.62	ND	0.62	0.22	94	ND	23	ND	--
2007 Mar	--	ND	ND	ND	ND	150	ND	1.2	ND	ND
2008 Mar	--	ND	ND	ND	ND	44	ND	6.3	ND	ND
2009 Mar	--	ND	ND	ND	ND	61	ND	3.5	ND	3.8
2010 Mar	--	ND	ND	ND	ND	ND	0.67	ND	ND	ND
2012 Mar	--	ND	0.46	0.46	ND	ND	ND	ND	ND	ND
2014 May [1]	--	ND	ND	ND	ND	ND	ND	ND	ND	3.0

[1] March annual sampled 4/29/14 to 5/7/14

CW-8S End of Ralston Ave.

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
1992 Jan	1	0.8	ND	0.8	ND	--	ND	ND	ND	ND
2002 Oct	4.1	ND	ND	ND	ND	80	ND	ND	ND	ND
2004 Mar	ND	ND	ND	ND	ND	20	ND	ND	ND	ND
2005 Mar	--	ND	ND	ND	ND	1.4	ND	ND	ND	ND
2006 Mar	--	ND	ND	ND	ND	1.7	ND	ND	ND	--
2007 Mar	--	ND	ND	ND	ND	2.1	ND	ND	ND	ND
2008 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2009 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2011 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2013 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND

BTEX: Benzene + Toluene + Ethylbenzene + Total Xylenes
MTBE: Methyl tert-Butyl Ether
TCE: Trichloroethylene PCP: Pentachlorophenol
Total Dioxins based on 1989 TEQ
"--": Not sampled ND: Not Detected

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Table 10
Havertown PCP Superfund Site
Major Contaminants in Monitoring Wells 1990-2014

CW-8D End of Ralston Ave.

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
1992 Jan	ND	ND	ND	ND	0.6	--	1.0	110	ND	ND
2000 Dec	3.2	ND	ND	ND	ND	230	ND	ND	ND	ND
2002 Oct	--	ND	ND	ND	ND	730	ND	ND	ND	ND
2004 Mar	0.02	ND	ND	ND	0.1	77	ND	ND	ND	ND
2005 Mar	--	ND	ND	ND	ND	1.5	ND	ND	ND	ND
2006 Mar	--	ND	ND	ND	ND	1.7	ND	ND	ND	--
2007 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2008 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2009 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2011 Mar	--	ND	ND	ND	ND	ND	ND	0.54	ND	ND
2013 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND

CW-9S Rittenhouse Circle Installed September 2003

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
2002 Oct	3.0	2	ND	2	ND	2	ND	70	ND	ND
2003 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2003 Sep	--	0.038	ND	0.038	ND	1.1	ND	ND	ND	ND
2004 Mar	0.03	ND	ND	ND	ND	0.97	ND	ND	ND	ND
2005 Mar	--	ND	ND	ND	ND	0.88	ND	ND	ND	--
2005 Sep	--	ND	ND	ND	ND	0.53	ND	ND	ND	--
2006 Mar	--	ND	ND	ND	ND	0.93	ND	ND	ND	--
2007 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2007 Sep	--	ND	ND	ND	ND	0.83	ND	ND	ND	--
2008 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2009 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2010 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2012 Mar	--	ND	0.72	0.8	ND	0.34	ND	ND	ND	ND

BTEX: Benzene + Toluene + Ethylbenzene + Total Xylenes
MTBE: Methyl tert-Butyl Ether
TCE: Trichloroethylene PCP: Pentachlorophenol
Total Dioxins based on 1989 TEQ
"--": Not sampled ND: Not Detected

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Table 10
Havertown PCP Superfund Site
Major Contaminants in Monitoring Wells 1990-2014

CW-9D Rittenhouse Circle Installed September 2003

Date	Total Dioxins (pg/L)	Benzene (μg/L)	Total Xylenes (μg/L)	BTEX Total (μg/L)	TCE (μg/L)	MTBE (μg/L)	Naphthalene (μg/L)	PCP (μg/L)	Phenanthrene (μg/L)	Arsenic (μg/L)
RGO	30	5			5		3	1	41	10
2002 Oct	0.02	2	ND	2	ND	2	ND	18	ND	ND
2003 Mar	0.02	ND	ND	ND	ND	2	ND	8	ND	ND
2003 Sep	--	0.72	0.18	0.9	0.1	1.2	ND	ND	ND	ND
2004 Mar	ND	0.31	ND	0.31	ND	1.2	ND	2.2	ND	ND
2004 Jun	--	0.46	ND	0.46	ND	0.98	ND	2.9	ND	--
2004 Sep	--	3.5	ND	3.5	9.1	0.6	ND	5.3	ND	ND
2004 Dec	--	0.39	ND	0.39	ND	1.7	ND	ND	1.8	--
2005 Mar	0.08	0.21	ND	0.21	ND	0.89	ND	2.4	ND	--
2005 Sep	--	0.22	0.39	0.74	ND	0.36	ND	ND	ND	--
2006 Mar	--	ND	ND	0.12	ND	0.51	ND	ND	ND	--
2006 Jun	--	ND	ND	ND	ND	0.62	ND	ND	ND	--
2006 Sep	--	ND	ND	ND	ND	ND	ND	0.59	ND	--
2007 Mar	--	ND	ND	ND	ND	ND	ND	0.78	ND	ND
2007 Jun	--	ND	ND	ND	ND	0.72	0.26	5.2	ND	--
2008 Mar	--	ND	ND	ND	ND	ND	ND	7.4	ND	ND
2009 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2009 Sep	--	ND	ND	ND	ND	0.14	ND	1.2	ND	--
2010 Sep	--	ND	ND	ND	ND	ND	ND	ND	ND	0.36
2011 Sep	--	ND	ND	ND	ND	ND	ND	0.51 B	ND	ND
2012 Sep	--	ND	ND	ND	ND	ND	ND	0.31	ND	ND
2014 May [1]	--	ND	ND	ND	ND	ND	ND	ND	ND	ND

[1] March annual sampled 4/29/14 to 5/7/14

BTEX: Benzene + Toluene + Ethylbenzene + Total Xylenes
MTBE: Methyl tert-Butyl Ether
TCE: Trichloroethylene PCP: Pentachlorophenol
Total Dioxins based on 1989 TEQ
"--": Not sampled ND: Not Detected

Revised 8/27/15

Table 10
Havertown PCP Superfund Site
Major Contaminants in Monitoring Wells 1990-2014

CW-10S Rittenhouse Circle Installed September 2003

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
2002 Oct	0.51	ND	ND	ND	ND	ND	ND	ND	ND	ND
2003 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2004 Mar	0.67	ND	ND	ND	ND	0.44	ND	ND	ND	ND
2005 Mar	2.9	ND	ND	ND	ND	0.54	ND	ND	ND	ND
2005 Sep	--	ND	ND	ND	ND	0.28	ND	ND	ND	--
2006 Mar	ND	ND	ND	ND	ND	0.46	ND	ND	ND	--
2007 Mar	0.08	ND	ND	ND	ND	ND	ND	ND	ND	ND
2007 Sep	--	ND	ND	ND	ND	ND	ND	ND	ND	--
2008 Mar	0.24	ND	ND	ND	ND	ND	ND	ND	ND	ND
2009 Mar	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND
2011 Mar	--	ND	ND	ND	ND	0.33	0.96	ND	ND	ND
2013 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND

BTEX: Benzene + Toluene + Ethylbenzene + Total Xylenes
MTBE: Methyl tert-Butyl Ether
TCE: Trichloroethylene PCP: Pentachlorophenol
Total Dioxins based on 1989 TEQ
"--": Not sampled ND: Not Detected

Table 10
Havertown PCP Superfund Site
Major Contaminants in Monitoring Wells 1990-2014

CW-10D Rittenhouse Circle Installed September 2003

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	30	5			5		3	1	41	10
2002 Oct	0.54	ND	ND	ND	ND	ND	ND	ND	ND	ND
2003 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2004 Mar	1.7	0.63	ND	0.63	18	0.57	ND	54	ND	ND
2004 Jun	--	5.9	ND	5.9	16	0.97	ND	310	ND	--
2004 Sep	0.20	8.4	ND	8.4	18	1.7	ND	690	ND	ND
2004 Dec	--	8.8	ND	8.9	17	1.9	ND	300	ND	--
2005 Mar	9.7	0.38	ND	0.38	9.1	ND	ND	44	ND	ND
2005 Sep	--	7.8	ND	7.9	14	0.76	ND	810	ND	--
2006 Mar	0.89	5.8	ND	5.8	13	0.91	ND	360	ND	--
2006 Jun	--	3.9	ND	3.9	10	0.74	ND	280	ND	--
2006 Sep	--	9.2	ND	9.2	17	1.2	ND	230	ND	--
2007 Mar	3.1	ND	ND	ND	ND	ND	ND	ND	ND	ND
2007 Jun	--	7.1	ND	7.1	13	1.2	ND	390	ND	--
2008 Mar	1.6	3.8	ND	3.8	9.5	ND	ND	190	ND	ND
2008 Sep	--	--	--	--	--	--	ND	1.6	ND	--
2009 Mar	0.32	ND	ND	ND	4.7	ND	ND	120	ND	ND
2009 Sep	--	6.4	ND	6.4	9.5	1.1	ND	560	ND	--
2010 Sep	0.11	6.3	ND	6.3	9.3	1.3	ND	460	ND	0.46
2011 Sep	0.22	2.8	ND	2.8	7.5	ND	0.99	180	ND	ND
2012 Sep	0.0068	ND	ND	ND	1.5	ND	ND	6.7	ND	ND
2014 May [1]	0.068	ND	ND	ND	5.8	0.35	ND	ND	ND	ND

[1] March annual sampled 4/29/14 to 5/7/14

BTEX: Benzene + Toluene + Ethylbenzene + Total Xylenes
MTBE: Methyl tert-Butyl Ether
TCE: Trichloroethylene PCP: Pentachlorophenol
Total Dioxins based on 1989 TEQ
"--": Not sampled ND: Not Detected

Revised 8/27/15

Table 10
Havertown PCP Superfund Site
Major Contaminants in Monitoring Wells 1990-2014

CW-11S Rittenhouse Circle Installed September 2003

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
2002 Oct	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2003 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2004 Mar	0.03	ND	ND	ND	0.25	0.64	ND	ND	ND	ND
2005 Mar	--	ND	ND	ND	0.19	0.46	1.2	7.1	2.0	ND
2005 Sep	--	ND	ND	ND	0.13	0.34	ND	ND	ND	--
2006 Mar	--	ND	ND	ND	0.19	0.47	ND	ND	ND	--
2007 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2008 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2009 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2011 Mar	--	ND	ND	ND	0.17	0.23	ND	ND	ND	ND
2013 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND

BTEX: Benzene + Toluene + Ethylbenzene + Total Xylenes
MTBE: Methyl tert-Butyl Ether
TCE: Trichloroethylene PCP: Pentachlorophenol
Total Dioxins based on 1989 TEQ
"--": Not sampled ND: Not Detected

Table 10
Havertown PCP Superfund Site
Major Contaminants in Monitoring Wells 1990-2014

CW-11D Rittenhouse Circle Installed September 2003

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
2002 Oct	5.7	ND	ND	ND	ND	ND	ND	ND	ND	ND
2003 Mar	--	ND	ND	ND	2	ND	ND	1	ND	4.8
2004 Mar	22	ND	ND	ND	1.7	0.2	ND	ND	ND	ND
2004 Jun	--	ND	ND	ND	1.5	0.19	ND	ND	ND	--
2004 Dec	--	ND	ND	ND	1.6	0.1	ND	ND	ND	--
2005 Mar	1.5	0.16	ND	0.16	0.95	0.25	ND	2.1	ND	ND
2005 Sep	--	ND	ND	ND	1	ND	ND	ND	ND	--
2006 Mar	--	0.19	ND	0.19	1.6	0.18	ND	ND	ND	--
2006 Jun	--	ND	ND	ND	1.2	ND	ND	ND	ND	--
2006 Sep	--	ND	ND	ND	1.7	ND	ND	ND	ND	--
2007 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2007 Jun	--	ND	ND	ND	1.1	ND	ND	1.7	ND	--
2007 Sep	--	0.58	0.65	2.13	1.1	ND	ND	ND	ND	--
2008 Mar	--	ND	ND	ND	1.0	ND	ND	ND	ND	ND
2009 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2009 Sep	--	ND	ND	ND	0.27	ND	ND	22	ND	--
2010 Sep	--	ND	ND	ND	1.2	ND	ND	ND	ND	ND
2011 Sep	--	ND	ND	ND	0.6	ND	ND	ND	ND	ND
2012 Sep	--	ND	ND	ND	0.92	ND	ND	1.2	ND	ND
2014 May [1]	--	ND	ND	ND	1.2	ND	ND	ND	ND	ND

[1] March annual sampled 4/29/14 to 5/7/14

BTEX: Benzene + Toluene + Ethylbenzene + Total Xylenes
MTBE: Methyl tert-Butyl Ether
TCE: Trichloroethylene PCP: Pentachlorophenol
Total Dioxins based on 1989 TEQ
"--": Not sampled ND: Not Detected

Revised 8/27/15

Table 10
Havertown PCP Superfund Site
Major Contaminants in Monitoring Wells 1990-2014

CW-12S Rittenhouse Circle Installed September 2003

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	30	5			5		3	1	41	10
2003 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2004 Mar	3.2	ND	ND	ND	ND	0.17	ND	ND	ND	ND
2005 Mar	0.76	ND	ND	ND	ND	0.26	ND	ND	ND	ND
2006 Mar	1.1	ND	ND	ND	ND	0.23	ND	ND	ND	--
2007 Mar	0.08	ND	ND	ND	ND	ND	ND	ND	ND	ND
2008 Mar	1.6	ND	ND	ND	ND	ND	ND	1.0	ND	2.5
2009 Mar	0.18	ND	ND	ND	ND	ND	ND	ND	ND	2.3
2010 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	4.6
2012 Mar	--	ND	0.47	0.47	ND	ND	ND	ND	ND	ND

CW-12D Rittenhouse Circle Installed September 2003

Date	Total Dioxins	Benzene	Total Xylenes	BTEX Total	TCE	MTBE	Naphthalene	PCP	Phenanthrene	Arsenic
RGO	30	5			5		3	1	41	10
2002 Oct	0.018	ND	ND	ND	ND	ND	ND	ND	ND	ND
2003 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2004 Mar	0.96	ND	0.76	ND	0.54	0.12	ND	ND	ND	ND
2005 Mar	--	ND	ND	ND	ND	0.48	ND	ND	ND	ND
2006 Mar		ND	ND	ND	0.12	0.41	ND	ND	ND	--
2006 Jun	--	ND	ND	ND	ND	ND	ND	ND	ND	--
2006 Sep	--	ND	ND	ND	ND	ND	ND	ND	ND	--
2007 Mar	0.04	ND	ND	ND	ND	ND	ND	ND	ND	ND
2007 Jun	--	ND	ND	ND	ND	ND	ND	0.58	ND	--
2007 Sep	--	ND	ND	ND	ND	ND	ND	ND	ND	--
2008 Mar	2.5	ND	ND	ND	ND	ND	ND	ND	ND	ND
2009 Mar	0.13	ND	ND	ND	ND	ND	ND	ND	ND	ND
2009 Sep	--	ND	ND	ND	ND	ND	ND	ND	ND	--
2010 Sep	--	ND	ND	ND	ND	ND	ND	ND	ND	0.24
2011 Sep	--	ND	ND	ND	ND	ND	1.2	0.19 B	ND	ND
2012 Sep	--	ND	ND	ND	ND	ND	ND	0.86	ND	2.0
2014 May [1]	--	ND	ND	ND	ND	ND	0.35	4.0	ND	3.0

[1] March annual sampled 4/29/14 to 5/7/14

BTEX: Benzene + Toluene + Ethylbenzene + Total Xylenes
MTBE: Methyl tert-Butyl Ether
TCE: Trichloroethylene PCP: Pentachlorophenol
Total Dioxins based on 1989 TEQ
"--": Not sampled ND: Not Detected

Revised 8/27/15

Table 10
Havertown PCP Superfund Site
Major Contaminants in Monitoring Wells 1990-2014

CW-13S Lawrence Road Installed September 2003

Date	Total Dioxins (pg/L)	Benzene (μg/L)	Total Xylenes (μg/L)	BTEX Total (μg/L)	TCE (μg/L)	MTBE (μg/L)	Naphthalene (μg/L)	PCP (μg/L)	Phenanthrene (μg/L)	Arsenic (μg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
2002 Oct	0.035	ND	ND	ND	ND	2	ND	ND	ND	ND
2003 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2004 Mar	ND	ND	ND	ND	0.47	1.7	ND	ND	ND	ND
2005 Mar	--	ND	ND	ND	0.42	0.7	ND	ND	ND	ND
2006 Mar	--	ND	ND	ND	0.57	0.76	ND	ND	ND	--
2007 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2007 Sep	--	ND	ND	ND	0.56	0.63	ND	ND	ND	--
2008 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2009 Mar	--	ND	ND	0.5 *	0.36	ND	ND	ND	ND	ND
2010 Mar	--	ND	ND	ND	ND	0.53	ND	ND	ND	ND
2012 Mar	--	ND	0.53	0.53	0.16	0.18	ND	ND	ND	ND

* Toluene

BTEX: Benzene + Toluene + Ethylbenzene + Total Xylenes
MTBE: Methyl tert-Butyl Ether
TCE: Trichloroethylene PCP: Pentachlorophenol
Total Dioxins based on 1989 TEQ
"--": Not sampled ND: Not Detected

Table 10
Havertown PCP Superfund Site
Major Contaminants in Monitoring Wells 1990-2014

CW-13D Lawrence Road Installed September 2003

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
2002 Oct	0.03	ND	ND	ND	ND	ND	ND	44	ND	5.0
2003 Mar	--	3	ND	3	10	ND	ND	110	ND	12
2003 Sep	--	1.9	0.12	1.9	24	0.27	ND	75	ND	7.6
2004 Mar	3.0	4.8	ND	4.99	24	0.28	ND	270	ND	13
2004 Jun	--	1.3	ND	1.3	14	0.26	ND	180	ND	--
2004 Sep	3.1	1.1	ND	1.1	14	0.46	ND	170	ND	ND
2004 Dec	--	0.96	ND	0.96	11	0.39	ND	38	ND	--
2005 Mar	0.32	0.95	ND	0.95	9.9	0.32	ND	83	ND	ND
2005 Sep	--	2.9	ND	2.9	11	0.27	ND	280	ND	--
2006 Mar	0.22	0.83	ND	0.83	13	0.39	ND	110	ND	--
2006 Jun	--	ND	ND	ND	6.9	ND	ND	11	ND	--
2006 Sep	--	ND	ND	ND	6.9	ND	ND	17	ND	--
2007 Mar	0.44	ND	ND	ND	6.0	ND	ND	120	ND	ND
2007 Jun	--	2.1	ND	2.1	5.9	ND	ND	64	ND	--
2008 Mar	12.4	ND	ND	ND	7.2	ND	ND	38	ND	24
2008 Sep	--	--	--	--	--	--	ND	ND	ND	--
2009 Mar	0.14	ND	ND	5.8 *	2.5	ND	ND	ND	ND	ND
2009 Sep	--	ND	ND	ND	1.1	ND	ND	0.9	ND	--
2010 Sep	--	ND	ND	ND	1.9	ND	ND	ND	ND	0.31
2011 Sep	--	ND	ND	ND	4.9	ND	ND	ND	ND	ND
2012 Sep	--	1.1	ND	1.1	5.3	0.35	ND	63	ND	3.0
2012 Dec	--	ND	ND	ND	8.3	ND	ND	ND	ND	--
2014 May [1]	--	2.6	ND	2.60	6.7	0.43	ND	115	ND	3.0

[1] March annual sampled 4/29/14 to 5/7/14

* Toluene

BTEX: Benzene + Toluene + Ethylbenzene + Total Xylenes
MTBE: Methyl tert-Butyl Ether
TCE: Trichloroethylene PCP: Pentachlorophenol
Total Dioxins based on 1989 TEQ
"--": Not sampled ND: Not Detected

Revised 8/27/15

Table 10
Havertown PCP Superfund Site
Major Contaminants in Monitoring Wells 1990-2014

CW-14S Lawrence Road Park Installed September 2003

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
2002 Oct	11	ND	ND	ND	ND	ND	ND	ND	ND	9.4
2003 Mar	2.6	ND	ND	ND	ND	ND	ND	3	ND	6.5
2004 Mar	2.0	ND	ND	ND	ND	ND	ND	ND	ND	5.6
2005 Mar	2.2	ND	ND	ND	ND	ND	ND	ND	ND	--
2006 Mar	--	ND	0.3	ND	ND	ND	ND	ND	ND	--
2007 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2008 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2009 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2010 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2011 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2012 Mar	--	ND	0.79	0.89	ND	ND	ND	ND	ND	ND
2013 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND

CW-14D Lawrence Road Park Installed September 2003

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
2002 Oct	0.057	ND	ND	ND	ND	ND	ND	ND	ND	ND
2003 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2004 Mar	0.041	ND	ND	ND	ND	ND	ND	ND	ND	ND
2005 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	--
2006 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	--
2007 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2008 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2009 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2010 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2011 Mar	--	ND	ND	0.11	ND	ND	ND	ND	ND	ND
2012 Mar	--	ND	ND	6.2*	ND	ND	ND	ND	ND	ND
2013 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND

* Toluene

BTEX: Benzene + Toluene + Ethylbenzene + Total Xylenes
MTBE: Methyl tert-Butyl Ether
TCE: Trichloroethylene PCP: Pentachlorophenol
Total Dioxins based on 1989 TEQ
"--": Not sampled ND: Not Detected

Table 10
Havertown PCP Superfund Site
Major Contaminants in Monitoring Wells 1990-2014

CW-15S Bailey Park NW end of basketball courts Installed September 2003

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	30	5			5		3	1	41	10
2002 Oct	5.8	ND	ND	ND	ND	3	ND	ND	ND	ND
2003 Mar	--	ND	ND	ND	ND	3	ND	ND	ND	ND
2004 Mar	ND	ND	ND	ND	ND	2.2	ND	ND	ND	ND
2005 Mar	--	ND	ND	ND	ND	1.8	ND	ND	ND	ND
2006 Mar	--	ND	ND	ND	ND	0.96	ND	ND	ND	--
2007 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2008 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2009 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2010 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2011 Mar	--	ND	ND	ND	ND	ND	0.56	ND	ND	ND
2012 Mar	--	ND	ND	ND	ND	0.22	ND	ND	ND	ND
2013 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2014 May [1]	--	ND	ND	ND	ND	ND	ND	ND	ND	ND

[1] March annual sampled 4/29/14 to 5/7/14

CW-16S Zac's Hamburgers Installed March 2005

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	30	5			5		3	1	41	10
2005 Jun	2381	120	110	339	0.55	4.5	2300	24000	68	ND
2005 Aug	356	120	110	299	ND	2.2	1500	6600	41	ND
2006 Mar	3254	73	80	199	0.51	2.6	720	3500	61	--
2007 Mar	2995	6.9	8.3	18	ND	ND	190	200	66	ND
2008 Mar	119	150	14	168	ND	1.2	240	1400	22	ND
2009 Mar	884	16	17	40	ND	ND	500	5600	32	4.1
2010 Mar	--	14	27	50	ND	0.54	620	1000	43	ND
2011 Mar	--	14	15	37	ND	0.46	230	1200	23	ND
2012 Mar	8.33	9.3	5	57	ND	ND	28	470	11	ND
2013 Mar	22	11	19	70	ND	ND	500	2300	28	ND
2014 May [1]	2.7	4.3	1.3	5.6	ND	ND	9.9	101	6.2	ND

[1] March annual sampled 4/29/14 to 5/7/14

BTEX: Benzene + Toluene + Ethylbenzene + Total Xylenes
MTBE: Methyl tert-Butyl Ether
TCE: Trichloroethylene PCP: Pentachlorophenol
Total Dioxins based on 1989 TEQ
"--": Not sampled ND: Not Detected

Table 10
Havertown PCP Superfund Site
Major Contaminants in Monitoring Wells 1990-2014

CW-16I Zac's Hamburgers Installed August 2004

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
2004 Sep	12	5.3	5.9	13	ND	0.77	5.2	160	ND	ND
2005 Mar	7.1	1.6	1.6	3.3	ND	1.5	ND	62	ND	--
2005 Aug	1.7	8.3	7	16	ND	3.5	ND	120	ND	ND
2006 Mar	--	1	1.3	2.3	ND	2.1	ND	59	ND	--
2006 Dec	--	ND	ND	ND	ND	2.0	ND	14	ND	ND
2007 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2008 Mar	--	ND	ND	ND	ND	ND	ND	5.2	ND	ND
2009 Mar	--	ND	ND	ND	ND	0.67	ND	2.2	ND	2.1

CW-16D Zac's Hamburgers Installed August 2004

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
2004 Sep	64	12	17	37	0.59	0.94	64	700	9.3	ND
2005 Mar	24	12	0.84	13	0.68	0.99	11	200	1.7	--
2005 Aug	13	3.8	0.15	4.12	0.46	2	2.2	120	ND	ND
2006 Mar	93	6.8	0.2	7.3	0.49	0.77	ND	190	2.1	--
2006 Dec	--	3.8	ND	3.8	ND	ND	ND	190	ND	ND
2007 Mar	18	6.1	ND	6.1	1.8	1.2	ND	80	ND	ND
2008 Mar	83	ND	ND	ND	ND	1.0	ND	160	ND	ND
2009 Mar	4.0	4.1	ND	4.1	ND	ND	ND	150	ND	5.7
2010 Mar	0.74	6.2	ND	6.2	ND	0.98	ND	110	ND	5.8
2011 Mar	1.05	1.0	ND	2.2	0.19	0.79	0.16	48	ND	ND
2012 Mar	--	0.65	ND	31	ND	0.57	ND	31	ND	ND
2013 Mar	--	ND	ND	ND	ND	ND	ND	33	ND	ND
2014 May [1]	0.62	0.36	ND	ND	ND	ND	ND	27	ND	ND

[1] March annual sampled 4/29/14 to 5/7/14

BTEX: Benzene + Toluene + Ethylbenzene + Total Xylenes
MTBE: Methyl tert-Butyl Ether
TCE: Trichloroethylene PCP: Pentachlorophenol
Total Dioxins based on 1989 TEQ
"--": Not sampled ND: Not Detected

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Table 10
Havertown PCP Superfund Site
Major Contaminants in Monitoring Wells 1990-2014

DUP-04 Field Duplicate of CW-16D

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
2014 May [1]	0.33	0.36	ND	ND	ND	ND	ND	32	ND	ND

[1] March annual sampled 4/29/14 to 5/7/14

CW-17D SW corner PCG near RW-3 Installed August 2004

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
2004 Sep	1.3	58	53	117	34	2.4	130	7100	3.8	ND
2005 Mar	1.3	76	66	147	21	2	300	4900	5.6	--
2005 Aug	8.4	75	59	139	15	3.1	260	3200	4.0	ND
2006 Mar	--	110	54	173	9.3	2.6	48	4100	4.8	--
2006 Sep	--	100	52	154	17	2.2	48	2200	ND	--
2006 Dec	--	110	51	165	12	2.8	24	6700	3.2	5.5
2007 Mar	--	100	33	138	8.1	2.9	11	3800	3.0	1.7
2008 Mar	--	55	10	65	20	1.8	11	5200	4.5	3.6
2008 Sep	--	--	--	--	--	--	4.2	3700	2.6	--
2009 Mar	--	51	5.8	60	4.3	ND	ND	2700	ND	7.8
2010 Mar	--	66	2.7	71	4.1	1.9	ND	2200	ND	5.8
2011 Mar	--	15	5.7	21.72 B*	7.7	ND	160	2500	5.5	ND
2012 Mar	--	9.2	1.8	11	5.0	0.66	110	2700	ND	ND
2013 Mar	--	9.4	ND	9.4	4.9	ND	24	1800	ND	ND
2014 May [1]	--	6.2	5.3	11.8	3.0	ND	100	3780	6.5	2.7

[1] March annual sampled 4/29/14 to 5/7/14

* Toluene = 0.86 B ug/L

BTEX: Benzene + Toluene + Ethylbenzene + Total Xylenes
MTBE: Methyl tert-Butyl Ether
TCE: Trichloroethylene PCP: Pentachlorophenol
Total Dioxins based on 1989 TEQ
"--": Not sampled ND: Not Detected

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Table 10
Havertown PCP Superfund Site
Major Contaminants in Monitoring Wells 1990-2014

CW-18D SE corner PCG near CW-5S Installed August 2004

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	30	5			5		3	1	41	10
2004 Sep	0.20	64	2.6	70	0.51	ND	ND	780	1.4	ND
2005 Mar	0.56	44	1.0	46	0.53	1.3	ND	460	ND	--
2005 Aug	3.9	19	ND	19	0.2	1.1	ND	190	ND	ND
2006 Mar	--	10	ND	10.11	0.13	0.6	ND	210	ND	--
2006 Sep	--	19	ND	19	ND	ND	ND	75	ND	--
2007 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2008 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2009 Mar	--	ND	ND	ND	ND	ND	ND	3.0	ND	2.0
2010 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2011 Mar	--	ND	ND	0.84 B	ND	ND	ND	0.30	ND	ND
2012 Mar	--	0.22	ND	17.2*	ND	ND	ND	10	ND	ND
2013 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2014 May [1]	--	ND	ND	ND	ND	ND	ND	53	ND	2.9

[1] March annual sampled 4/29/14 to 5/7/14

* Toluene

BTEX: Benzene + Toluene + Ethylbenzene + Total Xylenes
MTBE: Methyl tert-Butyl Ether
TCE: Trichloroethylene PCP: Pentachlorophenol
Total Dioxins based on 1989 TEQ
"--": Not sampled ND: Not Detected

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Table 10
Havertown PCP Superfund Site
Major Contaminants in Monitoring Wells 1990-2014

CW-19D rear PCG parking lot near CW-6D Installed August 2004

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
2004 Sep	0.48	5.9	49	73	52	16	ND	5000	2.4	ND
2005 Mar	0.92	8.0	43	72	46	13	1.5	3800	3.3	--
2005 Aug	2.8	6.6	47	73	41	10	ND	2300	2.3	ND
2006 Mar	--	6.9	47	73	45	8.1	ND	6900	3.4	--
2006 Jun	--	3.6	23	37	26	8.1	ND	2900	ND	--
2007 Mar	--	5.8	40	55	44	11	ND	4100	1.7	ND
2007 Jun	--	5.4	35	56	42	10	0.99	4400	3.1	--
2008 Mar	--	ND	40	48	42	8.7	ND	5000	3.4	ND
2009 Mar	--	3.5	26	40	24	10	ND	2700	3.1	ND
2009 Sep	--	5.1	26	42	30	7.7	1.7	5100	1.7	--
2010 Mar	--	7.7	41	64	42	9.1	ND	5100	ND	ND
2011 Mar	--	2.5	20	25	3.4	6.8	18	2400	2.7	ND
2012 Mar	--	1.4	15	19	1.5	3.2	1.3	1800	2.7	ND
2013 Mar	--	ND	6.9	6.9	ND	3.3	ND	1300	1.4	ND
2014 May [1]	--	0.33	7.3	8.8	0.65	1.6	1.2	1030	3.5	3.0

[1] March annual sampled 4/29/14 to 5/7/14

BTEX: Benzene + Toluene + Ethylbenzene + Total Xylenes
MTBE: Methyl tert-Butyl Ether
TCE: Trichloroethylene PCP: Pentachlorophenol
Total Dioxins based on 1989 TEQ
"--": Not sampled ND: Not Detected

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Table 10
Havertown PCP Superfund Site
Major Contaminants in Monitoring Wells 1990-2014

CW-20S Lawrence Road Installed August 2004

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
2004 Sep	10.6	ND	ND	0.97	ND	0.81	ND	13	3.8	ND
2005 Mar	4.9	ND	ND	1	ND	1.6	ND	12	2.6	--
2005 Sep	--	ND	ND	0.87	ND	1.3	ND	8.8	2.5	--
2006 Mar	2.9	ND	ND	0.77	0.12	1.5	ND	19	ND	--
2006 Jun	--	ND	ND	ND	ND	0.69	ND	3.9	ND	--
2006 Sep	--	ND	ND	0.58	ND	1.1	ND	6.4	1.3	--
2007 Mar	1.2	ND	ND	ND	ND	ND	ND	9.8	ND	ND
2007 Sep	--	ND	ND	ND	ND	0.94	ND	6.6	0.85	--
2008 Mar	--	ND	ND	ND	ND	ND	ND	16	ND	ND
2008 Sep	--	--	--	--	--	--	ND	5.7	ND	--
2009 Mar	--	ND	ND	ND	ND	ND	ND	8.2	ND	3.5
2009 Sep	--	ND	ND	0.35 *	ND	0.48	ND	18	ND	--
2010 Mar	--	ND	ND	ND	ND	ND	ND	11	ND	4.0
2011 Mar	--	ND	ND	ND	ND	0.56	ND ***	9.2 ***	ND ***	ND
2012 Mar	--	ND	ND	12 **	ND	0.31	ND	ND	ND	ND
2013 Mar	--	ND	ND	ND	ND	ND	ND	6.5	ND	ND
2014 May [1]	--	ND	ND	ND	ND	ND	0.41	5.0	ND	ND

[1] March annual sampled 4/29/14 to 5/7/14

* Ethylbenzene, ** Toluene *** CW-20S SVOCs were resampled on 4/19/11 due to out of range results received from the 3/21/11 sample.

BTEX: Benzene + Toluene + Ethylbenzene + Total Xylenes
MTBE: Methyl tert-Butyl Ether
TCE: Trichloroethylene PCP: Pentachlorophenol
Total Dioxins based on 1989 TEQ
"--": Not sampled ND: Not Detected

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Table 10
Havertown PCP Superfund Site
Major Contaminants in Monitoring Wells 1990-2014

CW-20D Lawrence Road Installed August 2004

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
2004 Sep	0.12	ND	ND	ND	ND	1.1	ND	3.1	ND	ND
2005 Mar	0.84	ND	ND	ND	ND	2	ND	1.7	ND	--
2005 Sep	--	ND	ND	ND	ND	1.7	ND	ND	ND	--
2006 Mar	--	ND	ND	ND	ND	2	ND	48	ND	--
2006 Jun	--	ND	ND	ND	ND	1.1	ND	ND	ND	--
2006 Sep	--	ND	ND	ND	ND	1.2	ND	1.0	ND	--
2007 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2007 Sep	--	ND	ND	ND	ND	0.70	ND	1.1	ND	--
2008 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2008 Sep	--	--	--	--	--	--	1.9	13	ND	--
2009 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2009 Sep	--	ND	ND	ND	ND	0.39	ND	0.61	ND	--
2010 Mar	--	ND	ND	ND	ND	ND	ND	0.66	ND	ND
2011 Mar	--	ND	ND	0.71	ND	0.48	0.45	2.2	ND	ND
2012 Mar	--	ND	ND	7.4 *	ND	0.42	ND	ND	ND	ND
2013 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2014 May [1]	--	ND	ND	ND	ND	ND	ND	ND	ND	ND

[1] March annual sampled 4/29/14 to 5/7/14

* Toluene

DUP-06 Field Duplicate of CW-20D

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
2014 May [1]	--	ND	ND	ND	ND	ND	ND	ND	ND	ND

[1] March annual sampled 4/29/14 to 5/7/14

BTEX: Benzene + Toluene + Ethylbenzene + Total Xylenes
MTBE: Methyl tert-Butyl Ether
TCE: Trichloroethylene PCP: Pentachlorophenol
Total Dioxins based on 1989 TEQ
"--": Not sampled ND: Not Detected

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Table 10
Havertown PCP Superfund Site
Major Contaminants in Monitoring Wells 1990-2014

CW-21S Rittenhouse Circle Installed April 2005

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
2005 Jun	2.5	20	18	44	18	5.9	ND	790	2.2	ND
2005 Aug	ND	23	14	42	16	6.1	ND	1500	2.6	ND
2005 Dec	--	17	13	34	12	ND	ND	1300	1.8	--
2006 Mar	--	19	10	32	14	4.9	ND	1400	ND	--
2006 Jun	--	13	11	27	20	13	ND	1400	ND	--
2006 Sep	--	24	8.9	36	21	8.3	0.6	1400	1.8	--
2006 Dec	--	21	6.3	27	17	5.9	ND	2100	ND	ND
2007 Mar	--	15	ND	15	11	4.1	ND	1700	0.83	ND
2007 Jun	--	14	4.0	20	13	5.4	ND	1600	ND	--
2007 Sep	--	15	4.0	21	15	5.4	ND	710	ND	--
2007 Dec	--	9.3	ND	11	7.2	3.0	ND	2000	ND	--
2008 Mar	--	17	2.3	21	16	4.2	ND	2900	ND	ND
2008 Jun	--	--	--	--	--	--	ND	2200	1.9	--
2008 Sep	--	--	--	--	--	--	ND	2200	1.1	--
2009 Mar	--	15	5.5	23	15	ND	ND	2400	1.2	ND
2009 Jun	--	9.5	1.7	13	9.2	3.1	ND	2300	ND	--
2009 Sep	--	12	4.6	19	15	3.7	0.8	2200	1.3	--
2009 Dec	--	9.8	ND	9.8	7.8	ND	ND	1100	ND	--
2010 Mar	--	11	3.6	17	11	3.5	ND	1300	1.5	ND
2010 Jun	--	8.8	3.2	13	13	2.8	1.0	1500	1.1	--
2010 Sep	--	8.8	3.7	14	14	4.8	ND	1900	1.1	--
2010 Dec	--	5.9	1.8	8.7	7.4	4.8	ND	1500	ND	--
2011 Mar	--	4.7	1.1	6.6	5.4	7.5	ND	770	0.41	ND
2011 Jun	--	ND	ND	ND	3.2	4.8	ND	410	ND	--
2011 Sep	--	2.7	0.46	3.4	2.5	3.2	0.24	690	0.23	--
2011 Dec	--	ND	3.1	3.1	3.0	ND	ND	350	ND	--
2012 Mar	--	3.4	0.8	4.7	1.8	1.7	ND	710	ND	ND
2012 Jun	--	4.1	ND	4.1	2.5	1.6	ND	990	ND	--
2012 Sep	--	3.5	0.8	4.9	2.1	2.7	0.31	1000	ND	--
2012 Dec	--	4.5	1.8	7.4	2.8	2.2	ND	1700	ND	--
2013 Mar	--	4.6	ND	4.6	2.8	1.7	ND	1300	ND	ND

BTEX: Benzene + Toluene + Ethylbenzene + Total Xylenes
MTBE: Methyl tert-Butyl Ether
TCE: Trichloroethylene PCP: Pentachlorophenol
Total Dioxins based on 1989 TEQ
"--": Not sampled ND: Not Detected

Table 10
Havertown PCP Superfund Site
Major Contaminants in Monitoring Wells 1990-2014

2013 Jun	--	3.6	0.8	12	2.4	1.3	ND	2000	ND	--
2013 Nov [1]	--	1.7	ND	2.4	1.6	2.1	ND	1340	ND	--
2014 Jan [2]	--	3.0	1.9	5.7	1.7	0.96	0.85	1370	ND	--
2014 May [3]	--	2.2	0.83	3.6	1.6	1.4	ND	833	ND	ND
2014 Jun	--	2.1	1.30	4.1	1.3	2.8	ND	985	ND	--
2014 Dec	--	2.1	ND	2.1	1.2	2.6	ND	883	ND	--

[1] September quarterly sampled 11/11/13 to 11/13/13

[2] December quarterly sampled 1/27/14 to 1/29/14

[3] March annual sampled 4/29/14 to 5/7/14

CW-21D Rittenhouse Circle Installed April 2005

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
2005 Jun	2.4	21	13	39	13	4.2	ND	1300	1.7	ND
2005 Aug	ND	28	12	44	12	5.2	ND	970	1.8	ND
2005 Dec	--	19	10	32	8.2	ND	ND	1100	1.9	--
2006 Mar	--	25	10	39	11	2.8	ND	1400	1.8	--
2006 Jun	--	27	11	42	13	4.0	ND	870	ND	--
2006 Sep	--	28	20	54	18	4.5	0.95	1100	2.4	--
2006 Dec	--	27	16	49	16	4.3	1.6	2100	2.3	ND
2007 Mar	--	16	9.4	28	9.6	3.7	ND	1900	2.2	ND
2007 Jun	--	17	9.9	31	11	3.4	ND	1100	1.8	--
2007 Sep	--	18	12	35	13	3.8	ND	1000	2.2	--
2007 Dec	--	14	8.7	27	9.6	2.7	ND	1800	2.3	--
2008 Mar	--	21	12	38	16	3.0	ND	2600	1.9	ND
2008 Jun	--	--	--	--	--	--	ND	2900	1.2	ND
2008 Sep	--	--	--	--	--	--	1.1	1800	1.2	--
2009 Mar	--	13	13	29	10	ND	ND	2300	1.4	ND
2009 Jun	--	10	8.3	21	7.5	2.5	ND	8500	2.6	--
2009 Sep	--	12	10.5	25	9.7	2.8	1.0	2000	1.5	--
2009 Dec	--	9.9	8.4	18	6.7	ND	ND	1300	ND	--
2010 Mar	--	13	13	29	11	3.0	ND	1500	ND	ND
2010 Jun	--	15	14	33	15	2.3	ND	1100	1.3	--
2010 Sep	--	9.3	11	24	10	3.4	--	1900	2	--

BTEX: Benzene + Toluene + Ethylbenzene + Total Xylenes
MTBE: Methyl tert-Butyl Ether
TCE: Trichloroethylene PCP: Pentachlorophenol
Total Dioxins based on 1989 TEQ
"--": Not sampled ND: Not Detected

Table 10
Havertown PCP Superfund Site
Major Contaminants in Monitoring Wells 1990-2014

2010 Dec	--	6.3	5.7	14	5.5	3.0	ND	1100	ND	--
2011 Mar	--	5.5	4.4	12	4.4	5.2	0.48	660	0.65	ND
2011 Jun	--	ND	ND	ND	2.2	3.4	ND	630	ND	--
2011 Sep	--	3.6	2.3	7.0	2.1	1.3	0.56	610	1.1	--
2011 Dec	--	ND	ND	ND	3.4	4.2	ND	370	ND	--
2012 Mar	--	3.5	1.8	6.7	1.7	0.61	ND	590	ND	ND
2012 Jun	--	3.6	ND	3.6	2	ND	ND	660*	ND	--
2012 Sep	--	3.5	2.2	6.6	1.8	0.5	0.29	780	ND	--
2012 Dec	--	5.4	6.3	14	2.8	1.0	0.58	1600	ND	--
2013 Mar	--	4.3	8.2	13	2.1	ND	ND	1300	2.5	ND
2013 Jun	--	4.5	4.9	10	2.7	0.71	ND	2100	3.2	--
2013 Nov [1]	--	2.0	5.0	7.6	1.5	0.65	ND	1360	ND	--
2014 Jan [2]	--	3.2	6.7	12	1.8	0.45	3.9	1070	2.4	--
2014 May [3]	--	2.4	4.1	7.9	1.4	0.75	ND	830	1.2	ND
2014 Jun	--	2.3	5.6	9.3	1.3	0.77	ND	759	1.0	--
2014 Dec	--	2.2	2.4	5.2	1.3	0.93 (J)	1.0 (J)	864	0.46 (J)	--

[1] September quarterly sampled 11/11/13 to 11/13/13

[2] December quarterly sampled 1/27/14 to 1/29/14

[3] March annual sampled 4/29/14 to 5/7/14

CW-21X Field Duplicate of CW-21D

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
2010 Sep	--	9.5	11	24	10	3	ND	2200	1.9	--
2011 Mar	--	5.2	4.4	11	4.2	5.4	0.43	720	0.57	ND
2012 Mar	--	3.5	1.8	6.6	1.9	0.68	ND	550	ND	--
2012 Jun	--	3.7	ND	3.7	1.9	ND	ND	600	ND	--
2012 Sep	--	3.4	2.2	6.4	1.8	0.57	0.32	930	ND	--
2012 Dec	--	5.3	6.0	13	2.6	1.0	1.1	1600	ND	--
2013 Mar	--	4.5	7.7	12	2.5	ND	ND	1800	2.5	--
2013 Jun	--	3.8	4.0	10	2.3	0.65	ND	2000	2.3	--
2014 Jun	--	2.2	5.7	9.3	1.3	0.77	ND	932	ND	--

BTEX: Benzene + Toluene + Ethylbenzene + Total Xylenes
MTBE: Methyl tert-Butyl Ether
TCE: Trichloroethylene PCP: Pentachlorophenol
Total Dioxins based on 1989 TEQ
"--": Not sampled ND: Not Detected

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Table 10
Havertown PCP Superfund Site
Major Contaminants in Monitoring Wells 1990-2014

CW-22S rear PCG R.O.W. Installed January 2005

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
2005 Mar	1.6	ND	ND	ND	0.13	0.59	ND	0.54	ND	ND
2005 Jun	--	ND	ND	ND	0.29	1.1	ND	ND	ND	ND
2005 Sep	--	ND	ND	ND	0.12	0.37	ND	ND	ND	--
2005 Dec	--	ND	ND	ND	ND	ND	ND	ND	ND	--
2006 Mar	--	ND	ND	ND	ND	0.61	ND	ND	ND	--
2006 Jun	--	ND	ND	ND	ND	ND	ND	ND	ND	--
2006 Sep	--	ND	ND	ND	ND	ND	ND	ND	ND	--
2006 Dec	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2007 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2007 Jun	--	ND	ND	ND	ND	0.64	ND	ND	ND	--
2007 Sep	--	ND	ND	ND	ND	0.62	ND	1.0	ND	--
2008 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2008 Jun	--	--	--	--	--	--	ND	ND	ND	--
2008 Sep	--	--	--	--	--	--	ND	ND	ND	--
2009 Mar	--	ND	ND	ND	ND	ND	ND	3.3	ND	ND
2009 Jun	--	ND	ND	ND	ND	0.46	ND	ND	ND	--
2009 Sep	--	ND	ND	ND	ND	0.55	ND	ND	ND	--
2009 Dec	--	ND	ND	ND	ND	ND	ND	35	ND	--
2010 Mar	--	ND	ND	ND	ND	0.54	ND	ND	ND	ND
2010 Jun	--	ND	ND	ND	ND	ND	ND	ND	ND	--
2010 Sep	--	ND	ND	ND	ND	ND	ND	1.5	ND	--
2010 Dec	--	ND	ND	ND	ND	0.69	ND	ND	ND	--
2011 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2011 Jun	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2011 Sep	--	ND	ND	ND	ND	ND	ND	0.28 B	ND	--
2011 Dec	--	ND	ND	ND	ND	ND	ND	16	ND	--
2012 Mar	--	ND	ND	ND	ND	0.71	ND	ND	ND	ND
2012 Jun	--	ND	ND	ND	ND	ND	ND	ND	ND	--
2012 Sep	--	ND	ND	ND	ND	0.45	ND	1.1	ND	--
2012 Dec	--	ND	ND	ND	ND	0.59	ND	ND	ND	--
2013 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND

BTEX: Benzene + Toluene + Ethylbenzene + Total Xylenes
MTBE: Methyl tert-Butyl Ether
TCE: Trichloroethylene PCP: Pentachlorophenol
Total Dioxins based on 1989 TEQ
"--": Not sampled ND: Not Detected

Revised 8/27/15

Table 10
Havertown PCP Superfund Site
Major Contaminants in Monitoring Wells 1990-2014

2013 Jun	--	ND	ND	ND	ND	0.69	ND	ND	ND	--
2013 Nov [1]	--	ND	ND	ND	ND	0.69	ND	ND	ND	--
2014 Jan [2]	--	ND	ND	ND	ND	0.57	ND	ND	ND	--
2014 May [3]	--	ND	ND	ND	ND	0.62	ND	ND	ND	3.0
2014 Jun	--	3.2	ND	3.5	ND	0.66	ND	ND	ND	--
2014 Sep	--	ND	ND	ND	ND	0.66	ND	ND	ND	--
2014 Dec	--	ND	ND	ND	ND	0.60	ND	ND	ND	--

[1] September quarterly sampled 11/11/13 to 11/13/13

[2] December quarterly sampled 1/27/14 to 1/29/14

[3] March annual sampled 4/29/14 to 5/7/14

CW-22D rear PCG R.O.W. Installed March 2005

RGO	30	5			5		3	1	41	10
Date	**Total Dioxins (pg/L)**	**Benzene (μg/L)**	**Total Xylenes (μg/L)**	**BTEX Total (μg/L)**	**TCE (μg/L)**	**MTBE (μg/L)**	**Naphthalene (μg/L)**	**PCP (μg/L)**	**Phenanthrene (μg/L)**	**Arsenic (μg/L)**
2005 Jun	0.09	0.075	ND	0.16	0.42	1.2	ND	ND	ND	ND
2005 Aug	ND	ND	ND	ND	1.5	1.3	ND	ND	ND	ND
2005 Dec	--	ND	ND	ND	1.6	ND	ND	ND	ND	--
2006 Mar	--	ND	ND	ND	0.18	1	ND	ND	ND	--
2006 Jun	--	ND	ND	ND	ND	0.86	ND	ND	ND	--
2006 Sep	--	ND	ND	ND	ND	ND	ND	ND	ND	--
2006 Dec	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2007 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2007 Jun	--	ND	ND	ND	ND	0.86	ND	0.54	ND	--
2008 Mar	--	ND	ND	ND	1.5	2.0	ND	ND	ND	ND
2008 Jun	--	--	--	--	--	--	ND	ND	ND	--
2009 Mar	--	ND	ND	ND	ND	ND	ND	5.3	ND	ND
2009 Jun	--	ND	ND	ND	0.41	1.1	ND	ND	ND	--
2009 Sep	--	ND	ND	ND	ND	0.94	ND	ND	ND	--
2009 Dec	--	ND	ND	ND	ND	ND	ND	11	ND	--
2010 Mar	--	ND	ND	ND	ND	0.75	ND	ND	ND	ND
2010 Jun	--	ND	ND	ND	ND	ND	ND	ND	ND	--
2010 Sep	--	ND	ND	ND	ND	1.8	ND	ND	ND	--
2010 Dec	--	ND	ND	ND	0.9	1.5	ND	ND	ND	--
2011 Mar	--	ND	ND	ND	0.15	1.1	ND	ND	ND	2.9

BTEX: Benzene + Toluene + Ethylbenzene + Total Xylenes
MTBE: Methyl tert-Butyl Ether
TCE: Trichloroethylene PCP: Pentachlorophenol
Total Dioxins based on 1989 TEQ
"--": Not sampled ND: Not Detected

Table 10
Havertown PCP Superfund Site
Major Contaminants in Monitoring Wells 1990-2014

2011 Jun	--	ND	ND	ND	ND	ND	ND	ND	ND	--
2011 Sep	--	ND	ND	ND	ND	0.88	ND	0.22 B	ND	--
2011 Dec	--	ND	ND	ND	ND	ND	ND	8.2	ND	--
2012 Mar	--	ND	ND	3.7 *	ND	0.77	ND	ND	ND	ND
2012 Jun	--	ND	ND	3	ND	1.1	ND	ND	ND	--
2012 Sep	--	ND	ND	0	0.34	0.94	ND	54	ND	--
2012 Dec	--	ND	ND	ND	0.32	1.3	ND	ND	ND	--
2013 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2013 Jun	--	ND	ND	ND	ND	0.55	ND	0.97	ND	--
2013 Nov [1]	--	ND	ND	ND	ND	1.1	ND	ND	ND	--
2014 Jan [2]	--	ND	ND	ND	ND	0.96	ND	ND	ND	--
2014 May [3]	--	ND	ND	ND	ND	0.76	ND	ND	ND	3.0
2014 Jun	--	ND	ND	ND	ND	0.86	ND	ND	ND	--
2014 Sep	--	ND	ND	ND	ND	0.89	ND	8.0 [4]	ND	--
2014 Dec	--	ND	ND	ND	ND	.82 (J)	ND	ND	ND	--

[1] September quarterly sampled 11/11/13 to 11/13/13

[2] December quarterly sampled 1/27/14 to 1/29/14

[3] March annual sampled 4/29/14 to 5/7/14

[4] 2014 Sep PCP - SVOC = ND / SVSIM = 8.0 µg/L

CW-22D DUP Field Duplicate of CW-22D

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
2014 Jan [1]	--	ND	ND	ND	ND	0.84	ND	ND	ND	--
2014 Dec	--	ND	ND	ND	ND	ND	ND	ND	ND	--

[1] December 2013 quarterly sampled 1/27/14 to 1/29/14

BTEX: Benzene + Toluene + Ethylbenzene + Total Xylenes
MTBE: Methyl tert-Butyl Ether
TCE: Trichloroethylene PCP: Pentachlorophenol
Total Dioxins based on 1989 TEQ
"--": Not sampled ND: Not Detected

Table 10
Havertown PCP Superfund Site
Major Contaminants in Monitoring Wells 1990-2014

CW-23D Zac's Hamburgers near R-4 Installed March 2005

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
2005 Jun	ND	ND	ND	ND	ND	6.1	ND	1.2	ND	2.0
2005 Aug	2.5	ND	ND	ND	ND	5.8	3.2	12	ND	ND
2006 Mar	--	ND	ND	ND	ND	2.2	ND	ND	ND	--
2006 Jun	--	ND	ND	ND	ND	1.6	ND	ND	ND	--
2006 Sep	--	ND	ND	ND	ND	1.2	ND	2.8	ND	--
2007 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2007 Sep	--	ND	ND	ND	ND	1.4	ND	79	ND	--
2008 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2008 Sep	--	--	--	--	--	--	2.0	2.8	ND	--
2009 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2009 Sep	--	ND	ND	ND	ND	0.81	ND	ND	ND	--
2010 Mar	--	ND	ND	ND	ND	0.81	ND	ND	ND	ND
2011 Mar	--	ND	ND	0.49 B	ND	0.66	1.8	1.0	ND	ND
2012 Mar	--	ND	ND	7.5*	ND	0.36	ND	ND	ND	ND
2013 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2014 May [1]	--	ND	ND	ND	ND	ND	ND	ND	ND	3.0

[1] March annual sampled 4/29/14 to 5/7/14

* Toluene

BTEX: Benzene + Toluene + Ethylbenzene + Total Xylenes
MTBE: Methyl tert-Butyl Ether
TCE: Trichloroethylene PCP: Pentachlorophenol
Total Dioxins based on 1989 TEQ
"--": Not sampled ND: Not Detected

Table 10
Havertown PCP Superfund Site
Major Contaminants in Monitoring Wells 1990-2014

CW-24D Zac's Hamburgers Installed March 2005

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
2005 Jun	11846	65	180	290	2.1	2.6	2000	5100	280	68
2005 Aug	8054	210	170	479	3.1	ND	4300	6000	370	44
2006 Mar	2487	490	270	1342	4.4	10	6600	27000	160	--
2006 Jun	--	310	217	876	3.6	5.6	2400	6900	73	--
2006 Dec	--	160	216	587	2.7	3.7	2000	6100	68	38
2007 Mar	87	340	400	1102	3.5	5.2	3100	7500	33	60
2008 Mar	209	270	340	805	2.3	4.9	2400	7100	31	64
2008 Sep	--	--	--	--	--	--	2300	7100	34	--
2009 Mar	256	140	189	443	0.94	ND	1200	7300	20	31
2010 Sep	1.1	75	193	337	ND	ND	1500	5600	14	17
2011 Sep	9.3	66	139	259	0.54	1.1	970	3900	16	5.4
2012 Mar	5.0	33	108	191	0.39	0.82	970	2700	20	ND
2013 Mar	6.2	46	116	203	ND	ND	1400	4000	33	ND
2014 May [1]	6.0	9.0	34	53	ND	ND	415	2230	28	11

[1] March annual sampled 4/29/14 to 5/7/14

CW-25D Swiss Farm exit lane Installed April 2005 (Online as RW-5 in February 2006)

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
2005 Jun	7.6	18	79	120	2.5	2.2	680	6700	7.2	--
2005 Aug	44	48	110	192	10	1.8	770	5000	11	--

BTEX: Benzene + Toluene + Ethylbenzene + Total Xylenes
MTBE: Methyl tert-Butyl Ether
TCE: Trichloroethylene PCP: Pentachlorophenol
Total Dioxins based on 1989 TEQ
"--": Not sampled ND: Not Detected

Revised 8/27/15

Table 10
Havertown PCP Superfund Site
Major Contaminants in Monitoring Wells 1990-2014

CW-26D Swiss Farm near RW-4 Installed April 2005

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
2005 Jun	641	5.7	33	50	5.9	2.4	220	5500	10	6.5
2005 Aug	500	18	52	91	14	5	460	6300	7.9	8.3
2006 Mar	387	11	75	112	27	6.2	520	6300	10	--
2006 Dec	--	4.6	87	116	13	4.1	860	6900	7.3	ND
2007 Mar	7.3	2.7	68	92	13	3.8	590	4100	13	11
2008 Mar	180	ND	74	88	11	3.5	660	6600	12	14
2008 Sep	--	--	--	--	--	--	640	6400	11	--
2009 Mar	1.2	1.2	46	57	6.8	2.8	350	6400	7.2	18
2010 Mar	285	2.1	42	52	6.1	2.2	220	4900	ND	11
2011 Mar	--	ND	2.4	3.78 B*	ND	0.41	19	88	1.1	6.2
2011 Dec	--	ND	26	32	2.8	ND	250	2500	ND	--
2012 Mar	--	0.75	28	51	3.9	0.88	310	2100	2.9	17
2012 Jun	--	ND	22	32	3.6	ND	360	3400	3.9	--
2012 Sep	--	0.94	16	20	2.0	ND	170	2800	4.0	--
2012 Dec	--	0.40	19	24	1.4	ND	220	2900	1.2	--
2013 Mar	--	ND	11	11	ND	ND	110	1300	ND	17
2013 Nov [1]	--	ND	6.5	7.0	1.3	ND	66	3260	3.5	--
2014 May [2]	--	28	21	57	4.8	0.58	5.9	3560	5.7	6.7

[1] September quarterly sampled 11/11/13 to 11/13/13

[2] March annual sampled 4/29/14 to 5/7/14

* Toluene = 1.1 B ug/L

BTEX: Benzene + Toluene + Ethylbenzene + Total Xylenes
MTBE: Methyl tert-Butyl Ether
TCE: Trichloroethylene PCP: Pentachlorophenol
Total Dioxins based on 1989 TEQ
"--": Not sampled ND: Not Detected

Revised 8/27/15

Table 10
Havertown PCP Superfund Site
Major Contaminants in Monitoring Wells 1990-2014

CW-27D Swiss Farm front Installed April 2005

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
2005 Jun	12	98	140	298	7.2	3.6	630	6200	9.1	49
2005 Aug	--	31	72	130	18	ND	600	4700	12	26
2006 Mar	--	12	66	96	17	4.1	720	6300	12	--
2006 Jul(1)	--	16	152	207	38	9.6	820	8800	15	--
2006 Jul(2)	--	11	143	196	51	12	640	7400	15	--
2006 Aug	--	2.5	56	76	16	2.9	460	4400	9.5	--
2006 Sep	--	4.4	131	157	23	4	930	4200	ND	--
2006 Dec	--	4.8	123	160	20	5.6	1600	11000	18	6.5
2007 Mar	--	3.3	111	146	18	4.9	900	5600	19	2.1
2008 Mar	--	ND	107	132	13	4.6	740	7100	12	6.0
2008 Sep	--	--	--	--	--	--	670	7300	15	--
2009 Mar	--	ND	33	41	4.6	2.0	520	7200	12	8.7
2010 Mar	--	2.7	97	117	9.6	1.9	930	12000	ND	9.7
2011 Mar	--	1.0	23	29	6.4	2.6	160	1500	6.8	11
2011 Dec	--	ND	67	82	5.1	ND	520	4800	13	--
2012 Mar	--	ND	20.4	534.3	ND	ND	180	2400	ND	ND
2012 Jun	--	ND	63	85	3.6	ND	660	6100	10	--
2012 Sep	--	ND	36	46	1.5	ND	400	3600	8.3	--
2012 Dec	--	0.41	48	60	1.5	ND	630	5200	14	--
2013 Mar	--	ND	56	69	ND	ND	680	4600	14	ND
2013 Nov [1]	--	ND	36	45	2.2	ND	188	3990	10.8	--
2014 May [2]	--	5.7	11	20	4.4	ND	3.6	1820	4.0	3.1

[1] September quarterly sampled 11/11/13 to 11/13/13

[2] March annual sampled 4/29/14 to 5/7/14

BTEX: Benzene + Toluene + Ethylbenzene + Total Xylenes
MTBE: Methyl tert-Butyl Ether
TCE: Trichloroethylene PCP: Pentachlorophenol
Total Dioxins based on 1989 TEQ
"--": Not sampled ND: Not Detected

Table 10
Havertown PCP Superfund Site
Major Contaminants in Monitoring Wells 1990-2014

CW-27X Field Duplicate of CW-27D Installed April 2005

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
2012 Dec	--	0.44	48	61	1.6	ND	630	5100	13	--
2013 Mar	--	ND	52	64	ND	ND	760	4400	20	ND
2013 Nov [1]	--	ND	36	45	2.3	ND	185	3490	10	--
2014 May [2]	--	5.1	12	21	4.5	0.35	4.7	1800	4.6	3.3

[1] September quarterly sampled 11/11/13 to 11/13/13

[2] March annual sampled 4/29/14 to 5/7/14

CW-28D Swiss Farm front Installed April 2005

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
2005 Jun	13	2.9	130	175	65	6.6	640	8700	19	7.4
2005 Aug	30	13	83	125	35	11	840	6500	13	7.7
2006 Mar	--	1.8	58	75	21	5	660	4600	9.8	--
2006 Dec	--	ND	44	52	9.5	5.1	790	8500	11	9.4
2007 Mar	--	2.2	96	123	9.3	5.0	750	8900	15	6.9
2008 Mar	--	ND	36	40	6.5	4.7	410	5800	6.7	2.7
2009 Mar	--	ND	1.5	2.4	ND	ND	170	4000	5.5	3.6
2010 Mar	--	ND	26	29	2.7	2.3	350	5100	ND	ND
2011 Mar	--	1.2	86	101	2.7	1.9	500	3000	9.6	8.8
2012 Mar	--	ND	33	103	1.2	ND	200	3000	6.1	ND
2013 Mar	--	ND	13	13	ND	ND	180	1800	5.0	ND
2014 May [1]	--	0.65	97	124	ND	ND	698	6830	9.3	ND

[1] March annual sampled 4/29/14 to 5/7/14

BTEX: Benzene + Toluene + Ethylbenzene + Total Xylenes
MTBE: Methyl tert-Butyl Ether
TCE: Trichloroethylene PCP: Pentachlorophenol
Total Dioxins based on 1989 TEQ
"--": Not sampled ND: Not Detected

Table 10
Havertown PCP Superfund Site
Major Contaminants in Monitoring Wells 1990-2014

CW-29D Cap area rear of Swiss Farm Installed April 2005 Test Injection well July 2006-Sept. 2007 Converted to Injection Well IW-4 in July 2011

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	30	5			5		3	1	41	10
2005 Jun	268	ND	21	29	34	4.2	120	3900	11	2
2005 Aug	126	ND	29	41	40	5	190	2700	10	7.3
2006 Mar	34	2.1	74	105	48	9.1	530	6500	11	--
2006 Dec	--	ND	43	59	12	5.4	310	4100	3.7	5.3
2007 Mar	3.0	ND	ND	ND	ND	ND	ND	4.9	ND	3.3
2007 Jun	--	ND	ND	ND	ND	0.65	ND	3.7	ND	--
2007 Dec	--	ND	29	38	9.9	6.1	130	2200	ND	--
2008 Mar	606	ND	70	93	17	7.5	530	7000	1.1	39
2009 Mar	0.89	ND	46	61	16	4.7	360	6100	4.1	10.4
2010 Sep	0.31	1.8	76	99	11	5.9	770	8600	6.6	8.3
2011 Jun	--	ND	51	67	4.5	2.8	ND	4200	ND	5.1

CW-30D Cap area rear of Swiss Farm Installed April 2005 Converted to Injection Well IW-5 in October 2011

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	30	5			5		3	1	41	10
2005 Jun	28	2.9	120	166	100	16	900	7200	15	3.7
2005 Aug	7.4	2.1	75	104	62	12	1100	6100	12	ND
2006 Mar	--	0.89	6	7.6	1.4	0.87	100	1100	2.4	--
2006 Jun	--	ND	1.8	1.8	ND	ND	53	620	ND	--
2006 Jul(2)	--	ND	3.2	3.2	ND	ND	77	1300	2.7	--
2006 Aug	--	ND	23	27	11	5.5	270	4700	ND	--
2006 Sep	--	ND	7.1	7.6	1.0	ND	80	660	ND	--
2006 Dec	--	ND	20	20	ND	2.1	480	8700	7	3.9
2007 Mar	--	ND	17	17	ND	ND	280	4200	7.4	2.4
2007 Jun	--	ND	37	42	3.9	6.8	380	6600	8.2	--
2008 Mar	--	ND	17	18	ND	2.0	200	4000	5.1	3.3
2009 Mar	--	ND	7.8	8.9	0.44	1.5	63	3600	2.7	8.8
2010 Mar	--	ND	20	21	ND	1.0	260	3300	ND	ND
2011 Mar	--	ND	15	16	0.40	1.9	190	2400	1.3	ND

BTEX: Benzene + Toluene + Ethylbenzene + Total Xylenes
MTBE: Methyl tert-Butyl Ether
TCE: Trichloroethylene PCP: Pentachlorophenol
Total Dioxins based on 1989 TEQ
"--": Not sampled ND: Not Detected

Table 10
Havertown PCP Superfund Site
Major Contaminants in Monitoring Wells 1990-2014

CW-31D PCG property, front loading dock — Installed October 2008 — CW-31D was converted to RW-7 in June 2010

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
2008 Oct	--	9.7	44	60	32	5.7	200	3500	5.4	--
2008 Dec	332	1.1	15	17	11	9.7	330	5800	ND	--
2009 Mar	0.13	ND	13	14	7.7	5.8	160	3700	4.1	4.7
2009 Jun	--	0.8	4.3	8.0	4.9	6.8	330	8200	ND	--
2009 Sep	--	1.2	8.5	13	7.5	6.3	180	4800	0.8	--
2009 Dec	--	ND	5.5	5.5	4.6	4.8	80	1800	ND	--
2010 Mar	--	1.2	7.7	11	7.1	6.0	61	3600	ND	ND

CW-32 ROS — Installed April 2010

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
2010 May	2.6	ND	ND	ND	ND	ND	ND	ND	ND	4.3
2010 Dec	0.0046	ND	ND	ND	ND	0.78	ND	1.2	ND	ND
2012 Mar	--	ND	0.14	0.14	ND	0.27	ND	ND	ND	ND
2012 Sep	--	ND	ND	ND	ND	0.48	ND	ND	ND	--
2012 Dec	--	ND	ND	ND	ND	0.57	ND	ND	ND	--
2013 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2013 Jun	--	ND	ND	ND	ND	ND	ND	ND	ND	--
2014 Jan [1]	--	ND	ND	ND	ND	ND	ND	ND	ND	--
2014 May [2]	--	ND	ND	ND	ND	ND	ND	ND	ND	3.0
2014 Jun	--	ND	ND	ND	ND	ND	ND	ND	ND	--
2014 Dec	--	ND	ND	ND	ND	ND	ND	ND	ND	--

[1] December quarterly sampled 1/27/14 to 1/29/14

[2] March annual sampled 4/29/14 to 5/7/14

BTEX: Benzene + Toluene + Ethylbenzene + Total Xylenes
MTBE: Methyl tert-Butyl Ether
TCE: Trichloroethylene PCP: Pentachlorophenol
Total Dioxins based on 1989 TEQ
"--": Not sampled ND: Not Detected

Revised 8/27/15

Table 10
Havertown PCP Superfund Site
Major Contaminants in Monitoring Wells 1990-2014

CW-33 ROS Installed April 2010

Date	Total Dioxins	Benzene	Total Xylenes	BTEX Total	TCE	MTBE	Naphthalene	PCP	Phenanthrene	Arsenic
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
2010 May	0.12	ND	ND	ND	ND	ND	ND	ND	ND	ND
2010 Dec	0.069	ND	ND	ND	ND	0.70	ND	0.31	ND	ND
2012 Mar	--	ND	0.20	0.20	ND	0.25	ND	ND	ND	ND
2012 Sep	--	ND	ND	ND	ND	ND	ND	ND	ND	--
2012 Dec	--	ND	ND	ND	ND	0.34	ND	ND	ND	--
2013 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2013 Jun	--	ND	ND	ND	ND	ND	ND	ND	ND	--
2014 Jan [1]	--	ND	ND	ND	ND	ND	ND	ND	ND	--
2014 May [2]	--	ND	ND	ND	ND	ND	ND	ND	ND	3.0
2014 Jun	--	ND	ND	ND	ND	ND	ND	ND	ND	--
2014 Dec	--	ND	ND	ND	ND	ND	ND	ND	ND	--

[1] December quarterly sampled 1/27/14 to 1/29/14

[2] March annual sampled 4/29/14 to 5/7/14

CW-34 ROS Installed April 2010

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
2010 May	0.41	ND	ND	ND	ND	ND	ND	ND	ND	ND
2010 Dec	0.087	ND	ND	ND	ND	0.33	ND	3.2	ND	2.5
2012 Mar	--	ND	0.34	0.34	ND	ND	ND	ND	ND	ND
2012 Sep	--	ND	ND	ND	ND	ND	ND	ND	ND	--
2012 Dec	--	ND	ND	ND	ND	ND	ND	ND	ND	--
2013 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2013 Jun	--	ND	ND	ND	ND	ND	ND	ND	ND	--
2014 Jan [1]	--	ND	ND	ND	ND	ND	ND	ND	ND	--
2014 May [2]	--	ND	ND	ND	ND	ND	ND	ND	ND	3.0
2014 Jun	--	ND	ND	ND	ND	ND	ND	ND	ND	--
2014 Dec	--	ND	ND	ND	ND	ND	ND	ND	ND	--

[1] December quarterly sampled 1/27/14 to 1/29/14

[2] March annual sampled 4/29/14 to 5/7/14

BTEX: Benzene + Toluene + Ethylbenzene + Total Xylenes
MTBE: Methyl tert-Butyl Ether
TCE: Trichloroethylene PCP: Pentachlorophenol
Total Dioxins based on 1989 TEQ
"--": Not sampled ND: Not Detected

Revised 8/27/15

Table 10
Havertown PCP Superfund Site
Major Contaminants in Monitoring Wells 1990-2014

HAV-02 PCG property, outside office entrance Abandoned August 2012

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
1990 Nov	23136	ND	240	240	ND	--	670	1900	80	8.0
2000 Dec	8795	4	230	289	22	32	3800	ND	ND	7.9
2003 Mar	449	ND	76	90	10	15	200	30000	ND	ND
2004 Mar	6621	5.6	73	93	19	7.6	760	14000	110	ND
2005 Mar	34	9.4	98	127	18	5.1	1700	23000	14	ND
2006 Mar	5.6	7.9	95	121	12	6.8	ND	11000	13	--
2006 Dec	--	3.1	139	167	18	8.2	410	12000	34	5.7
2007 Mar	508	ND	82	94	12	5.3	490	5700	15	4.4
2008 Mar	1072	ND	61	69	8.1	3.1	370	7800	10	1.6
2009 Mar	66	ND	45	51	3.7	ND	ND	6600	ND	4.7
2009 Sep *	--	ND	52	60	3.7	0.94	390	5800	5.0	--
2010 Mar	408	1.9	49	59	4.5	1.2	97	3700	ND	ND
2011 Mar	357	0.88	64	77	3.8	1.4	490	3700	14	9.1
2012 Mar	--	0.65	76	147	3.4	0.83	480	7800	ND	ND

* Resampled on November 5, 2009 for September 2009

BTEX: Benzene + Toluene + Ethylbenzene + Total Xylenes
MTBE: Methyl tert-Butyl Ether
TCE: Trichloroethylene PCP: Pentachlorophenol
Total Dioxins based on 1989 TEQ
"--": Not sampled ND: Not Detected

Table 10
Havertown PCP Superfund Site
Major Contaminants in Monitoring Wells 1990-2014

HAV-04 Rittenhouse Circle rear of house

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
1990 Nov	173739	230	1300	1530	ND		12000	63000	ND	ND
2003 Mar	14507	7	63	78	22	ND	ND	8700	ND	ND
2003 Sep	--	13	370	445	35	2.4	1900	17000	800	9.2
2004 Mar	23414	29	290	369	36	ND	1600	19000	340	21
2004 Sep	--	25	460	549	27	3.2	4100	27000	1500	ND
2005 Mar	3910	27	280	342	26	1.2	660	26000	40	ND
2006 Mar	DRY									
2007 Mar	11112	22	202	254	23	ND	72	6600	68	ND
2008 Mar	4616	26	237	299	21	1.4	460	11000	38	ND
2009 Mar	DRY									
2010 Jun	--	4.9	114	136	11	ND	ND	7800	ND	--
2011 Jun	--	ND	104	120	8.0	ND	ND	4900	15	--
2012 Mar	--	0.63	50	53	7.5	ND	ND	4000	ND	ND
2013 Mar	--	2.1	68	75	6.1	ND	39	2900	2.4	ND
2014 May [1]	--	1.0	47	52	3.9	ND	ND	3290	ND	3.0

[1] March annual sampled 4/29/14 to 5/7/14

BTEX: Benzene + Toluene + Ethylbenzene + Total Xylenes
MTBE: Methyl tert-Butyl Ether
TCE: Trichloroethylene PCP: Pentachlorophenol
Total Dioxins based on 1989 TEQ
"--": Not sampled ND: Not Detected

Table 10
Havertown PCP Superfund Site
Major Contaminants in Monitoring Wells 1990-2014

HAV-05 Rittenhouse Circle rear of house

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	30	5			5		3	1	41	10
1990 Nov	3599	68	1700	1768	ND	--	270	3300	32	ND
2001 Feb	60	49	69	158	7	10	16	760	2	8.8
2002 Oct	--	66	230	373	14	10	220	2300	16	6.1
2003 Sep	177	40	190	285	7.4	2.8	290	3100	ND	ND
2004 Mar	--	12	38	60	1.5	2	36	1700	2.7	ND
2004 Sep	180	20	85	135	2.0	1	130	1200	13	ND
2005 Mar	--	11	63	95	1.1	0.98	77	810	7.2	ND
2005 Jun	--	13	59	99	0.62	0.96	37	490	6.8	--
2005 Sep	--	19	38	85	1.3	0.57	35	1400	6.5	--
2005 Dec	--	8.9	21	53	0.37	0.65	ND	380	ND	--
2006 Mar	144	7.8	34	58	0.81	0.28	ND	800	ND	--
2006 Sep	--	26	137	210	11	ND	460	3700	11	--
2006 Dec	--	12	95	131	4.7	ND	320	3700	ND	ND
2007 Mar	41	7.0	70	100	2.8	ND	130 +	1000	7.7	ND
2007 Jun	--	19.0	114	163	9.8	1.1	280 +	3800	15	--
2008 Mar	917	11	83	116	6.3	ND	150 +	2600	5.5	ND
2008 Jun	--	--	--	--	--	--	240 +	3000	16	--
2009 Mar	227	7.9	85	116	4.6	ND	69	3500	1.9	5.3
2009 Jun	--	3.3	43	61	1.7	ND	180 +	2900	5.4	--
2009 Sep	--	2.2	40	60	1.4	ND	280	8100	3.9	--
2009 Dec	--	ND	16	26	ND	ND	37	340	5.0	--
2010 Mar	73	1.7	26	39	1.2	ND	37	550	9.0	ND
2010 Jun	--	7.1	48	74	2.3	ND	60	1100	4.3	--
2010 Dec	--	4.8	15	27	1.9	0.33	ND	1600	ND	--
2011 Mar	134	1.8	36	55	1.2	ND	68	660	2.9	ND
2011 Jun	--	ND	28	42	ND	ND	ND	270	ND	--
2011 Sep	--	11	48	81	1.5	ND	100 +	860	12	--
2011 Dec	--	ND	43	66	ND	ND	ND	360	ND	--
2012 Mar	24	16	79	124	5.9	0.54	170	3100	ND	ND
2012 Jun	--	11	94	131	6.8	ND	390	4600	7.3	--
2012 Sep	--	6.0	52	73	3.6	0.51	350	4500	9.2	--

BTEX: Benzene + Toluene + Ethylbenzene + Total Xylenes
MTBE: Methyl tert-Butyl Ether
TCE: Trichloroethylene PCP: Pentachlorophenol
Total Dioxins based on 1989 TEQ
"--": Not sampled ND: Not Detected

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Table 10
Havertown PCP Superfund Site
Major Contaminants in Monitoring Wells 1990-2014

2012 Dec	--	4.3	68	83	4.0	0.68	430	6000	9.5	--
2013 Mar	73	3.0	54	67	2.4	ND	390	3600	5.2	ND
2013 Jun	--	2.6	43	68	1.6	ND	52	3100	ND	--
2013 Nov [1]	--	15	104	149	5.2	0.35	501	5960	10	--
2014 Jan [2]	--	7.6	107	135	5.9	ND	435	4130	10	--
2014 May [3]	19	3.4	70	103	ND	ND	123	2020	1.9	3.0
2014 Jun	--	2.9	50	69	1.1	ND	0.7	1800	ND	--
2014 Dec	--	6.9	71	95	4.0	ND	280	3920	8.6	--

[1] September quarterly sampled 11/11/13 to 11/13/13

[2] December quarterly sampled 1/27/14 to 1/29/14

[3] March annual sampled 4/29/14 to 5/7/14

HAV-07 Rittenhouse Circle rear of house

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
1990 Nov	212	ND	ND	ND	1	--	ND	14	ND	2.7
2001 Nov	3.1	ND	0.10	0.30	0.20	--	ND	9.0	ND	--
2002 Feb	18	0.02	ND	0.22	0.08	--	ND	ND	ND	--
2002 May	6.0	ND	ND	0.06	ND	--	ND	ND	ND	--
2002 Aug	12	0.02	ND	0.22	0.40	--	--	--	--	--
2003 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2003 Jun	7.7	ND	0.25	ND	0.069	0.33	ND	ND	ND	ND
2003 Sep	--	ND	0.68	ND	0.097	0.25	ND	1.3	ND	ND
2003 Dec	10.5	ND	0.067	ND	0.048	0.15	ND	6.9	ND	ND
2004 Mar	--	ND	ND	ND	ND	0.11	ND	ND	ND	ND
2004 Jun	6.8	ND	ND	ND	0.12	0.39	ND	ND	ND	ND
2004 Sep	--	ND	ND	ND	0.19	0.58	ND	ND	ND	ND
2004 Dec	0.64	ND	ND	ND	ND	0.33	ND	ND	ND	ND
2005 Mar	--	ND	ND	ND	0.20	0.59	ND	2.0	ND	3.4
2005 Jun	--	ND	ND	ND	0.61	1.3	ND	1.8	ND	--
2005 Sep	--	ND	ND	ND	0.18	0.36	ND	ND	ND	--
2005 Dec	--	ND	ND	ND	ND	ND	ND	ND	ND	--
2006 Mar	--	ND	ND	ND	ND	0.67	ND	ND	ND	--
2006 Jun	--	ND	ND	ND	ND	0.48	ND	ND	ND	--

BTEX: Benzene + Toluene + Ethylbenzene + Total Xylenes
MTBE: Methyl tert-Butyl Ether
TCE: Trichloroethylene PCP: Pentachlorophenol
Total Dioxins based on 1989 TEQ
"--": Not sampled ND: Not Detected

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Table 10
Havertown PCP Superfund Site
Major Contaminants in Monitoring Wells 1990-2014

2006 Sep	--	ND	ND	ND	ND	0.59	ND	ND	ND	--
2006 Dec	--	ND	ND	ND	ND	ND	ND	ND	ND	3.9
2007 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	2.0
2007 Jun	--	ND	ND	ND	ND	ND	ND	1.3	ND	--
2007 Sep	--	ND	ND	ND	ND	0.55	ND	0.95	ND	--
2007 Dec	--	ND	ND	ND	ND	ND	ND	ND	ND	--
2008 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2008 Jun	--	--	--	--	--	--	ND	ND	ND	--
2008 Sep	--	--	--	--	--	--	ND	ND	ND	--
2009 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2009 Jun	--	ND	ND	ND	ND	0.31	ND	ND	ND	--
2009 Sep *	--	ND	ND	ND	ND	0.48	ND	0.28	ND	--
2009 Dec	--	ND	ND	ND	ND	ND	ND	ND	ND	--
2010 Mar	--	ND	ND	ND	ND	0.58	ND	ND	ND	ND
2010 Jun	--	ND	ND	ND	ND	ND	ND	ND	ND	--
2010 Sep	--	ND	ND	ND	ND	ND	ND	ND	ND	--
2010 Dec	--	ND	ND	ND	ND	0.54	ND	ND	ND	--
2011 Mar	--	ND	ND	0.2	ND	0.38	ND	0.18	ND	ND
2011 Jun	--	ND	ND	ND	ND	ND	ND	ND	ND	--
2011 Sep	--	ND	ND	ND	ND	ND	ND	ND	ND	--
2011 Dec	--	ND	ND	ND	ND	ND	ND	ND	ND	--
2012 Mar	--	ND	ND	ND	ND	0.28	ND	ND	ND	ND
2012 Jun	--	ND	ND	ND	ND	ND	ND	ND	ND	--
2012 Sep	--	ND	0.27	0.27	ND	ND	ND	0.48	ND	--
2012 Dec	--	ND	ND	ND	ND	ND	ND	0.59	ND	--
2013 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2013 Jun	--	ND	ND	ND	ND	ND	ND	ND	ND	--
2013 Nov [1]	--	ND	ND	ND	ND	0.33	ND	ND	ND	--
2014 Jan [2]	--	ND	ND	ND	ND	ND	ND	ND	ND	--
2014 Jun	--	ND	ND	ND	ND	ND	ND	ND	ND	--
2014 Dec	--	ND	ND	ND	ND	ND	ND	ND	ND	--

[1] September quarterly sampled 11/11/13 to 11/13/13

[2] December quarterly sampled 1/27/14 to 1/29/14

* Resampled on November 5, 2009 for September 2009

BTEX: Benzene + Toluene + Ethylbenzene + Total Xylenes
MTBE: Methyl tert-Butyl Ether
TCE: Trichloroethylene   PCP: Pentachlorophenol
Total Dioxins based on 1989 TEQ
"--": Not sampled   ND: Not Detected

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Table 10
Havertown PCP Superfund Site
Major Contaminants in Monitoring Wells 1990-2014

HAV-08 (Abandoned during Collection Trench construction)

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
1990 Nov	52	32	53	85	15	--	700	1900	9	ND

IW-1 west side Eagle Road formerly RW-1 converted to Injection Well in June 2010

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
2011 Mar	--	ND	0.31	0.98	ND	0.49	0.74	41	ND	ND
2011 Dec	--	ND	ND	ND	ND	ND	ND	130	ND	--
2012 Mar	--	ND	ND	130*	ND	ND	ND	430	ND	ND
2012 Jun	--	ND	ND	7.7	ND	ND	ND	210	ND	--
2012 Sep	--	ND	0.16	0.16	ND	ND	0.97	410	ND	--
2012 Dec	--	ND	ND	0.39	ND	ND	ND	190	ND	--
2013 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2013 Nov [1]	--	ND	0.39	0.39	ND	ND	ND	643	ND	--
2014 May [2]	19	ND	1.1	1.1	ND	ND	ND	358	ND	ND

[1] September quarterly sampled 11/11/13 to 11/13/13

[2] March annual sampled 4/29/14 to 5/7/14

* Toluene

BTEX: Benzene + Toluene + Ethylbenzene + Total Xylenes
MTBE: Methyl tert-Butyl Ether
TCE: Trichloroethylene PCP: Pentachlorophenol
Total Dioxins based on 1989 TEQ
"--": Not sampled ND: Not Detected

Table 10
Havertown PCP Superfund Site
Major Contaminants in Monitoring Wells 1990-2014

IW-2 west side Eagle Road at Swiss Farms formerly RW-2 converted to Injection Well in June 2010

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
2011 Mar	--	ND	ND	0.19	ND	0.71	0.2	5.6	0.23	2.7
2011 Dec	--	ND	42	52	1.7	ND	3.1	4000	ND	--
2012 Mar	--	ND	30.5	183.6	1.6	ND	21	2400	ND	ND
2012 Jun	--	ND	51	62	1.9	ND	130	6200	ND	--
2012 Sep	--	ND	25	29	1.2	ND	0.5	5200	ND	--
2012 Dec	--	0.41	21	27	1.4	ND	100	5500	ND	--
2013 Mar	--	ND	ND	ND	ND	ND	ND	4800	ND	ND
2013 Nov [1]	--	ND	78	96	ND	ND	877	10200	7.4	--
2014 May [2]	19	0.6	74	81.7	ND	ND	ND	4750	ND	ND

[1] September quarterly sampled 11/11/13 to 11/13/13

[2] March annual sampled 4/29/14 to 5/7/14

IW-3 west side Eagle Road at Swiss Farms formerly RW-4 converted to Injection Well in June 2010

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
2011 Mar	--	ND	ND	0.94 B	ND	0.49	ND	2.5	ND	4.5
2011 Dec	--	ND	ND	ND	ND	ND	ND	510	ND	--
2012 Mar	--	ND	3.4	12	2.8	0.40	ND	1700	ND	ND
2012 Jun	--	ND	4.9	5	2.8	ND	ND	3100	ND	--
2012 Sep	DRY									
2012 Dec	DRY									
2013 Mar	DRY									
2013 Nov [1]	DRY									
2014 May [2]	--	2.3	1.2	3.9	1.9	ND	ND	980	ND	ND

[1] September quarterly sampled 11/11/13 to 11/13/13

[2] March annual sampled 4/29/14 to 5/7/14

BTEX: Benzene + Toluene + Ethylbenzene + Total Xylenes
MTBE: Methyl tert-Butyl Ether
TCE: Trichloroethylene PCP: Pentachlorophenol
Total Dioxins based on 1989 TEQ
"--": Not sampled ND: Not Detected

Table 10
Havertown PCP Superfund Site
Major Contaminants in Monitoring Wells 1990-2014

IW-4 Cap area rear of Swiss Farm Formerly CW-29D - Installed April 2005 Converted to Injection Well IW-4 in July 2011

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
2011 Dec	--	ND	8.7	10.1	1.6	ND	24	430	ND	--
2012 Mar	1.8	ND	ND	43*	ND	ND	ND	73	ND	ND
2012 Jun	--	ND	ND	ND	ND	ND	ND	ND	ND	--
2012 Sep	--	ND	2.5	2.7	0.24	ND	1.2	450	ND	--
2012 Dec	--	ND	ND	0.77	ND	ND	ND	250	ND	--
2013 Mar	0.87	ND	ND	ND	ND	ND	ND	2.9	ND	ND
2013 Nov [1]	--	ND	ND	ND	ND	ND	ND	112	ND	--
2014 May [2]	0.25	ND	ND	ND	ND	ND	ND	11	ND	ND

[1] September quarterly sampled 11/11/13 to 11/13/13

[2] March annual sampled 4/29/14 to 5/7/14

* Toluene

IW-5 Cap area rear of Swiss Farm Formerly CW-30D - Installed April 2005 Converted to Injection Well IW-5 in October 2011

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
2011 Dec	--	ND	22	22	ND	2.3	140	2800	ND	--
2012 Mar		ND	ND	22	ND	ND	ND	ND	ND	ND
2012 Jun	--	ND	ND	ND	ND	ND	ND	46	ND	--
2012 Sep	--	ND	ND	ND	ND	ND	1.5	380	ND	--
2012 Dec	--	ND	ND	0.44	ND	ND	ND	250	ND	--
2013 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2013 Nov [1]	--	ND	ND	ND	ND	ND	ND	3.5	ND	--
2014 May [2]	--	ND	ND	ND	ND	ND	ND	33	ND	ND

[1] September quarterly sampled 11/11/13 to 11/13/13

[2] March annual sampled 4/29/14 to 5/7/14

BTEX: Benzene + Toluene + Ethylbenzene + Total Xylenes
MTBE: Methyl tert-Butyl Ether
TCE: Trichloroethylene PCP: Pentachlorophenol
Total Dioxins based on 1989 TEQ
"--": Not sampled ND: Not Detected

Revised 8/27/15

Table 10
Havertown PCP Superfund Site
Major Contaminants in Monitoring Wells 1990-2014

IW-5 DUP Field Dupicate of IW-5

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
2013 Nov [1]	--	ND	ND	ND	ND	ND	ND	3.8	ND	--

[1] September quarterly sampled 11/11/13 to 11/13/13

MW-1 Collection Trench

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
2000 Dec	3.3	1	ND	3	2	2	ND	ND	ND	6.5
2003 Sep	90	4.7	0.07	4.7	5.6	1.6	ND	430	ND	ND
2003 Dec	--	1.5	0.3	1.5	1.7	1.4	ND	130	ND	ND
2004 Mar	3.6	9.8	ND	9.8	7.7	2.1	ND	770	ND	ND
2004 Jun	--	8.1	ND	8.1	5.5	1.6	ND	580	ND	ND
2004 Sep	8.9	6.8	ND	6.8	5.0	2.7	ND	400	ND	ND
2004 Dec	--	6.5	ND	6.5	4.4	2	ND	390	ND	ND
2005 Mar	--	5.4	ND	5.4	3.5	1.2	ND	300	ND	3.1
2005 Jun	--	19	ND	19	9.2	3.4	ND	410	ND	--
2005 Sep	--	10	ND	10	4.6	0.66	ND	850	ND	--
2005 Dec	--	4.0	ND	4	1.8	1.0	ND	330	ND	--
2006 Mar	--	4.3	ND	4.3	1.6	0.64	ND	430	ND	--
2006 Jun	--	0.3	ND	0.32	0.3	1.0	ND	100	ND	--
2006 Sep	--	ND	ND	ND	ND	0.74	ND	21	ND	--
2006 Dec	--	ND	ND	ND	ND	ND	ND	61	ND	ND
2007 Mar	--	ND	ND	ND	ND	ND	ND	13	ND	ND
2007 Jun	--	ND	ND	ND	0.3	ND	0.21	21	ND	--
2007 Sep	--	ND	ND	ND	ND	0.6	ND	9.2	ND	--
2007 Dec	--	ND	ND	ND	ND	ND	ND	20	ND	--
2008 Mar	--	ND	ND	ND	ND	ND	ND	9.5	ND	ND
2008 Jun	--	--	--	--	--	--	ND	21	ND	--
2008 Sep	--	--	--	--	--	--	ND	10	ND	--
2009 Mar	--	ND	ND	ND	ND	ND	ND	37	ND	ND
2009 Jun	--	ND	ND	ND	ND	ND	ND	18	ND	--

BTEX: Benzene + Toluene + Ethylbenzene + Total Xylenes
MTBE: Methyl tert-Butyl Ether
TCE: Trichloroethylene PCP: Pentachlorophenol
Total Dioxins based on 1989 TEQ
"--": Not sampled ND: Not Detected

Table 10
Havertown PCP Superfund Site
Major Contaminants in Monitoring Wells 1990-2014

2009 Sep	--	0.91	ND	0.91	0.94	0.58	ND	43	ND	--
2009 Dec	--	ND	ND	ND	ND	ND	ND	ND	ND	--
2010 Mar	--	ND	ND	ND	ND	ND	ND	9.9	ND	ND
2010 Jun	--	ND	ND	ND	ND	ND	ND	ND	ND	--
2010 Dec	--	ND	ND	ND	0.80	0.55	ND	61	ND	--
2011 Mar	--	ND	ND	ND	0.48	0.65	4.2	2.6	ND	ND
2011 Jun	--	ND	ND	ND	ND	ND	ND	5.0	ND	ND
2011 Sep	--	ND	ND	ND	ND	ND	ND	27	ND	--
2011 Dec	--	ND	ND	ND	ND	ND	ND	8.1	ND	--
2012 Mar	--	0.09	ND	0.09	0.32	0.19	ND	ND	ND	ND
2012 Jun	--	ND	ND	ND	ND	ND	ND	18	ND	--
2012 Sep	--	ND	ND	ND	0.21	ND	ND	81	ND	--
2012 Dec	--	ND	ND	ND	0.24	ND	ND	19	ND	--
2013 Mar	--	ND	ND	ND	ND	ND	ND	2.4	ND	ND
2013 Jun	--	ND	ND	ND	ND	ND	ND	ND	ND	--
2013 Nov [1]	--	ND	ND	ND	ND	ND	ND	11	ND	--
2014 Jan [2]	--	ND	ND	ND	ND	ND	ND	3.4	ND	--
2014 May [3]	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2014 Jun	--	ND	ND	ND	ND	ND	ND	ND	ND	--
2014 Sep	--	ND	ND	ND	ND	ND	ND	3.3 [4]	ND	--
2014 Dec	--	ND	ND	ND	ND	ND	ND	ND	ND	--

[1] September quarterly sampled 11/11/13 to 11/13/13

[2] December quarterly sampled 1/27/14 to 1/29/14

[3] March annual sampled 4/29/14 to 5/7/14

[4] 2014 Sep PCP - SVOC = 2.3 (J) µg/L & SVSIM = 3.3 µg/L

BTEX: Benzene + Toluene + Ethylbenzene + Total Xylenes
MTBE: Methyl tert-Butyl Ether
TCE: Trichloroethylene PCP: Pentachlorophenol
Total Dioxins based on 1989 TEQ
"--": Not sampled ND: Not Detected

Table 10
Havertown PCP Superfund Site
Major Contaminants in Monitoring Wells 1990-2014

MW-2 Rittenhouse Circle rear of house

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
2000 Dec	21	ND	ND	19	ND	ND	ND	130	ND	1.7
2003 Sep	5.0	0.21	0.27	0.21	0.51	1.3	ND	2.0	ND	7.9
2003 Dec	--	ND	0.33	ND	0.11	0.21	ND	ND	ND	ND
2004 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2004 Jun	12	1.7	2.1	28	1.3	2	ND	30	ND	ND
2004 Sep	--	0.24	0.10	0.58	0.42	1.2	ND	ND	ND	ND
2004 Dec	2.7	1.8	1.7	10	1.4	1.8	ND	59	ND	3.5
2005 Mar	--	1.2	3.9	19	1.6	0.79	ND	140	ND	3.1
2005 Jun	--	1.4	0.35	2.8	1.1	4.0	ND	7.3	ND	--
2005 Sep	--	0.3	0.79	1.5	0.23	0.66	ND	5.1	ND	--
2005 Dec	--	ND	ND	ND	ND	ND	ND	ND	ND	--
2006 Mar	--	ND	ND	ND	0.22	0.24	ND	ND	ND	--
2006 Jun	--	ND	ND	ND	ND	0.27	ND	ND	ND	--
2006 Sep	--	ND	ND	ND	ND	ND	ND	ND	ND	--
2006 Dec	--	ND	ND	ND	ND	ND	ND	ND	ND	3.7
2007 Mar	--	ND	ND	ND	ND	ND	ND	43	ND	ND
2007 Jun	--	ND	ND	0.5	0.92	0.77	ND	41	ND	--
2007 Sep	--	ND	ND	ND	ND	0.68	ND	1.7	ND	--
2007 Dec	--	ND	ND	ND	ND	ND	ND	3.1	ND	--
2008 Mar	--	ND	ND	ND	ND	ND	ND	38	ND	ND
2008 Jun	--	--	--	--	--	--	ND	ND	ND	--
2008 Sep	--	--	--	--	--	--	ND	5.6	ND	--
2009 Mar	--	ND	2.9	5.0	1.6	ND	ND	1100 +	ND	2.4
2009 Jun	--	ND	ND	ND	ND	0.66	ND	400	ND	--
2009 Sep	--	ND	ND	0.17 *	0.35	0.47	3.7	3.6	ND	--
2009 Dec	--	ND	ND	ND	ND	ND	ND	ND	ND	--
2010 Mar	--	ND	ND	ND	ND	ND	ND	19	ND	3.3
2010 Jun	--	ND	ND	ND	ND	ND	ND	ND	ND	--
2011 Mar	--	ND	ND	0.2	ND	ND	ND	0.5	ND	ND
2011 Jun	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2011 Sep	--	ND	ND	ND	ND	ND	ND	2.9	ND	--

BTEX: Benzene + Toluene + Ethylbenzene + Total Xylenes
MTBE: Methyl tert-Butyl Ether
TCE: Trichloroethylene PCP: Pentachlorophenol
Total Dioxins based on 1989 TEQ
"--": Not sampled ND: Not Detected

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Table 10
Havertown PCP Superfund Site
Major Contaminants in Monitoring Wells 1990-2014

2011 Dec	--	ND	ND	ND	ND	ND	ND	3.7	ND	--
2012 Mar	--	ND	ND	ND	0.22	ND	ND	12	ND	ND
2012 Jun	--	ND	ND	ND	ND	ND	ND	ND	ND	--
2012 Sep	--	ND	ND	ND	ND	ND	ND	0.73	ND	--
2012 Dec	--	ND	ND	ND	ND	ND	ND	1.3	ND	--
2013 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2013 Jun	--	ND	ND	ND	ND	ND	ND	ND	ND	--
2013 Nov [1]	--	ND	ND	0.98	ND	ND	ND	ND	ND	--
2014 Jan [2]	--	ND	ND	ND	ND	ND	ND	ND	ND	--
2014 May [3]	--	ND	ND	ND	ND	ND	ND	4.3	ND	ND
2014 Jun	--	ND	ND	ND	ND	ND	ND	ND	ND	--
2014 Sep	--	ND	ND	ND	ND	ND	ND	1.7 [4]	ND	--
2014 Dec	--	ND	ND	ND	ND	ND	ND	ND	ND	--

[1] September quarterly sampled 11/11/13 to 11/13/13

[2] December quarterly sampled 1/27/14 to 1/29/14

[3] March annual sampled 4/29/14 to 5/7/14

[4] 2014 Sep PCP - SVOC = ND & SVSIM = 1.7 µg/L

MW-3 PCG behind rear parking lot Converted May 2005 (Formerly EW-2)

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
2005 Jun	0.40	4.9	24	53	25	16	1.4	5300	3.7	--
2005 Aug	ND	3.9	44	68	39	11	1.1	4000	3.6	--
2006 Mar	--	4.3	42	67	33	9.5	ND	5100	3.4	--
2007 Mar	--	3.9	36	57	32	13	1.5	2900	4.6	ND
2008 Mar	--	ND	31	47	32	9.3	1.0	3600	3.1	ND
2009 Mar	--	6.0	43	66	43	10	1.2	2500	2.8	2.9
2010 Mar	--	5.3	33	54	35	9.9	ND	3400	ND	ND
2011 Mar	--	2.1	29	52	5.9	6.0	ND	1500	ND	ND
2012 Mar	--	1.8	9.0	16.8	3.6	3.5	ND	900	ND	ND
2013 Mar	--	1.8	3.8	5.6	ND	3.6	ND	920	ND	ND
2014 May [1]	--	0.78	2.5	4.6	1.2	1.7	ND	1040	ND	3.0

[1] March annual sampled 4/29/14 to 5/7/14

BTEX: Benzene + Toluene + Ethylbenzene + Total Xylenes
MTBE: Methyl tert-Butyl Ether
TCE: Trichloroethylene PCP: Pentachlorophenol
Total Dioxins based on 1989 TEQ
"--": Not sampled ND: Not Detected

Table 10
Havertown PCP Superfund Site
Major Contaminants in Monitoring Wells 1990-2014

NW-1-81 Along Eagle Road near GWTP

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
1990 Nov	9976	ND	ND	ND	ND	--	1500	ND	1000	ND
2000 Dec	5550	ND	ND	ND	ND	ND	10	22	110	4.6
2003 Mar	510	2	ND	2	ND	ND	ND	1	ND	ND
2004 Mar	896	2.2	ND	2.2	ND	ND	ND	9.7	2.1	ND
2005 Mar	225	1.9	ND	1.9	ND	0.19	ND	4.1	ND	ND
2006 Mar	1184	5.2	ND	5.3	ND	ND	ND	3.1	ND	--
2006 Sep	--	ND	ND	ND	ND	ND	ND	ND	ND	--
2007 Mar	1484	ND	ND	ND	ND	ND	ND	23	ND	ND
2007 Sep	--	ND	ND	ND	ND	ND	ND	12	ND	--
2008 Mar	6925	ND	ND	ND	ND	ND	ND	21	ND	ND
2009 Mar	395	ND	ND	ND	ND	ND	ND	16	ND	ND
2010 Mar	100	ND	ND	ND	ND	ND	ND	2.6	ND	ND
2011 Mar	87	ND	ND	ND	ND	ND	0.50	9.3	ND	3.4
2012 Mar	53	ND	ND	ND	ND	ND	ND	ND	ND	ND
2013 Mar	106	ND	ND	ND	ND	ND	ND	9.8	ND	ND
2014 May [1]	25	ND	ND	ND	ND	ND	ND	ND	ND	3.0

[1] March annual sampled 4/29/14 to 5/7/14

NW-1X Field Duplicate of NW-01

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
2013 Mar	103	ND	ND	ND	ND	ND	ND	5.0	ND	ND

NW-3-81 (Abandoned - Formerly in Capped area)

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
1990 Nov	32	ND	3	3	ND	--	25	ND	180	ND

BTEX: Benzene + Toluene + Ethylbenzene + Total Xylenes
MTBE: Methyl tert-Butyl Ether
TCE: Trichloroethylene PCP: Pentachlorophenol
Total Dioxins based on 1989 TEQ
"--": Not sampled ND: Not Detected

Revised 8/27/15

Table 10
Havertown PCP Superfund Site
Major Contaminants in Monitoring Wells 1990-2014

NW-6-81 Continental Auto Parts off Lawrence Road

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
1990 Nov	0.008	1	2	3	5	--	ND	2800	ND	14
2000 Dec	213	ND	ND	ND	ND	35	ND	1900	ND	22
2003 Mar	--	ND	ND	ND	ND	37	ND	1100	ND	ND
2004 Mar	3.0	0.2	1.1	1.56	0.68	4.3	ND	2700	ND	ND
2005 Mar	4.6	0.21	0.78	1.17	0.67	1.5	ND	2200	ND	--
2006 Mar	--	0.37	0.4	1.03	0.44	9.8	ND	990	ND	--
2007 Mar	--	ND	ND	ND	ND	2.1	3.9	1100	ND	7.2
2007 Sep	--	0.73	ND	0.73	ND	2.4	ND	770	ND	--
2008 Mar	119	ND	ND	ND	ND	1.6	ND	1300	ND	ND
2008 Sep	--	--	--	--	--	--	0.56	670	ND	--
2009 Mar	255	ND	ND	ND	ND	ND	ND	580	ND	15
2010 Mar	37	0.51	ND	ND	ND	ND	3.0	1200	ND	7.6
2011 Mar	0.52	ND	ND	ND	0.14	ND	0.26	1100	ND	5.9
2012 Mar	--	0.16	1.18	1.52	0.46	0.13	ND	1600	ND	22
2012 Oct	--	ND	ND	ND	ND	ND	ND	780	ND	--
2013 Mar	--	ND	ND	ND	ND	ND	ND	520	ND	5.7
2014 May [1]	0.42	ND	ND	ND	ND	ND	0.38	891	ND	ND

[1] March annual sampled 4/29/14 to 5/7/14

BTEX: Benzene + Toluene + Ethylbenzene + Total Xylenes
MTBE: Methyl tert-Butyl Ether
TCE: Trichloroethylene PCP: Pentachlorophenol
Total Dioxins based on 1989 TEQ
"--": Not sampled ND: Not Detected

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Table 10
Havertown PCP Superfund Site
Major Contaminants in Monitoring Wells 1990-2014

RW-1 west side Eagle Road Recovery Well Converted to Injection Well IW-1 in June 2010

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
2003 Jun	192	1.6	49	61	15	10	470	4300	2.7	14
2003 Sep	--	1.1	50	60	7.9	9.8	490	4600	ND	12
2003 Dec	272	50	170	257	33	7.3	1400	7300	330	31
2004 Feb	478	--	--	--	--	--	--	--	--	ND
2004 Mar	--	1.6	61	73	12	7.8	380	4500	ND	ND
2004 Jun	18	0.70	37	44	3.6	8.9	140	4900	9.8	ND
2004 Sep	--	0.5	32	34	0.33	1.3	340	4900	15	4.3
2004 Dec	74	0.48	38	45	3.7	3.7	480	5000	10	--
2005 Mar	--	1.1	61	76	21	7.6	580	5300	13	--
2007 Mar	--	ND	50	54	ND	ND	0.88	2700	1.0	2.6
2008 Mar	--	ND	85	93	ND	ND	450	4700	2.2	ND
2009 Mar	--	ND	30	34	ND	ND	53	3200	ND	6.2
2010 Mar	--	ND	23.9	26	ND	ND	53	4200	ND	ND

RW-2 west side Eagle Road at Swiss Farms Recovery Well Converted to Injection Well IW-2 in June 2010

Date	Total Dioxins	Benzene	Total Xylenes	BTEX Total	TCE	MTBE	Naphthalene	PCP	Phenanthrene	Arsenic
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
2003 Jun	90	3.1	140	181	38	6.4	1400	10000	4.9	13
2003 Sep	--	3.9	340	442	56	11	16000	29000	7000	9
2003 Dec	121	0.95	19	27	6.0	0.42	8700	20	3800	ND
2004 Feb	112346	--	--	--	--	--	--	--	--	ND
2004 Mar	--	3.3	200	264	81	11	260	8500	39	ND
2004 Jun	1500	3.5	180	242	63	8.5	1200	11000	35	8.9
2004 Sep	--	3.7	210	268	70	17	120	15000	1700	--
2004 Dec	236	2.4	150	198	42	9.3	1500	19000	24	--
2005 Mar	--	5.5	170	216	97	8	700	15000	89	--
2007 Mar	--	ND	173	219	21	ND	1000	7600	31	10.0
2008 Mar	--	1.8	192	234	17	2.6	1300	9400	120	8.3
2009 Mar	--	ND	110	134	11	3.4	480	6800	20	7.7
2010 Mar	--	ND	99	110	6.7	ND	220	3700	ND	13

BTEX: Benzene + Toluene + Ethylbenzene + Total Xylenes
MTBE: Methyl tert-Butyl Ether
TCE: Trichloroethylene PCP: Pentachlorophenol
Total Dioxins based on 1989 TEQ
"--": Not sampled ND: Not Detected

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Table 10
Havertown PCP Superfund Site
Major Contaminants in Monitoring Wells 1990-2014

RW-3 east side Eagle Road, PCG property Recovery Well

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
2003 Sep	218	4.4	150	190	42	13	880	6800	14	ND
2003 Dec	--	1.2	18	23	6.4	1.4	910	8400	17	ND
2004 Mar	4	13	130	162	46	9.8	720	7500	ND	ND
2004 Jun	--	12	110	139	31	11	790	8400	10	ND
2004 Sep	60	6.2	100	121	26	10	1200	9300	22	7.8
2004 Dec	--	45	55	116	10	2.2	1900	15000	2300	3.6
2005 Mar	--	21	140	182	43	6.2	ND	5200	22	--
2007 Mar	--	ND	82	98	14	5.0	170	5700	8.1	2.9
2008 Mar	16050	ND	68	79	8.4	3.3	220	9400	29	ND
2009 Mar	244	ND	61	71	4.7	1.6	ND	6000	10	5.7
2010 Mar	--	0.61	41	46	1.9	0.6	ND	4900	ND	4.3
2011 Mar	--	0.86	65	79	3.3	1.5	580	4300	21	7.6
2012 Mar	--	0.80	79	104	3.4	0.9	420	5000	ND	ND
2013 Mar	--	ND	68	76	ND	ND	630	3800	15	ND
2014 May [1]	--	0.61	95	118	1.8	ND	627	8620	11	ND

[1] March annual sampled 4/29/14 to 5/7/14

BTEX: Benzene + Toluene + Ethylbenzene + Total Xylenes
MTBE: Methyl tert-Butyl Ether
TCE: Trichloroethylene PCP: Pentachlorophenol
Total Dioxins based on 1989 TEQ
"--": Not sampled ND: Not Detected

Revised 8/27/15

Table 10
Havertown PCP Superfund Site
Major Contaminants in Monitoring Wells 1990-2014

RW-4 west side Eagle Road, Former Young's Produce Recovery Well Converted to Injection Well IW-3 in June 2010

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	30	5			5		3	1	41	10
2003 Sep	31	33	33	78	18	1.7	78	7200	ND	ND
2003 Dec	--	16	21	42	4.0	0.5	230	6000	11	48
2004 Mar	1628	1.7	39	50	24	1.5	290	12000	ND	44
2004 Jun	--	64	110	192	12	1.5	270	7000	ND	56
2004 Sep	8	46	150	226	9.0	3.1	370	13000	ND	25
2004 Dec	--	8.3	83	107	23	8.4	160	9800	6.9	36
2005 Mar	--	82	150	263	9.0	2.3	240	6600	13	35
2007 Mar	DRY									
2008 Mar	--	ND	31	37	7.5	2.0	290	4400	2.0	12
2009 Mar	--	ND	26	31	6.1	2.2	1.5	6200	ND	15
2010 Mar	--	1.7	38	44	6.5	1.7	170	2900	ND	8.3

RW-5 Swiss Farm exit lane Installed April 2005 (Converted from CW-25D - Online February 2006)

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	30	5			5		3	1	41	10
2006 Mar	ND	38	160	273	20	4.8	490	6000	13	--
2006 Jul(1)	--	33	160	271	38	9.6	580	4700	14	--
2006 Jul(2)	--	32	195	319	37	8.7	450	4700	14	--
2006 Aug	--	15	96	147	26	4.1	650	5100	15	--
2006 Sep	--	15	116	186	18	2.5	ND	2200	ND	--
2006 Dec	--	26	139	245	18	3.7	780	4600	15	38
2007 Mar	ND	17	86	158	17	3.0	530	3000	15	13
2007 Dec	--	26	77	157	18	4.7	390	2600	10	--
2008 Mar	527	21	76	144	16	2.7	540	4000	14	12
2008 Sep	--	--	--	--	--	--	440	2300	13	--
2009 Mar	455	16	78	136	14	ND	300	3600	9.8	17
2009 Sep	--	19	50	109	15	2.9	370	3700	13	--
2010 Sep	0.14	20	38	81	13	2.5	290	3200	11	17
2011 Mar	0.27	10	31	57	8.5	1.3	130	1300	8.6	19
2011 Sep	--	10	56	100	10	1.5	320	2900	10	--

BTEX: Benzene + Toluene + Ethylbenzene + Total Xylenes
MTBE: Methyl tert-Butyl Ether
TCE: Trichloroethylene PCP: Pentachlorophenol
Total Dioxins based on 1989 TEQ
"--": Not sampled ND: Not Detected

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Table 10
Havertown PCP Superfund Site
Major Contaminants in Monitoring Wells 1990-2014

2012 Mar	0.70	20	60	113	13	1.6	330	1900	10	15
2012 Sep	1.7	11	30	59	5.6	0.8	290	2000	11	--
2013 Mar	0.12	13	43	75	6.9	ND	710	5200	13	15
2013 Nov [1]	--	6.4	43	94	7.3	0.93	285	4040	15	--
2014 May [2]	3.3	31	68	127	11	ND	175	2860	15	7.9
2014 Sep	0.16	6.8	32	53	9.0	0.77	126	2350 [3]	11.8 [4]	--

[1] September quarterly sampled 11/11/13 to 11/13/13

[2] March annual sampled 4/29/14 to 5/7/14

[3] 2014 Sep PCP - SVOC = 2350 µg/L & SVSIM = 282 (E) µg/L

[4] 2014 Sep Phenanthrene - SVOC = 11.8 µg/L & SVSIM = 7.3 (E) µg/L

RW-6 Next to Collection Trench Installed October 2005 (Online April 2006)

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
2005 Dec	1.2	15	11	29	34	6.7	ND	2900	2.6	--
2006 Mar	0.21	3.9	0.8	5.1	8.6	4.5	ND	1700	1.4	--
2006 Dec	--	4.7	ND	4.7	11	6.1	ND	2200	ND	ND
2007 Mar	ND	3.0	ND	3.0	5.5	3.5	ND	1200	0.95	ND
2007 Dec	--	ND	ND	ND	3.9	2.7	2.3	1200	ND	--
2008 Mar	30	ND	ND	ND	6.6	3.4	ND	1200	ND	ND
2009 Mar	236	7.4	16	28	7.5	ND	ND	2100	ND	ND
2009 Sep *	--	ND	ND	ND	5.4	3.3	ND	700	0.18	--
2010 Sep	0.07	2.8	ND	2.8	8.5	4.4	ND	990	ND	0.16
2011 Mar	0.010	1.3	ND	1.3	1.6	1.2	ND	310	ND	ND
2011 Sep	--	1.8	ND	1.8	3.1	4.1	0.16	780	0.22	--
2012 Mar	--	1.7	ND	1.7	3.0	4.1	ND	770 D	ND	ND
2012 Sep	--	1.5	ND	1.5	1.7	2.6	ND	470	ND	--
2013 Mar	--	2.3	ND	2.3	ND	2.3	ND	700	ND	ND
2013 Nov [1]	--	ND	ND	ND	0.91	2.1	ND	289	ND	--
2014 May [2]	0.33	0.48	ND	0.48	0.93	1.6	ND	306	ND	ND
2014 Sep	--	0.34	ND	0.34	0.61	1.5	ND	279 [3]	0.018 [4]	--

* Resampled on November 5, 2009 for September 2009

[1] September quarterly sampled 11/11/13 to 11/13/13

[2] March annual sampled 4/29/14 to 5/7/14

BTEX: Benzene + Toluene + Ethylbenzene + Total Xylenes
MTBE: Methyl tert-Butyl Ether
TCE: Trichloroethylene PCP: Pentachlorophenol
Total Dioxins based on 1989 TEQ
"--": Not sampled ND: Not Detected

Table 10
Havertown PCP Superfund Site
Major Contaminants in Monitoring Wells 1990-2014

[3] 2014 Sep PCP - SVOC = 279 µg/L & SVSIM = 153 (E) µg/L

[4] 2014 Sep Phenanthrene - SVOC = ND & SVSIM = 0.018 (J) µg/L

RW-7 PCG property, front loading dock Installed October 2008 CW-31D was converted to RW-7 in June 2010 (placed online October 2010)

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	30	5			5		3	1	41	10
2010 Dec	0.034	4.2	32	42	12	3.5	270	3700	9.4	3.8
2011 Mar	--	3.7	30	39	9.6	3.0	190	2300	7.4	ND
2011 Sep	--	3.9	39	52	8.6	2.3	200	3700	8.3	--
2012 Mar	--	2.2	23	29	6.1	1.7	150	2900	7.2	ND
2012 Sep	--	2.0	21	27	5.2	1.2	220	2300	7.6	--
2013 Mar	--	2.8	23	29	6.0	ND	260	3200	11	ND
2013 Nov [1]	--	1.1	24	30	5.2	1.1	218	2850	10.1	--
2014 May [2]	--	2.0	26	34	4.5	0.88	147	2580	8.4	ND
2014 Sep	--	0.95	19	24	3.2	1.0	123	2680 [3]	7.8 [4]	ND

[1] September quarterly sampled 11/11/13 to 11/13/13

[2] March annual sampled 4/29/14 to 5/7/14

[3] 2014 Sep PCP - SVOC = 2680 µg/L & SVSIM = 349 (E) µg/L

[4] 2014 Sep Phenanthrene - SVOC = 7.8 µg/L & SVSIM = 6.4 (E) µg/L

RW-7X Field Duplicate of RW-7

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	30	5			5		3	1	41	10
2010 Dec	0.057	4.4	33	43	12	3.3	ND	3700	9.4	3.9
2012 Sep	--	2.1	23	29	5.4	ND	210	2600	7.9	--
2013 Mar	--	2.8	22	28	6.4	1.9	250	3000	10	ND

RW-8 ROS Installed April 2010 (Online August 2010)

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	30	5			5		3	1	41	10
2010 Sep	0.11	ND	ND	ND	ND	ND	ND	1.3	ND	0.85
2010 Dec	0.18	ND	ND	ND	ND	0.47	ND	3.3	ND	ND

BTEX: Benzene + Toluene + Ethylbenzene + Total Xylenes
MTBE: Methyl tert-Butyl Ether
TCE: Trichloroethylene PCP: Pentachlorophenol
Total Dioxins based on 1989 TEQ
"--": Not sampled ND: Not Detected

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Table 10
Havertown PCP Superfund Site
Major Contaminants in Monitoring Wells 1990-2014

2012 Mar		ND	ND	ND	ND	ND	ND	ND	ND	ND
2012 Sep	--	ND	ND	ND	ND	ND	ND	ND	ND	--
2012 Dec	--	ND	ND	ND	ND	ND	ND	ND	ND	--
2013 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2013 Jun	--	ND	ND	ND	ND	ND	ND	ND	ND	--
2013 Nov [1]	--	ND	ND	ND	ND	ND	ND	ND	ND	--
2014 Jan [2]	--	ND	ND	ND	ND	ND	ND	ND	ND	--
2014 May [3]	--	ND	ND	ND	ND	ND	ND	ND	ND	3.0
2014 Jun	--	ND	ND	ND	ND	ND	ND	ND	ND	--
2014 Sep	--	ND	ND	ND	ND	ND	ND	ND	ND	--
2014 Dec	--	ND	ND	ND	ND	ND	ND	ND	ND	--

[1] September quarterly sampled 11/11/13 to 11/13/13

[2] December quarterly sampled 1/27/14 to 1/29/14

[3] March annual sampled 4/29/14 to 5/7/14

RW-9 ROS Installed April 2010 (Online August 2010)

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
2010 Sep	ND	ND	ND	ND	ND	ND	ND	3.2	ND	0.15
2010 Dec	0.030	ND	ND	ND	ND	0.46	0.13	4.3	ND	ND
2012 Mar		ND	ND	ND	ND	ND	ND	ND	ND	ND
2012 Sep	--	ND	ND	ND	ND	ND	ND	ND	ND	--
2012 Dec	--	ND	ND	0.75	ND	ND	ND	ND	ND	--
2013 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2013 Jun	--	ND	ND	ND	ND	ND	ND	ND	ND	--
2013 Nov [1]	--	ND	ND	ND	ND	ND	ND	ND	ND	--
2014 Jan [2]	--	ND	ND	ND	ND	ND	ND	ND	ND	--
2014 May [3]	--	ND	ND	ND	ND	ND	ND	ND	ND	3.0
2014 Jun	--	ND	ND	ND	ND	ND	ND	ND	ND	--
2014 Sep	--	ND	ND	0.5 *	ND	ND	ND	ND	ND	--
2014 Dec	--	ND	ND	ND	ND	ND	ND	ND	ND	--

[1] September quarterly sampled 11/11/13 to 11/13/13

[2] December quarterly sampled 1/27/14 to 1/29/14

[3] March annual sampled 4/29/14 to 5/7/14

BTEX: Benzene + Toluene + Ethylbenzene + Total Xylenes
MTBE: Methyl tert-Butyl Ether
TCE: Trichloroethylene PCP: Pentachlorophenol
Total Dioxins based on 1989 TEQ
"--": Not sampled ND: Not Detected

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Table 10
Havertown PCP Superfund Site
Major Contaminants in Monitoring Wells 1990-2014

* Toluene

RW-10 ROS Installed April 2010 (Online August 2010)

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
2010 Sep	0.58	ND	ND	ND	ND	ND	ND	12	ND	ND
2010 Dec	0.20	ND	ND	ND	ND	0.46	ND	3.0	ND	ND
2012 Mar		ND	ND	ND	ND	ND	ND	ND	ND	ND
2012 Sep	--	ND	ND	ND	ND	ND	13	160	0.5	--
2012 Dec	--	ND	ND	1.2	ND	ND	ND	ND	ND	--
2013 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2013 Jun	--	ND	ND	ND	ND	ND	ND	ND	ND	--
2013 Nov [1]	--	ND	ND	ND	ND	ND	ND	ND	ND	--
2014 Jan [2]	--	ND	ND	ND	ND	ND	ND	ND	ND	--
2014 May [3]	--	ND	ND	ND	ND	ND	ND	ND	ND	3.0
2014 Jun	--	ND	ND	ND	ND	ND	ND	ND	ND	--
2014 Sep	--	ND	ND	ND	ND	ND	ND	ND	ND	--
2014 Dec	--	ND	ND	ND	ND	ND	ND	2.4 (J)	ND	--

[1] September quarterly sampled 11/11/13 to 11/13/13

[2] December quarterly sampled 1/27/14 to 1/29/14

[3] March annual sampled 4/29/14 to 5/7/14

R-2 Swiss Farm Market near RW-2

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
1990 Nov	29390	--	--	--	--	--	24000	80000	1900	23
2003 Mar	16727	3	350	418	8	5	1500	13000	ND	11
2004 Mar	65259	ND	1400	1400	ND	ND	9100	33000	4200	ND
2005 Mar	70	2.6	190	244	59	9.2	2000	23000	21	ND
2006 Mar	1600000	4.5	300	391	46	9.1	7800	16000	3300	--
2006 Dec	--	3.2	340	420	25	4.1	6400	17000	2200	13
2007 Mar	--	ND	108	136	8.9	2.2	1100	7100	82	7.6
2008 Mar	--	ND	209	242	8.4	2.1	1700	12000	120	6.5

BTEX: Benzene + Toluene + Ethylbenzene + Total Xylenes
MTBE: Methyl tert-Butyl Ether
TCE: Trichloroethylene PCP: Pentachlorophenol
Total Dioxins based on 1989 TEQ
"--": Not sampled ND: Not Detected

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Havertown PCP Superfund Site
Major Contaminants in Monitoring Wells 1990-2014

2009 Mar	--	1.4	94	116	5.1	2.1	400	6300	13	5.7
2010 Mar	738	0.93	175	201	3.9	ND	1100	6900	20	4.2
2011 Mar	369	ND	20	22	0.33	0.64	49	500	5.6	3.2
2012 Mar	297	0.92	95	116	1.7	0.95	700	6000	15	ND
2013 Mar	176	ND	79	89	ND	ND	980	3300	16	ND

R-4 Zac's Hamburgers

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
1990 Nov	7	ND	ND	ND	ND	--	ND	ND	ND	ND
2000 Dec	1.4	ND	ND	ND	ND	3	ND	ND	ND	ND
2001 Nov	2.6	ND	16	24	--	--	ND	ND	ND	--
2002 Feb	39	0.07	0.07	0.4	--	--	ND	ND	ND	--
2002 May	24	0.07	0.2	0.41	--	--	ND	3	ND	--
2002 Aug	77	0.03	ND	0.23	--	--	ND	ND	ND	--
2003 Mar	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2004 Mar	0.14	ND	ND	ND	ND	1.4	ND	ND	ND	ND
2005 Mar	--	ND	ND	ND	ND	4	ND	2.7	ND	--
2006 Mar	--	ND	0.24	0.24	ND	4.1	ND	ND	ND	--
2007 Mar	--	ND	ND	ND	ND	2.1	ND	ND	ND	ND
2008 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2009 Mar	--	ND	ND	ND	ND	ND	ND	ND	ND	ND
2010 Sep	--	ND	ND	ND	ND	ND	ND	ND	ND	0.24

PZ-2 Collection Trench

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
2002 Oct	--	33	120	156	10	8.0	190	3400	7.0	--

PZ-4 Collection Trench

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**

BTEX: Benzene + Toluene + Ethylbenzene + Total Xylenes
MTBE: Methyl tert-Butyl Ether
TCE: Trichloroethylene PCP: Pentachlorophenol
Total Dioxins based on 1989 TEQ
"--": Not sampled ND: Not Detected

Table 10
Havertown PCP Superfund Site
Major Contaminants in Monitoring Wells 1990-2014

2002 Oct	--	ND	ND	ND	ND	9	ND	200	ND	--

CTR Collection Trench

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
2003 Jun	16	13	61	83	8.0	5.4	160	1800	4.7	ND
2003 Sep	--	11	46	64	8.2	5.2	130	2200	4	ND
2003 Dec	4.6	7.8	32	43	5.1	4	50	2000	1.7	ND
2004 Mar	--	9	37	48	7.9	4.4	72	1600	ND	-
2004 Jun	3.1	7.6	29	39	4.3	3.5	69	1800	3.7	-
2004 Sep	--	9.1	29	40	6.2	5.8	62	1800	3.0	ND
2004 Dec	1.6	11	31	45	5.0	3	130	2400	4.6	ND
2005 Mar	--	6.0	22	29	4.7	2.1	46	4500	2.5	ND
2005 Dec	--	4.1	4.7	8.8	5.0	3.5	ND	710	ND	--
2006 Mar	1.2	5.5	9.9	16	5.7	3.7	8.5	1300	ND	--
2006 Dec	1.2	9.4	21	33	4.8	ND	34	1600	2.7	ND
2007 Mar	4.3	ND	2.7	2.7	ND	ND	ND	650	ND	ND
2007 Dec	--	7.9	ND	7.9	5.4	ND	8.0	1600	ND	--
2008 Mar	152	ND	2.0	2.0	2.0	ND	ND	920	ND	ND
2009 Mar	0.46	3.3	6.3	9.6	3.1	ND	3.9	1800	ND	2.2
2009 Sep	--	2.5	3.2	6.0	4.5	2.0	1.2	1400	ND	--
2010 Sep	4.3	ND	ND	ND	2.6	ND	1.1	590	ND	0.29
2011 Mar	4.03	0.93	1.2	2.2	1.4	1.2	0.25	330	ND	3.5
2011 Sep	--	1.2	1.9	3.3	1.1	1.1	3.2	710	0.30	--
2012 Mar	2.33	0.85	1.4	2.4	0.90	0.91	ND	420	ND	ND
2012 Sep	0.03	2.2	3.97	6.42	1.3	0.47	9.8	1200	ND	--
2013 Mar	2.27	ND	ND	ND	ND	ND	ND	500	ND	ND
2013 Nov [1]	--	ND	0.89	0.89	0.93	0.67	ND	775	ND	--
2014 May [2]	0.18	0.59	0.73	1.3	0.72	0.46	ND	415	ND	ND
2014 Sep	9.6	0.47	0.82	1.3	0.69	0.55	ND	509 [3]	0.014 [4]	--

[1] September quarterly sampled 11/11/13 to 11/13/13

[2] March annual sampled 4/29/14 to 5/7/14

[3] 2014 Sep PCP - SVOC = 509 µg/L & SVSIM = 181 (E) µg/L

[4] 2014 Sep Phenanthrene - SVOC = ND & SVSIM = 0.014 (J) µg/L

BTEX: Benzene + Toluene + Ethylbenzene + Total Xylenes
MTBE: Methyl tert-Butyl Ether
TCE: Trichloroethylene PCP: Pentachlorophenol
Total Dioxins based on 1989 TEQ
"--": Not sampled ND: Not Detected

Revised 8/27/15

Table 10
Havertown PCP Superfund Site
Major Contaminants in Monitoring Wells 1990-2014

CTR DUP Field Dupicate of CTR

Date	Total Dioxins (pg/L)	Benzene (µg/L)	Total Xylenes (µg/L)	BTEX Total (µg/L)	TCE (µg/L)	MTBE (µg/L)	Naphthalene (µg/L)	PCP (µg/L)	Phenanthrene (µg/L)	Arsenic (µg/L)
RGO	**30**	**5**			**5**		**3**	**1**	**41**	**10**
2014 Sep	7.9	0.41	0.47	0.88	0.57	0.46	ND	363 [1]	ND	--

[1] 2014 Sep PCP - SVOC = 363 µg/L & SVSIM = 165 (E) µg/L

BTEX: Benzene + Toluene + Ethylbenzene + Total Xylenes
MTBE: Methyl tert-Butyl Ether
TCE: Trichloroethylene PCP: Pentachlorophenol
Total Dioxins based on 1989 TEQ
"--": Not sampled ND: Not Detected

Revised 8/27/15

Table 11
Historical Total Organic Mass Removal
Havertown PCP Site
2003 - 2014

Date	units	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	TOTAL
Volatile Organics Removed	(lbs)	3.7	7.2	6.1	19.6	11.2	9.7	14.2	11.7	11.9	9.7	7.8	10.7	123.6
Semi-Volatile Organics Removed	(lbs)	233.4	337.5	287.6	537.7	327.7	220.5	438.3	497.3	603.5	595.4	413.7	458.0	4,950.8
Total Organics Removed	(lbs)	237.2	344.8	293.7	557.3	338.9	230.3	452.6	509.0	615.3	605.1	421.5	468.7	5,074.4

Table 12
HAVERTOWN PCP SITE
REMEDIAL GOAL OBJECTIVES FOR GROUNDWATER

CHEMICAL	GOAL	UNIT	OU [(1)] [(2)]
Benzene	5 (MCL)	µg/L	2
Benzo(a)pyrene	0.2 (MCL)	µg/L	Both
Dieldrin	0.038 (Risk-Based)	µg/L	3
Bis (2-ethylhexyl) phthalate	6 (MCL)	µg/L	Both
Dibenzofuran	4 (Risk-Based)	µg/L	3
Ethylbenzene	700 (MCL)	µg/L	2
2- Methylnaphthalene	2 (Risk-Based)	µg/L	3
Naphthalene	3 (Risk-Based)	µg/L	3
Pentachlorophenol (PCP)	1 (MCL)	µg/L	Both
Phenanthrene	41 (Risk-Based)	µg/L	Both
Toluene	1,000 (MCL)	µg/L	2
Total 2,3,7,8-TCDD	0.00003 (MCL)	µg/L	Both
TCE	5 (MCL)	µg/L	2
1,2-Trichloroethylene	100 (MCLG)	µg/L	2
1 ,2,4-Trimethylbenzene	16 (Risk-Based)	µg/L	3
1 ,3,5-Trimethylbenzene	16 (Risk-Based)	µg/L	3
4,6-Dinitro-2-methylphenol	1.7 (Risk-Based)	µg/L	3
Vinyl chloride	5 (MCL)	µg/L	2
Xylene	10,000 (MCL)	µg/L	2
Aluminum	50-200 (SMCL)	µg/L	3
Arsenic	10 (MCL) (OU-3)	µg/L	Both
Chromium	100 (MCL)	µg/L	3
Barium	2,000 (MCL)	µg/L	3
Manganese	50 (SMCL)	µg/L	Both
Iron	300 (SMCL)	µg/L	3
Vanadium	3.1 (Risk-Based)	µg/L	3

References:

[1] Table 23 in OU-2 ROD, dated September 1991.

[2] Table 15 in OU-3 ROD, dated April 2008.

Table 13
HAVERTOWN PCP SITE
REMEDIAL GOAL OBJECTIVES FOR ROS AREA SOILS

CHEMICAL	GOAL (mg/kg)	BASIS FOR REMEDIAL GOAL OBJECTIVE
Benzo(a)pyrene	1.3	Site-Specific Risk-Based Value
Dieldrin	0.011 [1]	Statewide Health Standards Soil to Groundwater [3]
PCP	0.5 [1]	Statewide Health Standards Soil to Groundwater [3]
Total 2,3,7,8-TCDD TEQ	0.00012	Statewide Health Standards Direct Contact [3]
Aluminum	6,200	Site-Specific Risk-Based Value
Iron	15,000	Site-Specific Risk-Based Value
Manganese [2]	160	Site-Specific Risk-Based Value

[1] *Soil to groundwater value based on 1/10 the generic value for saturated soils.*

[2] *The site-specific risk-based value presented is for the risk for construction workers, which is the most stringent. The site-specific risk-based values for child and adult residents are 570 mg/kg and 5,500 mg/kg, respectively.*

[3] *25 PA Code, Chapter 25 - Land Recycling and Environmental Remediation Standards Act (referred to as Act 2).*

Reference: Table 26 in OU-3 ROD, dated April 2008.

ATTACHMENT A

Detailed System Description
with Process Flow Diagrams

ATTACHMENT A

DETAILED GROUNDWATER TREATMENT PLANT SYSTEM DESCRIPTION

Process Flow Diagrams (PFD-1 and PFD-2) are enclosed under this attachment for reference.

Recovery Well / Collection Trench System

The present recovery system consists of three deep groundwater recovery wells (RW-5, RW-6, and RW-7), a shallow groundwater collector trench (CTR), and shallow groundwater recovery wells (RW-8, RW-9, and RW-10). RW-5 is located between the existing Swiss Farms Dairy Market and Zac's Hamburgers parking lot. The CTR is located southeast of the YMCA (former Philadelphia Chewing Gum-PCG) on the periphery of the YMCA parking lot. RW-6 is located just downgradient of the CTR. RW-7 is located in front of the YMCA along Eagle Road. A new forcemain from the three new ROS RWs and a series of valve vaults was constructed behind residences and along the former railroad ROW and through the ROW on the YMCA property where it connects with the forcemain converted from former RW-3 and continues with a new forcemain into the treatment plant and interconnects with the existing RW-5/CTR influent line before the Equalization Tank.

Operation of four shallow recovery wells (RW-1, RW-2, RW-4 located just north of Eagle Road southeast of the CAP, and RW-3 located south of Eagle Road on the YMCA property) was discontinued in 2006. RW-5 through RW-10, and CTR have level transmitters that send a signal to the PLC. These pumps are controlled by a PLC based on individual well level and equalization tank level.

Figure 2 shows the location of all recovery wells, collection trench, injection wells, and monitoring wells. PFD-1 shows the complete recovery and trench system as a process flow diagram.

Equalization System

The equalization (EQ) system consists of a steel equalization tank located in the separator room and two centrifugal EQ pumps. The equalization tank receives groundwater from the combined influent pumping system and the floor sump process water discharge from the solids separator. This tank has a level transmitter (signal to PLC) to operate a duplex equalization pump system (one running and second one standby). The equalization tank can receive the building sump discharge and GAC/new pressure filter backwash via a bypass line only when the backwash/wastewater tanks are not in operation. On the pump suction there is a basket strainer to capture large solids. The flow rate from the pump(s) is registered by the flow meter installed downstream of the pump(s) discharge. A manual globe valve can be used to adjust the pump discharge rate. A three-way valve controlled by the PLC, based on tank level, allows recycling of some water back into the tank under low flow conditions in order to keep the equalization pump continuously operating. Both pumps have local HOA switches that can be used to override the PLC. At present the equalization tank level, totalized pre-treatment flow, equalization pump flow rate, and pump discharge pressure are recorded on the daily log sheet. The system is monitored for any flow changes over time that may signal a blockage in the basket strainer.

Oxidation, Extended Oxidation, and Floc Tanks

The oxidation system flows in series and consists of an 800-gallon oxidation tank (T-205), an 800-gallon extended oxidation tank (T-305), and a 500-gallon poly flocculant (floc) tank (T-405). There is a pH probe and an oxidation-reduction potential (ORP) probe in tank T-205. Sodium hypochlorite is fed to tank T-205 based on ORP; and sodium hydroxide is fed to tank T-205 for pH adjustment. The hypochlorite and hydroxide feeds are fed inline ahead of a static mixer to improve overall mixing in the tank.

In August 2013, an anti-scalant chemical feed system was placed in operation to assist in the deterrent of calcium carbonate build-up in the piping internals and pumps and equipment. The injection locations are oxidation tank #2 and clarifier effluent. Deposition probes were installed in oxidation tank #2, surge tank, and inline on rayox pump main suction line. The probes would be monitored weekly. A removable spool piece was also installed in rayox suction so that pipe build-up could be easily monitored.

The equalization pumps discharge into tank T-205. Tank T-305 receives recycle flow from the clarifier seed pump on a timed basis. A polymer pump system mixes polymer with plant potable water, which is fed directly into the extended oxidation tank. Each tank has a high speed mixer, which operates when the pre-treatment system is activated. Each motor also has a separate HOA switch located at each tank. The floc tank mixer has its own control panel and VFD speed control. At present the pH and ORP values are recorded on the daily log sheet. Levels in these tanks are manually checked for any changes over time that may signal a blockage. Hi-level floats are located in Tanks T-205 and T-405 in order to shut down the pretreatment system in case of high water level and prevent overflows from the tanks.

Clarifier

The clarifier is a low profile, large capacity inclined plate clarifier. An air-operated diaphragm (AOD) clarifier sludge pump and the AOD clarifier seed pump remove collected sludge at the bottom of the clarifier. The seed pump discharges into the extended oxidation tank. The clarifier sludge pump discharges to the sludge thickener tank. The clarifier effluent flows to the RayOx surge tank. The clarifier effluent is monitored on a regular basis for performance of the polymer and water quality at its discharge. Sludge settling testing is conducted to maintain efficient polymer addition. There is a turbidity monitor on the clarifier effluent. This data is monitored at the PLC.

Surge Tank and UV/OX Feed Pumps

The UV/OX pumping system consists of a FRP surge tank and two centrifugal 10 HP RayOx feed pumps (one running and second one standby). On the UV/OX pumps discharge line there is an automatic control valve (pneumatic V-port control valve) that receives a signal from PLC to regulate flow through the UV/OX system and maintain a constant level in the surge tank. The flow meter and control valve located downstream of the pressure filter system so that there would be less effects internally from residual inorganic scaling. HOA switches are available at each of the two UV/OX pumps to override the PLC. At present, the UV/OX pump totalized flow, flow rate, pump discharge pressure, and surge tank level are recorded on the daily log sheet.

Pressure Sand Filter System

The pressure filter is a duplex pressure filter system with an automatic backwash feature installed on the discharge of the RayOx pumps. Effluent from the pressure filters flows to the UV/OX system. The pressure filter units automatically backwash with plant effluent water for 10 minutes after an operator selectable differential pressure (10 psi) or timer (12 hours) is reached. The backwash wastewater is held in two FRP backwash holding tanks located in the addition constructed in 2009. Daily O&M activities include visual inspection of the water quality, backwash quality, and air operated butterfly valves. Each cell's differential pressure and backwash totalized flow is recorded on the daily log sheet.

UV/OX System

The UV/OX system consists of three UV/OX reactor units plumbed in series. Only one lamp is sufficient to treat the contaminants. These units are equipped with air-actuated cleaning devices to maintain the quartz tube that separates the process water from the UV lamps. The units are equipped with cooling blowers, heat sensors, and flow switches to ensure the units do not overheat. All sensors and alarms are incorporated into the PLC. A static mixer is installed prior to the UV/OX units. Hydrogen peroxide is injected into the process water at the static mixer. Chemical doses are controlled by the PLC and are flow paced for hydrogen peroxide feed. In June 2013, sulfuric acid feed was discontinued for pH adjustment due to the lowering of the pH level in the oxidation system. At present, the UV/OX influent pressure is recorded on the daily log sheet.

GAC Units

The purpose of the liquid-phase carbon adsorber system is to adsorb and remove the leftover organic compounds (not removed by the UV/OX system) entrained in the groundwater. The GAC units contain no mechanical components. The plant operator can re-align the valves to operate the two units in series or in parallel. The valves may also be aligned to facilitate backwashing of the carbon. At present, the GAC inlet pressure and GAC outlet pressures are recorded on the daily log sheets. GAC series are also recorded (such as PV-1 to PV-2 or PV-2 to PV-1). These GAC units are backwashed on a monthly basis prior to the monthly sampling, and the backwash water is discharged into the backwash holding tanks. As part of monitoring the effects of peroxide residuals, the GACs are vented (water and air) to the surge tank and peroxide residuals are tested on the influent and effluent. Pressure buildup in the vessels is monitored and backwashing occurs if the normal flow rate appears to be diminishing.

Effluent Tanks

Treated process water is stored in two 3,600-gallon LDPE tanks housed outside of the treatment building. Closing the respective influent valve can isolate flow to the tank. The tank level is monitored in Effluent Tank #1. There are two effluent pumps (one running and another in standby mode) controlled by the PLC; both have a local HOA switch. Closing the respective effluent valve can isolate flow from the tank.

The effluent water also serves as backwash water for the pressure sand filter system and the GAC units. A backwash pump is provided for that purpose. For GAC backwashing the plant operator can position the valves on the GAC units to facilitate backwashing in series or parallel or in a single GAC unit. For pressure filter system backwashes it is an automatic process as stated previously. A separate line splits off before the effluent flow meter to provide recycle flow to the equalization tank for low influent flow make-up water and for effluent bypass if plant effluent pH is above or below the NPDES limits. Two on-off solenoid valves are installed and controlled by the PLC for switching the effluent flow. At present, effluent pump totalized flow, flow rate, discharge pressure and effluent pH are recorded on a daily log sheet.

As part of the OU3 remedy completed in August 2010 a separate line was split off before the effluent flow meter to provide effluent water to a storage/mix tank used for injection water, described below.

In November 2010 a new pneumatic v-port control valve was installed in the line before the flow meter. The automatic control valve receives a signal from the PLC to regulate flow through the effluent system and maintain a constant level in the effluent tanks.

Wastewater / Backwash Holding Tanks

Two 2,800-gallon FRP tanks are located inside the new building addition completed in February 2009 and used as wastewater/backwash holding tanks (to store pressure filter backwash wastewater and periodic GAC backwash). The tanks also can receive wastewater from the main building floor sump via a bypass valve.

These tanks have a level transmitter, which sends a continuous signal to PLC for trending and control of an on-off solenoid valve installed on the tank decant to the floor sump. The drain valve is automatically controlled to maintain a low level in the tank and be ready for automatic backwashing of the pressure filter system. An air-operated sludge pump was installed to transfer any sludge build-up to the sludge thickener.

Sludge Thickener

The sludge thickener receives sludge from the clarifier, solids separator, and backwash holding tanks. To increase the solids content of the sludge thickener, a motorized sludge rake is installed at the bottom of the tank. This motor is controlled by the PLC and has a local HOA switch. Decant water from the thickening process is discharged to the building sump. A floating decanter is also installed in this tank. An on-off solenoid valve was installed in the decant pipe and controlled by the PLC to maintain a minimum water level in the tank. The decant water is piped into a drain line that runs to the floor sump. The level transmitter on this tank sends a signal to PLC. Two 3-inch nozzles piped with butterfly valves near the bottom of the tank help facilitate draining and filling of the tank and recycling of the filter press sludge pump.

<u>Filter Press</u>

Thickened sludge is removed from the sludge thickener tank by the filter press sludge pump and discharged to the filter press. The filter press sludge pump is an air-actuated diaphragm pump controlled manually by the PLC. Once activated, the pump operates through three pressure settings to maximize solids content at the filter press. The sludge cake is dropped into a 10 c.y. roll-off box. To maximize the sludge cake stored in the roll-off, the plant operator rakes and levels the sludge in the roll-off.

<u>Building Sump</u>

The treatment building sump receives overflow from all the process tanks housed inside the building, as well as backwash tank drain water, decant water from the sludge thickener tank, filter press water, and UV/OX bleed valve water. A submersible pump that is controlled by level switches empties the sump. A local HOA switch can be used to override the level switches. Discharge from the sump is pumped back to the solids separator or it can be sent to backwash holding tank #2 using bypass valves. A second floor sump with a smaller submersible pump is located in the new addition completed in February 2009; it is piped to tie-in to the new backwash tank/equalization tank overflow drain line to the main building sump.

In August 2011, the existing floor sump pumping system was connected to the OWS in order to separate solids that formerly filled the EQ tank. Any settled material in the OWS continued to be pumped to the sludge thickener, and the water from the OWS flows by gravity into the equalization (EQ) tank.

<u>Solids Separator (former OWS)</u>

In early March 2011 the former oil-water separator (OWS) was removed from service because of continual iron buildup on the half-pack plates, which were difficult to maintain. Also, product had no longer been collecting since the removal of RW-1 thru RW-4 recovery wells. The influent of the recovery wells (RW-5, and RW-7 thru RW-10) and CTR was combined and piped directly to the EQ tank. In August 2011, the existing floor sump pumping system was connected to the separator in order to separate solids that formerly filled the EQ tank. Any settled material in the separator continued to be pumped to the sludge thickener, and the water from the separator flowed by gravity into the equalization (EQ) tank. The separator contains no mechanical parts. Floating solids are separated from the water by coalescing on the oleophilic plates (half-pack assembly) within the unit. Any solids still floating on the water can be skimmed off the process water and flow by gravity to the wastewater storage tank.

<u>Wastewater Storage Tank (former Free Product Tank)</u>

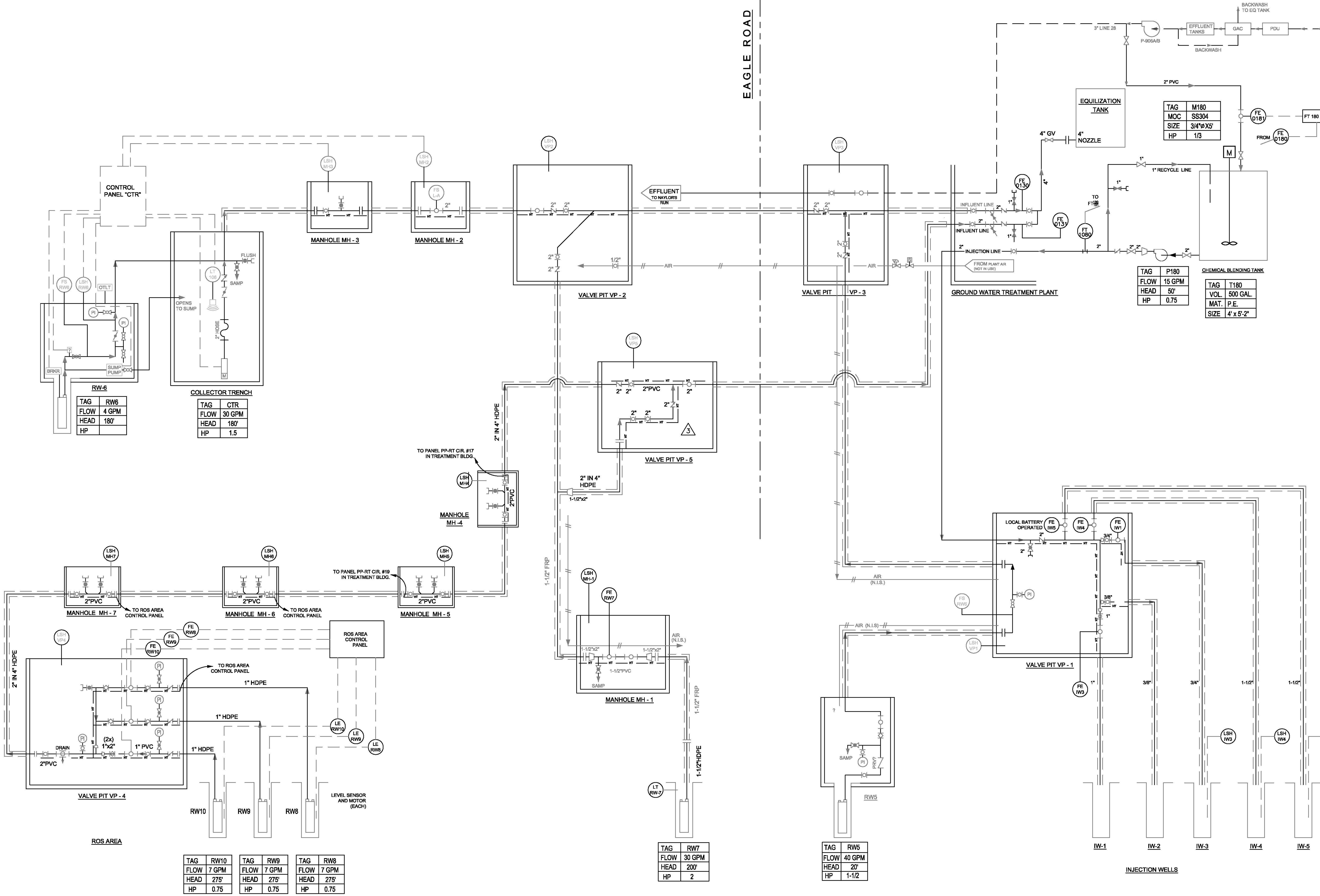
In 2005, a new double-wall tank was added just outside the OWS room. This tank received floating product by gravity from the OWS in a manual mode. In early 2013 the tank was emptied, cleaned, and decommissioned as a free product tank and converted as a spare wastewater tank. The tank has a high level alarm for notification. A local level gauge indicates the water level in the tank. This tank also has a level transmitter that sends a continuous signal to the PLC for trending. An existing air-actuated diaphragm pump is used (in manual mode) to pump the water back into the sludge thickener while observing the water quality through the sight glass.

<u>In-situ Flushing/Injection System</u>

Construction of a storage/mix tank, pumping system and injection wells for the in-situ flushing of the groundwater occurred in July and August 2010. In-situ flushing in the source area was included as part of the OU3 ROD to enhance mobilization of the principal threat waste. Existing recovery wells RW-1, RW-2, and RW-4 were retrofitted for injection and re-designated IW-1, IW-2, and IW-3, respectively. In 2011 the former CW-29D was converted into injection well IW-4 and placed online in July 2011, and the former CW-30D was converted into injection well IW-5 and placed online in October 2011.

The pumping system includes a 500-gallon poly storage tank with a stand-mounted mixer with manual control, a centrifugal pump, and piping connected to the existing effluent water discharge piping and piping to the injection wells utilizing the existing forcemain used for the former RW-1, RW-2, and RW-4 recovery system. The injection pump operation works in tandem with the effluent pumping system. Level control in the storage tank maintains level by sending a signal to the PLC, and a solenoid valve opens allowing effluent water to fill the tank. Pump operation is also controlled by injection tank level and only runs when the effluent pumps are running.

High level switches (vertical float) located at each well are set at approximately five feet below grade inside each well. When injection water in each well reaches the float switch, a signal is sent to the PLC that switches the injection system off. Programming was added to the PLC to allow an adjustable time limit before injection system re-energizes. Manual well levels are taken to track water levels in injection and surrounding monitoring wells. Injection pump and individual injection well totalized flow and flow rate are recorded on a daily log sheet.



TAG	M180
MOC	SS304
SIZE	3/4"øX5'
HP	1/3

TAG	P180
FLOW	15 GPM
HEAD	50'
HP	0.75

TAG	T180
VOL.	500 GAL.
MAT.	P.E.
SIZE	4' x 5'-2"

TAG	RW6
FLOW	4 GPM
HEAD	180'
HP	

TAG	CTR
FLOW	30 GPM
HEAD	180'
HP	1.5

TAG	RW10
FLOW	7 GPM
HEAD	275'
HP	0.75

TAG	RW9
FLOW	7 GPM
HEAD	275'
HP	0.75

TAG	RW8
FLOW	7 GPM
HEAD	275'
HP	0.75

TAG	RW7
FLOW	30 GPM
HEAD	200'
HP	2

TAG	RW5
FLOW	40 GPM
HEAD	20'
HP	1-1/2

REVISIONS

ISSUE DATES

As-Built Drawings as of 12.31.11

CONSULTANTS

TETRA TECH
240 Continental Drive, Suite 200
Newark, Delaware 19713
ph: (302) 738-7551 fax: (302) 454-5988
WWW.TETRATECH-DE.COM

RCN: 112G00940
DRAWN BY: SNL
CHECKED BY: HKM
SCALE:
APPROVED BY: HKM
DATE:
CAD FILE: SEE PLOT STAMP
ONE INCH — CHECK SCALE

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY (USEPA)

HAVERTOWN, PA PCP SITE

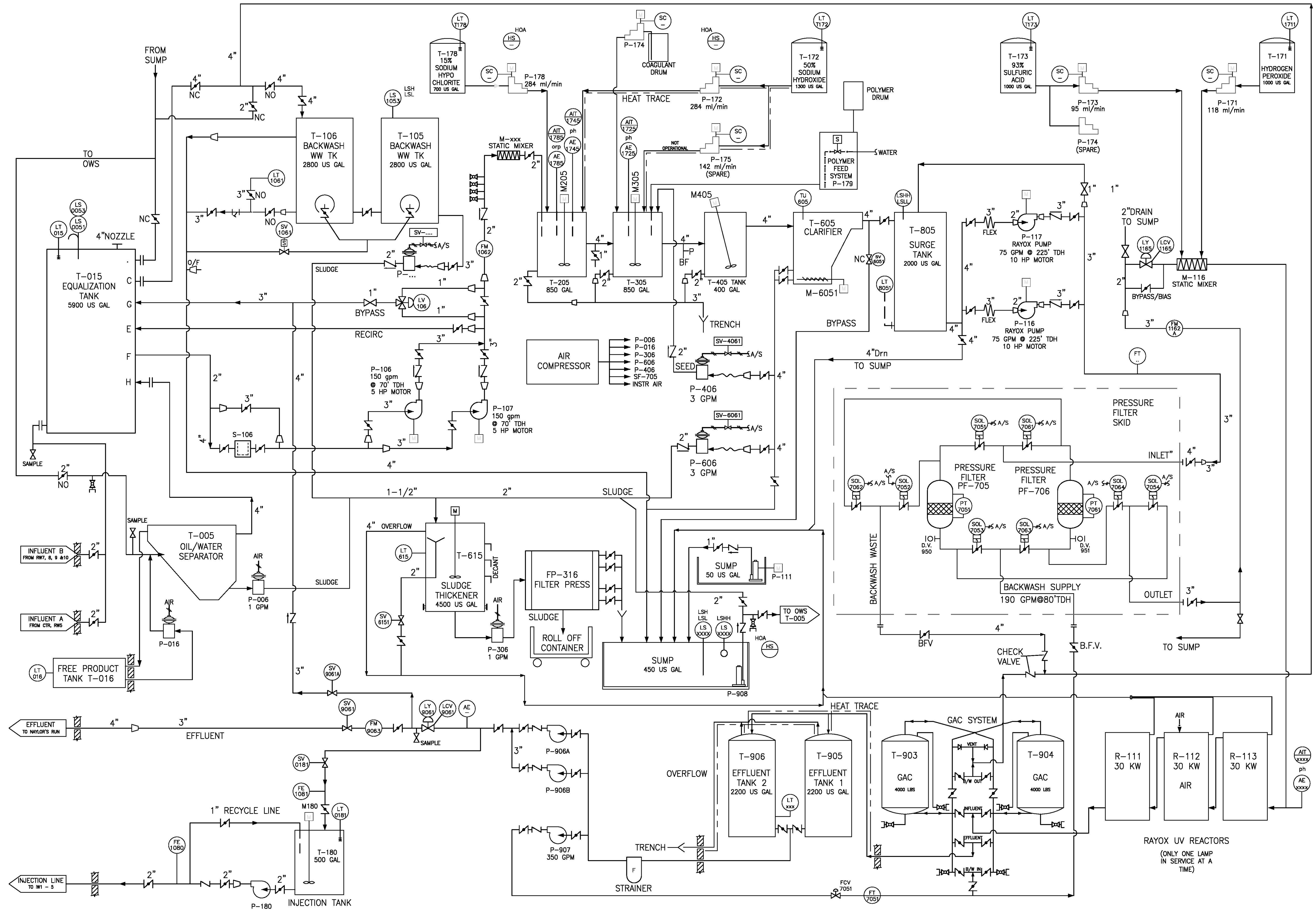
Delaware County
Havertown, Pennsylvania

PROCESS FLOW DIAGRAM
COLLECTION / INJECTION SYSTEM
DRAWING TITLE:

PFD-1
DRAWING NUMBER:

N:\Projects\NUS\112G00940_Havertown_OU2\AsBuilt_working\PID\PFD-1.dwg 09/06/2012 14:00

ARCHITECTURE ♦ CONSTRUCTION SERVICES ♦ SURVEYING ♦ LANDSCAPE ARCHITECTURE ♦ PLANNING ♦ CIVIL ENGINEERING ♦ INTERIOR DESIGN ♦ STRUCTURAL ENGINEERING ♦ GEOLOGICAL SCIENCES ♦ ENVIRONMENTAL ENGINEERING ♦ WATER RESOURCES MANAGEMENT ♦ HEALTH AND SAFETY ♦ GIS MAPPING ♦ ENVIRONMENTAL INVESTIGATION AND REMEDIATION ♦ GEOTECHNICAL AND SOILS ENGINEERING ♦ TRANSPORTATION ENGINEERING



REVISIONS

ISSUE DATES

As-Built as of 05.01.2013

CONSULTANTS

TETRA TECH

240 Continental Drive, Suite 200
Newark, Delaware 19713
ph: (302) 738-7551 fax: (302) 454-5988
WWW.TETRATECH-DE.COM

RCN: 112G00940

DRAWN BY: SNL

CHECKED BY: HKM

SCALE:

APPROVED BY: HKM

DATE:

CAD FILE: SEE PLOT STAMP

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY (USEPA)

HAVERTOWN, PA PCP SITE

Delaware County Havertown, Pennsylvania

PROCESS FLOW DIAGRAM IN-PLANT

DRAWING TITLE:

PFD-2

DRAWING NUMBER: AS-BUILT

ATTACHMENT B

List of Documents Reviewed

Attachment B

List of Documents Reviewed During Fifth Five-Year Review For the Havertown PCP Superfund Site

Various Fact Sheets for the site.

Record of Decision for Operable Unit 1, Havertown PCP Superfund Site, dated September 29, 1989

Record of Decision for Operable Unit 2, Havertown PCP Superfund Site, dated September 30, 1991

Record of Decision for Operable Unit 3, Havertown PCP Superfund Site, dated April 16, 2008

Remedial Action Report, Part I, for the Havertown PCP Superfund Site, Operable Unit One, prepared by Tetra Tech for the EPA, June 1991

Remedial Action Report, Part II, for the Havertown PCP Superfund Site, Operable Unit One, prepared by Tetra Tech for the EPA, February 1992

Remedial Action Report for the Havertown PCP Superfund Site, Operable Unit Two, prepared by the U.S. Army Corps of Engineers, June 2003.

Havertown PCP Site 2002-2004 Technical Assessment and Operations and Maintenance Report, June 2005

Havertown PCP Site 2005 Technical Assessment and Operations and Maintenance Report, April 2006

Havertown PCP Site 2006 Technical Assessment and Operations and Maintenance Report, March 2007

Havertown PCP Site 2007 Technical Assessment and Operations and Maintenance Report, May 2008

Havertown PCP Site 2008 Technical Assessment and Operations and Maintenance Report, June 2009

Havertown PCP Site 2009 Technical Assessment and Operations and Maintenance Report, August 2010

Havertown PCP Site 2010 Technical Assessment and Operations and Maintenance Report, August 2011

Havertown PCP Site 2011 Technical Assessment and Operations and Maintenance Report, September 2012

Havertown PCP Site 2012-13 Technical Assessment and Operations and Maintenance Report, November 2014

Havertown PCP Site 2013-14 Annual Groundwater Treatment Plant Operations and Maintenance Report, March 2015

Havertown PCP Site 2014 Annual Groundwater Monitoring Report, January 2015

Fourth Five Year Review Report, Havertown PCP Superfund Site, September 29, 2010

Title Search for the Havertown PCP Superfund Site, dated June 20, 2005

Update to Title Search for the Havertown PCP Superfund Site, March 17, 2010

Preliminary Closeout Report for the Havertown PCP Superfund Site, dated September 16, 2010

Institutional Control Implementation and Assurance Plan (ICIAP), June 2011

Capture Zone Analysis - Updated Report by Val F Britton, July 31, 2013.

Ecological Monitoring Report 2009, January 2010

Ecological Monitoring Report 2010-2014, March 2015

Site Inspection Checklist

<table>
<tr><th colspan="2">I. SITE INFORMATION</th></tr>
<tr><td>Site name: Havertown PCP</td><td>Date of inspection: 4/28/15</td></tr>
<tr><td>Location and Region: Havertown, PA; Region 3</td><td>EPA ID: PAD002338010</td></tr>
<tr><td>Agency, office, or company leading the five-year review: EPA</td><td>Weather/temperature: Sunny/80</td></tr>
<tr><td colspan="2">Remedy Includes: (Check all that apply)
☒ Landfill cover/containment ☐ Monitored natural attenuation
☒ Access controls ☐ Groundwater containment
☒ Institutional controls ☐ Vertical barrier walls
☒ Groundwater pump and treatment
☐ Surface water collection and treatment
☐ Other______________________________________</td></tr>
<tr><td colspan="2">Attachments: ☒ Inspection team roster attached ☒ Site map attached</td></tr>
<tr><th colspan="2">II. INTERVIEWS (Check all that apply)</th></tr>
<tr><td colspan="2">1. O&M site manager Harish Mital (Name) Eng. in Charge (Title) 4/28/15 (Date)
Interviewed ☐ at site ☐ at office ☐ by phone Phone no. ______________
Problems, suggestions; ☐ Report attached ______________________________</td></tr>
<tr><td colspan="2">2. O&M staff Kiran Pathak (Name) Plant Operator (Title) 4/28/15 (Date)
Interviewed ☐ at site ☐ at office ☐ by phone Phone no. ______________
Problems, suggestions; ☐ Report attached ______________________________</td></tr>
</table>

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

Agency PADEP
Contact Colin Wade | Project Officer | 4/28/15 | ______
Name | Title | Date | Phone no.
Problems; suggestions; ☐ Report attached ______

Agency PADEP
Contact John Zatyczyc | Geologist | 4/28/15 | ______
Name | Title | Date | Phone no.
Problems; suggestions; ☐ Report attached ______

Agency EPA
Contact Linda Watson | Toxicologist | 4/28/15 | ______
Name | Title | Date | Phone no.
Problems; suggestions; ☐ Report attached ______

Agency EPA
Contact Mindi Snoparsky | Geologist | 4/28/15 | ______
Name | Title | Date | Phone no.
Problems; suggestions; ☐ Report attached ______

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

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

1.	**O&M Documents**			
	☒ O&M manual	☒ Readily available	☒ Up to date	☐ N/A
	☒ As-built drawings	☒ Readily available	☒ Up to date	☐ N/A
	☒ Maintenance logs	☒ Readily available	☒ Up to date	☐ N/A
	Remarks______________________________			
2.	**Site-Specific Health and Safety Plan**	☒ Readily available	☒ Up to date	☐ N/A
	☒ Contingency plan/emergency response plan	☐ Readily available	☐ Up to date	☐ N/A
	Remarks______________________________			
3.	**O&M and OSHA Training Records**	☒ Readily available	☒ Up to date	☐ N/A
	Remarks______________________________			
4.	**Permits and Service Agreements**			
	☐ Air discharge permit	☐ Readily available	☐ Up to date	☐ N/A
	☒ Effluent discharge	☒ Readily available	☒ Up to date	☐ N/A
	☐ Waste disposal, POTW	☐ Readily available	☐ Up to date	☐ N/A
	☐ Other permits_____________________	☐ Readily available	☐ Up to date	☐ N/A
	Remarks Certificate of destruction for sludge and manifests			
5.	**Gas Generation Records**	☐ Readily available	☐ Up to date	☒ N/A
	Remarks______________________________			
6.	**Settlement Monument Records**	☐ Readily available	☐ Up to date	☒ N/A
	Remarks______________________________			
7.	**Groundwater Monitoring Records**	☒ Readily available	☒ Up to date	☐ N/A
	Remarks______________________________			
8.	**Leachate Extraction Records**	☐ Readily available	☐ Up to date	☒ N/A
	Remarks______________________________			
9.	**Discharge Compliance Records**			
	☐ Air	☐ Readily available	☐ Up to date	☐ N/A
	☒ Water (effluent)	☒ Readily available	☒ Up to date	☐ N/A
	Remarks______________________________			
10.	**Daily Access/Security Logs**	☒ Readily available	☒ Up to date	☐ N/A
	Remarks______________________________			

IV. O&M COSTS

1. **O&M Organization**
☒ State in-house ☒ Contractor for State
☐ PRP in-house ☐ Contractor for PRP
☐ Federal Facility in-house ☐ Contractor for Federal Facility
☐ Other____

2. **O&M Cost Records**
☒ Readily available ☒ Up to date
☒ Funding mechanism/agreement in place
Original O&M cost estimate____________________ ☒ Breakdown attached

Total annual cost by year for review period if available

From (Date)	To (Date)	Total cost	
			☒ Breakdown attached
			☒ Breakdown attached
			☒ Breakdown attached
			☒ Breakdown attached
			☒ Breakdown attached

3. **Unanticipated or Unusually High O&M Costs During Review Period**
Describe costs and reasons: Pipe calcification addressed by antiscalant

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

A. Fencing

1. **Fencing damaged** ☐ Location shown on site map ☐ Gates secured ☐ N/A
Remarks Old wooden fence behind Swiss Farms had deteriorated and had been removed. New fence installed in May 2015.

B. Other Access Restrictions

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

C. Institutional Controls (ICs)
1. **Implementation and enforcement** Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A Type of monitoring (*e.g.*, self-reporting, drive by) Plant Operator and contractor staff Frequency Daily or weekly Responsible party/agency EPA and PADEP Contact ______ Name ______ Title ______ Date ______ Phone no. Reporting is up-to-date ☒ Yes ☐ No ☐ N/A Reports are verified by the lead agency ☒ Yes ☐ No ☐ N/A Specific requirements in deed or decision documents have been met ☒ Yes ☐ No ☐ N/A Violations have been reported ☐ Yes ☐ No ☒ N/A Other problems or suggestions: ☐ Report attached
2. **Adequacy** ☒ ICs are adequate ☐ ICs are inadequate ☐ N/A Remarks
D. General
1. **Vandalism/trespassing** ☐ Location shown on site map ☒ No vandalism evident Remarks
2. **Land use changes on site** ☐ N/A Remarks Pending construction of storage units on cap
3. **Land use changes off site** ☐ N/A Remarks YMCA over former PCG Plant
VI. GENERAL SITE CONDITIONS
A. Roads ☒ Applicable ☐ N/A
1. **Roads damaged** ☐ Location shown on site map ☐ Roads adequate ☐ N/A Remarks

B. Other Site Conditions
Remarks VP-2, VP-5 in YMCA parking lot: access issues, need curb around VP-5. Suggest 2 parking spaces be removed and given to Site for access. VP-5 needs concrete collar to prevent sheet flow from surface runoff entering vault.

VII. LANDFILL COVERS ☒ Applicable ☐ N/A
A. Landfill Surface
1. **Settlement** (Low spots) ☐ Location shown on site map ☒ Settlement not evident Areal extent______________ Depth____________ Remarks______________________________
2. **Cracks** ☐ Location shown on site map ☒ Cracking not evident Lengths____________ Widths___________ Depths__________ Remarks______________________________
3. **Erosion** ☐ Location shown on site map ☒ Erosion not evident Areal extent______________ Depth____________ Remarks______________________________
4. **Holes** ☐ Location shown on site map ☒ Holes not evident Areal extent______________ Depth____________ Remarks______________________________
5. **Vegetative Cover** ☐ Grass ☐ Cover properly established ☒ No signs of stress ☐ Trees/Shrubs (indicate size and locations on a diagram) Remarks______________________________
6. **Alternative Cover (armored rock, concrete, etc.)** ☒ N/A Remarks______________________________
7. **Bulges** ☐ Location shown on site map ☒ Bulges not evident Areal extent______________ Height____________ Remarks______________________________

8.	**Wet Areas/Water Damage** ☒ Wet areas/water damage not evident ☐ Wet areas ☐ Location shown on site map Areal extent______________ ☐ Ponding ☐ Location shown on site map Areal extent______________ ☐ Seeps ☐ Location shown on site map Areal extent______________ ☐ Soft subgrade ☐ Location shown on site map Areal extent______________ Remarks____ ____
9.	**Slope Instability** ☐ Slides ☐ Location shown on site map ☒ No evidence of slope instability Areal extent______________ Remarks____ ____
B. Benches	☐ Applicable ☒ N/A (Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)
1.	**Flows Bypass Bench** ☐ Location shown on site map ☐ N/A or okay Remarks____ ____
2.	**Bench Breached** ☐ Location shown on site map ☐ N/A or okay Remarks____ ____
3.	**Bench Overtopped** ☐ Location shown on site map ☐ N/A or okay Remarks____ ____
C. Letdown Channels	☐ Applicable ☒ N/A (Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)
1.	**Settlement** ☐ Location shown on site map ☐ No evidence of settlement Areal extent______________ Depth____________ Remarks____ ____
2.	**Material Degradation** ☐ Location shown on site map ☐ No evidence of degradation Material type_______________ Areal extent_____________ Remarks____ ____
3.	**Erosion** ☐ Location shown on site map ☐ No evidence of erosion Areal extent______________ Depth____________ Remarks____ ____

4.	**Undercutting** ☐ Location shown on site map ☐ No evidence of undercutting Areal extent_______________ Depth_____________ Remarks____
5.	**Obstructions** Type______________________ ☐ No obstructions ☐ Location shown on site map Areal extent_______________ Size_____________ Remarks____
6.	**Excessive Vegetative Growth** Type_____________________ ☐ No evidence of excessive growth ☐ Vegetation in channels does not obstruct flow ☐ Location shown on site map Areal extent_______________ Remarks____
D. Cover Penetrations	X☐ Applicable ☐ N/A
1.	**Gas Vents** ☐ Active ☐ Passive ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition ☐ Evidence of leakage at penetration ☐ Needs Maintenance ☒ N/A Remarks____
2.	**Gas Monitoring Probes** ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition ☐ Evidence of leakage at penetration ☐ Needs Maintenance ☒ N/A Remarks____
3.	**Monitoring Wells** (within surface area of landfill) ☒ Properly secured/locked ☒ Functioning ☒ Routinely sampled ☒ Good condition ☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A Remarks____
4.	**Leachate Extraction Wells** ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition ☐ Evidence of leakage at penetration ☐ Needs Maintenance ☒ N/A Remarks____
5.	**Settlement Monuments** ☐ Located ☐ Routinely surveyed ☒ N/A Remarks____

E. Gas Collection and Treatment ☐ Applicable ☒ N/A
1. **Gas Treatment Facilities** ☐ Flaring ☐ Thermal destruction ☐ Collection for reuse ☐ Good condition ☐ Needs Maintenance Remarks______________________________
2. **Gas Collection Wells, Manifolds and Piping** ☐ Good condition ☐ Needs Maintenance Remarks______________________________
3. **Gas Monitoring Facilities** (*e.g.*, gas monitoring of adjacent homes or buildings) ☐ Good condition ☐ Needs Maintenance ☐ N/A Remarks______________________________
F. Cover Drainage Layer ☐ Applicable ☒ N/A
1. **Outlet Pipes Inspected** ☐ Functioning ☐ N/A Remarks______________________________
2. **Outlet Rock Inspected** ☐ Functioning ☐ N/A Remarks______________________________
G. Detention/Sedimentation Ponds ☐ Applicable ☒ N/A
1. **Siltation** Areal extent______________ Depth____________ ☐ N/A ☐ Siltation not evident Remarks______________________________
2. **Erosion** Areal extent______________ Depth____________ ☐ Erosion not evident Remarks______________________________
3. **Outlet Works** ☐ Functioning ☐ N/A Remarks______________________________
4. **Dam** ☐ Functioning ☐ N/A Remarks______________________________

H. Retaining Walls		☐ Applicable	☒ N/A
1.	**Deformations**	☐ Location shown on site map	☐ Deformation not evident
	Horizontal displacement_____________ Vertical displacement________________ Rotational displacement_____________ Remarks____		
2.	**Degradation**	☐ Location shown on site map	☐ Degradation not evident
	Remarks____		
I. Perimeter Ditches/Off-Site Discharge		☒ Applicable	☐ N/A
1.	**Siltation**	☐ Location shown on site map	☒ Siltation not evident
	Areal extent_______________ Depth_____________ Remarks____		
2.	**Vegetative Growth**	☐ Location shown on site map	☐ N/A
	☒ Vegetation does not impede flow Areal extent_______________ Type_____________ Remarks____		
3.	**Erosion**	☐ Location shown on site map	☒ Erosion not evident
	Areal extent_______________ Depth_____________ Remarks____		
4.	**Discharge Structure**	☒ Functioning	☐ N/A
	Remarks____		
VIII. VERTICAL BARRIER WALLS		☐ Applicable	☒ N/A
1.	**Settlement**	☐ Location shown on site map	☐ Settlement not evident
	Areal extent_______________ Depth_____________ Remarks____		
2.	**Performance Monitoring**	Type of monitoring___________________________	
	☐ Performance not monitored Frequency________________________________ ☐ Evidence of breaching Head differential___________________________ Remarks____		

IX. GROUNDWATER/SURFACE WATER REMEDIES ☒ Applicable ☐ N/A
A. Groundwater Extraction Wells, Pumps, and Pipelines ☒ Applicable ☐ N/A
1. **Pumps, Wellhead Plumbing, and Electrical** ☒ Good condition ☒ All required wells properly operating ☐ Needs Maintenance ☐ N/A Remarks____
2. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances** ☒ Good condition ☐ Needs Maintenance Remarks____
3. **Spare Parts and Equipment** ☒ Readily available ☒ Good condition ☐ Requires upgrade ☐ Needs to be provided Remarks____
B. Surface Water Collection Structures, Pumps, and Pipelines ☐ Applicable ☒ N/A
1. **Collection Structures, Pumps, and Electrical** ☐ Good condition ☐ Needs Maintenance Remarks____
2. **Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances** ☐ Good condition ☐ Needs Maintenance Remarks____
3. **Spare Parts and Equipment** ☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided Remarks____

C. Treatment System	☒ Applicable ☐ N/A
1.	**Treatment Train** (Check components that apply) ☒ Metals removal ☐ Oil/water separation ☐ Bioremediation ☐ Air stripping ☐ Carbon adsorbers ☒ Filters GAC ☒ Additive (*e.g.*, chelation agent, flocculent) H2O2, polymer, anti-scalant, hypochlorite, NaOH ☐ Others ☒ Good condition ☐ Needs Maintenance ☒ Sampling ports properly marked and functional ☒ Sampling/maintenance log displayed and up to date ☒ Equipment properly identified ☒ Quantity of groundwater treated annually See report ☐ Quantity of surface water treated annually Remarks
2.	**Electrical Enclosures and Panels** (properly rated and functional) ☐ N/A ☒ Good condition ☐ Needs Maintenance Remarks
3.	**Tanks, Vaults, Storage Vessels** ☐ N/A ☒ Good condition ☒ Proper secondary containment ☐ Needs Maintenance Remarks
4.	**Discharge Structure and Appurtenances** ☐ N/A ☒ Good condition ☐ Needs Maintenance Remarks
5.	**Treatment Building(s)** ☐ N/A ☒ Good condition (esp. roof and doorways) ☐ Needs repair ☒ Chemicals and equipment properly stored Remarks
6.	**Monitoring Wells** (pump and treatment remedy) ☒ Properly secured/locked ☒ Functioning ☒ Routinely sampled ☒ Good condition ☒ All required wells located ☐ Needs Maintenance ☐ N/A Remarks

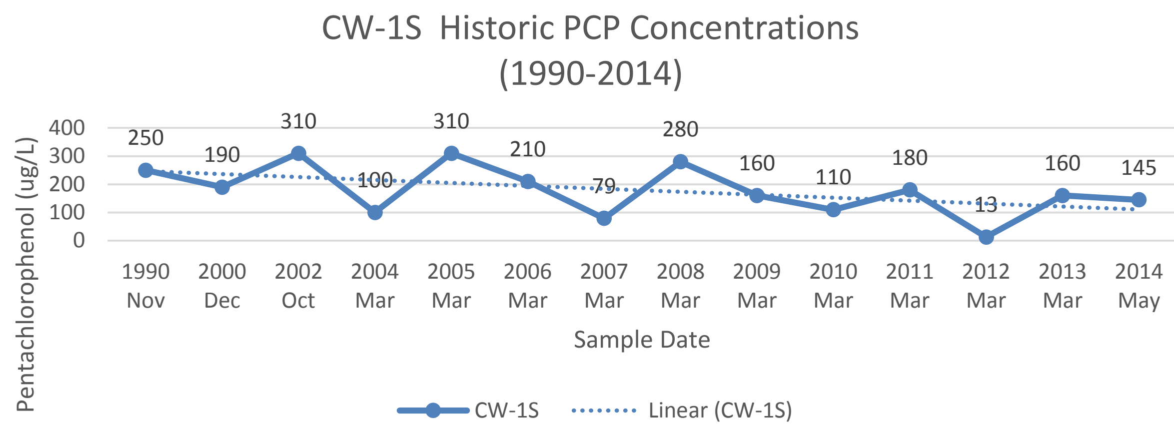
D. Monitoring Data	
1.	Monitoring Data ☒ Is routinely submitted on time ☒ Is of acceptable quality
2.	Monitoring data suggests: ☒ Groundwater plume is effectively contained ☒ Contaminant concentrations are declining

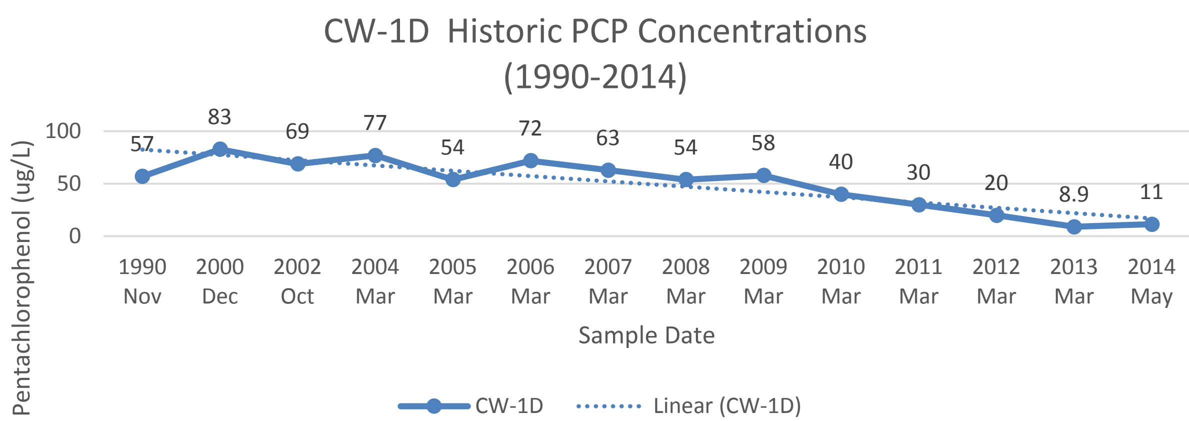
D. Monitored Natural Attenuation
1. **Monitoring Wells** (natural attenuation remedy) ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition ☐ All required wells located ☐ Needs Maintenance X ☐ N/A Remarks
X. OTHER REMEDIES
If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.
XI. OVERALL OBSERVATIONS
A. Implementation of the Remedy
Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.). Remedy is effective. See main body of FYR report
B. Adequacy of O&M
Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy. O&M measures sufficient. See main body of FYR report.

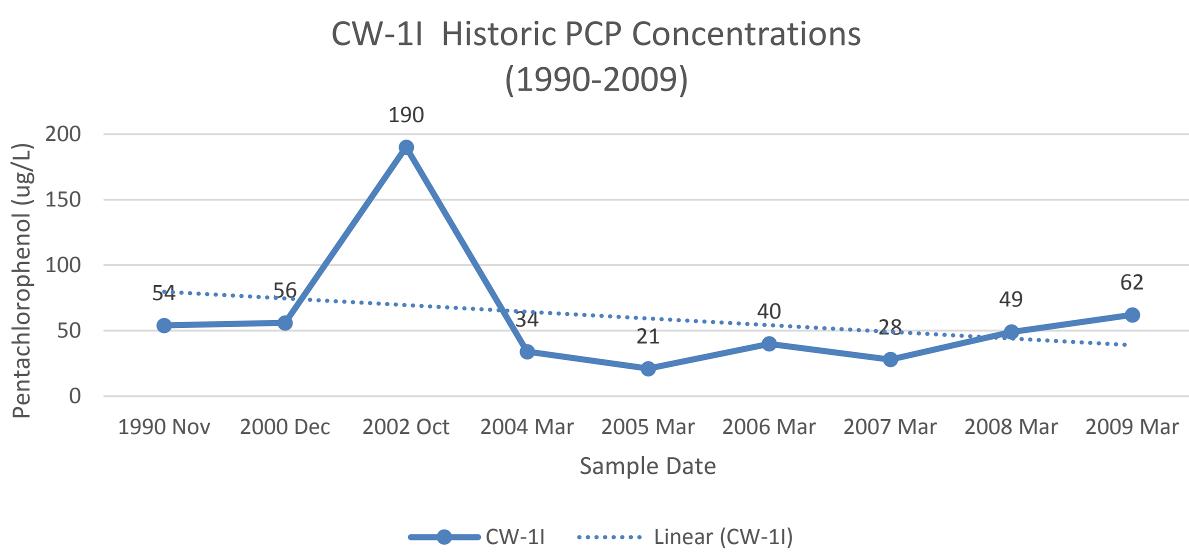
C.	Early Indicators of Potential Remedy Problems
	Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future. N/A
D.	**Opportunities for Optimization**
	Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy. Shut-down of ROS area Evaluate utility of UV/OX. Evaluate potential in situ treatment for source area and plume.

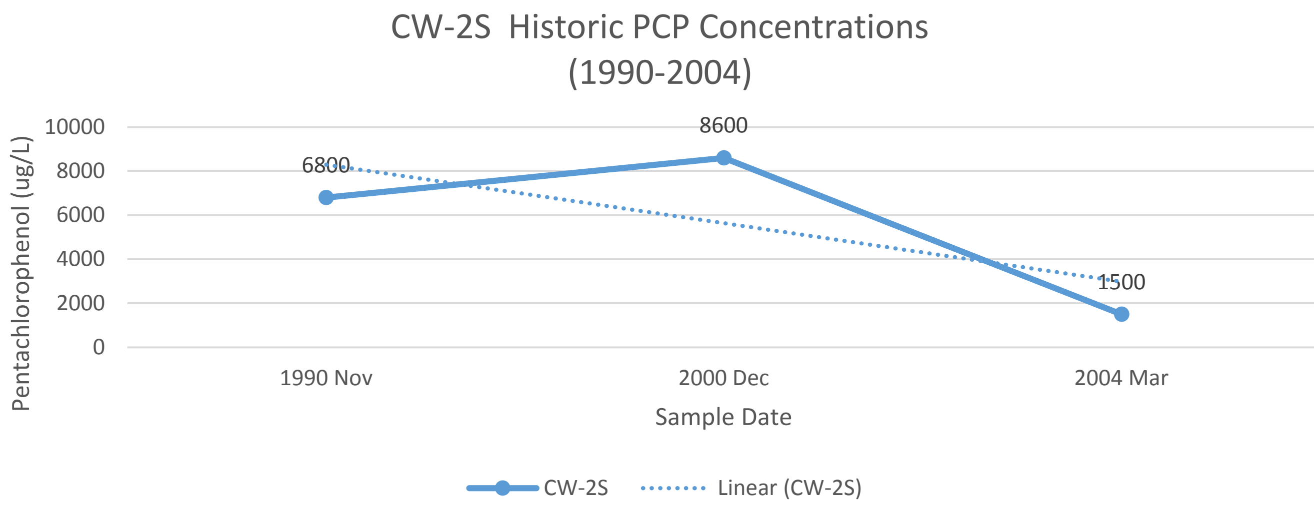
APPENDIX A

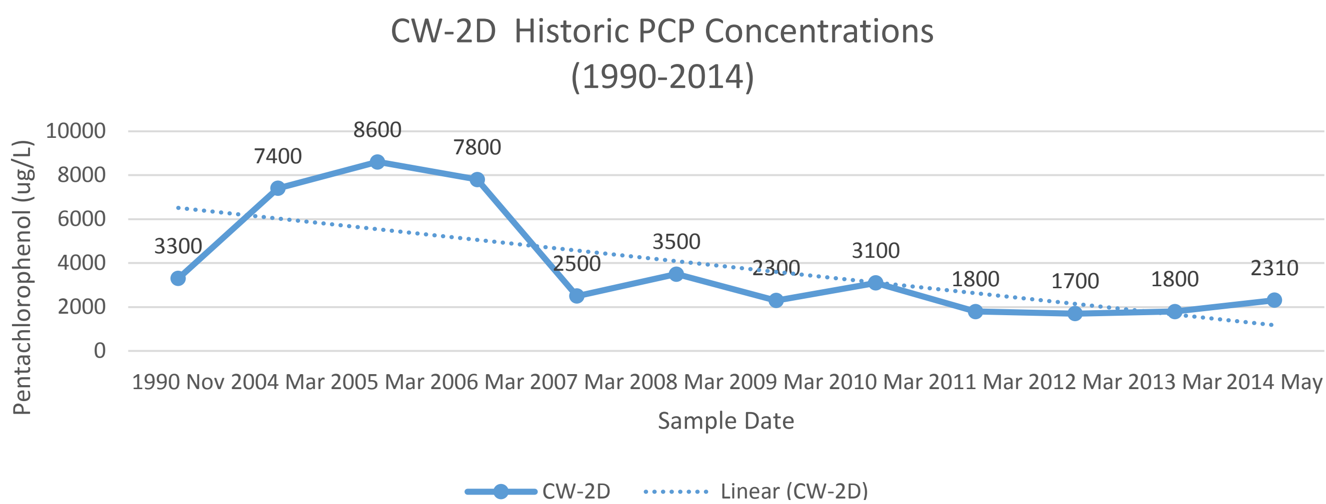
Historical PCP Trend
In Site wide Wells

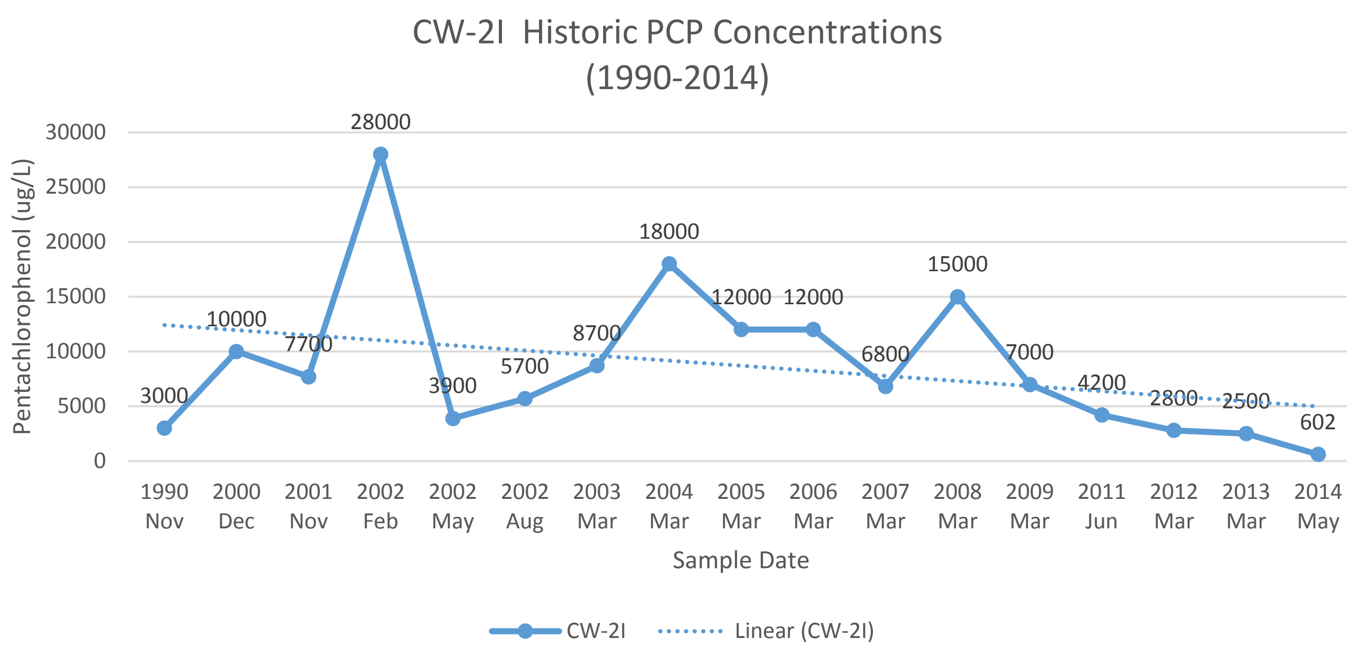

CW-1S Historic PCP Concentrations
(1990-2014)
Pentachlorophenol (ug/L)
400
300
200
100
0
250
190
310
100
310
210
79
280
160
110
180
13
160
145
1990 Nov
2000 Dec
2002 Oct
2004 Mar
2005 Mar
2006 Mar
2007 Mar
2008 Mar
2009 Mar
2010 Mar
2011 Mar
2012 Mar
2013 Mar
2014 May
Sample Date
CW-1S
Linear (CW-1S)


CW-1D Historic PCP Concentrations
(1990-2014)
Pentachlorophenol (ug/L)
100
50
0
57
83
69
77
54
72
63
54
58
40
30
20
8.9
11
1990 Nov
2000 Dec
2002 Oct
2004 Mar
2005 Mar
2006 Mar
2007 Mar
2008 Mar
2009 Mar
2010 Mar
2011 Mar
2012 Mar
2013 Mar
2014 May
Sample Date
CW-1D
Linear (CW-1D)

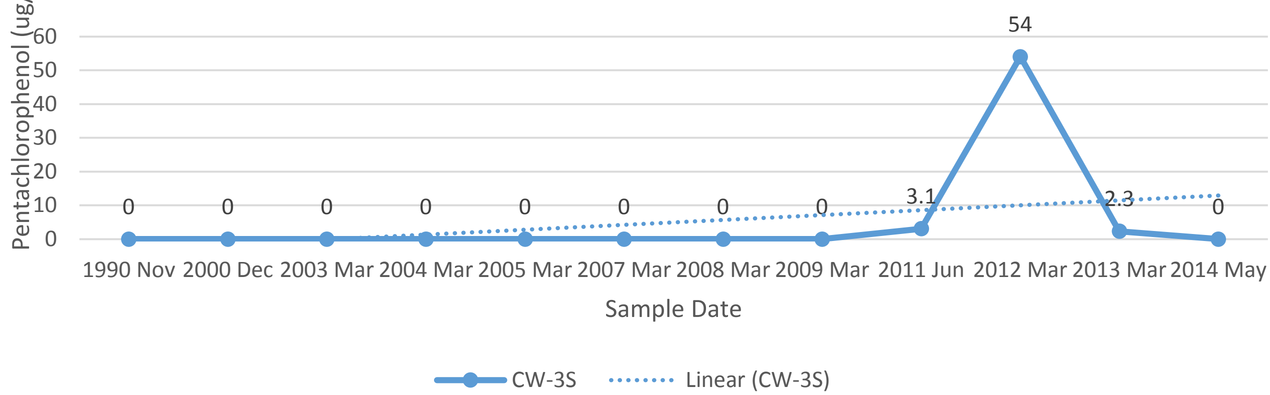

CW-1I Historic PCP Concentrations
(1990-2009)
Pentachlorophenol (ug/L)
200
150
100
50
0
54
56
190
34
21
40
28
49
62
1990 Nov
2000 Dec
2002 Oct
2004 Mar
2005 Mar
2006 Mar
2007 Mar
2008 Mar
2009 Mar
Sample Date
CW-1I
Linear (CW-1I)


CW-2S Historic PCP Concentrations
(1990-2004)
Pentachlorophenol (ug/L)
10000
8000
6000
4000
2000
0
6800
8600
1500
1990 Nov
2000 Dec
2004 Mar
Sample Date
CW-2S
Linear (CW-2S)

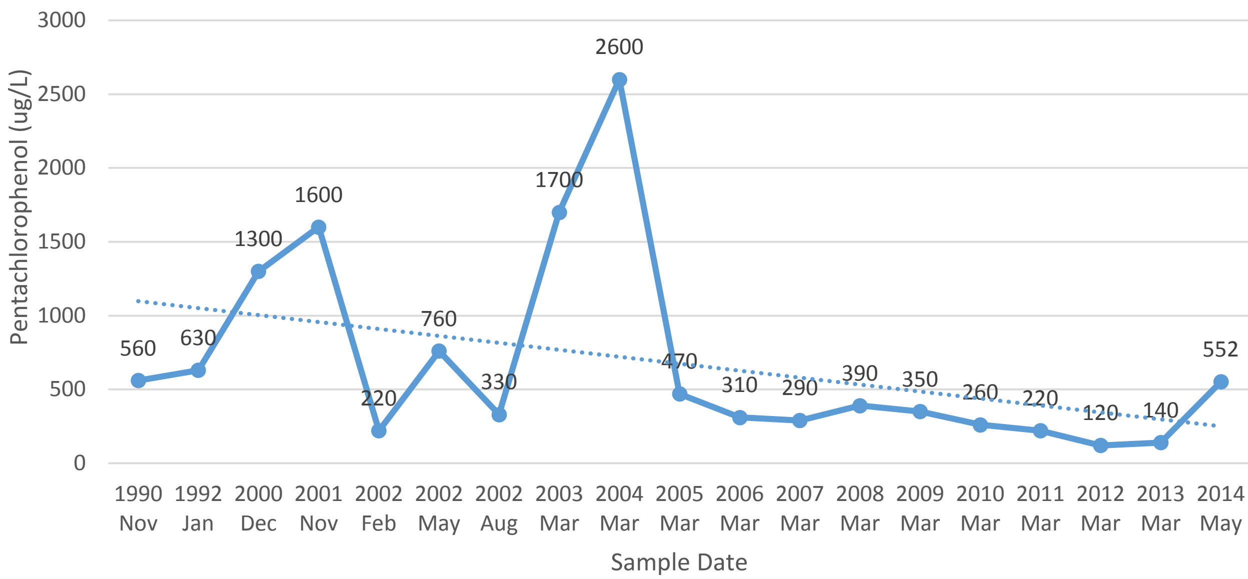

CW-2D Historic PCP Concentrations
(1990-2014)
Pentachlorophenol (ug/L)
10000
8000
6000
4000
2000
0
3300
7400
8600
7800
2500
3500
2300
3100
1800
1700
1800
2310
1990 Nov 2004 Mar 2005 Mar 2006 Mar 2007 Mar 2008 Mar 2009 Mar 2010 Mar 2011 Mar 2012 Mar 2013 Mar 2014 May
Sample Date
CW-2D
Linear (CW-2D)


CW-2I Historic PCP Concentrations
(1990-2014)
Pentachlorophenol (ug/L)
30000
25000
20000
15000
10000
5000
0
3000
10000
7700
28000
3900
5700
8700
18000
12000
12000
6800
15000
7000
4200
2800
2500
602
1990 Nov
2000 Dec
2001 Nov
2002 Feb
2002 May
2002 Aug
2003 Mar
2004 Mar
2005 Mar
2006 Mar
2007 Mar
2008 Mar
2009 Mar
2011 Jun
2012 Mar
2013 Mar
2014 May
Sample Date
CW-2I
Linear (CW-2I)

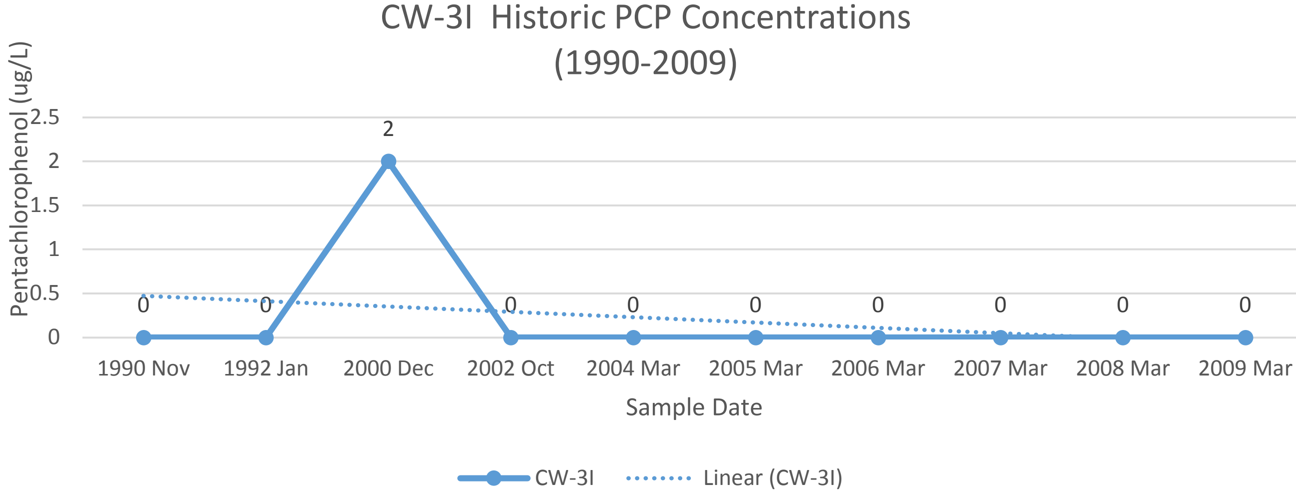
CW-3S Historic PCP Concentrations (1990-2014)

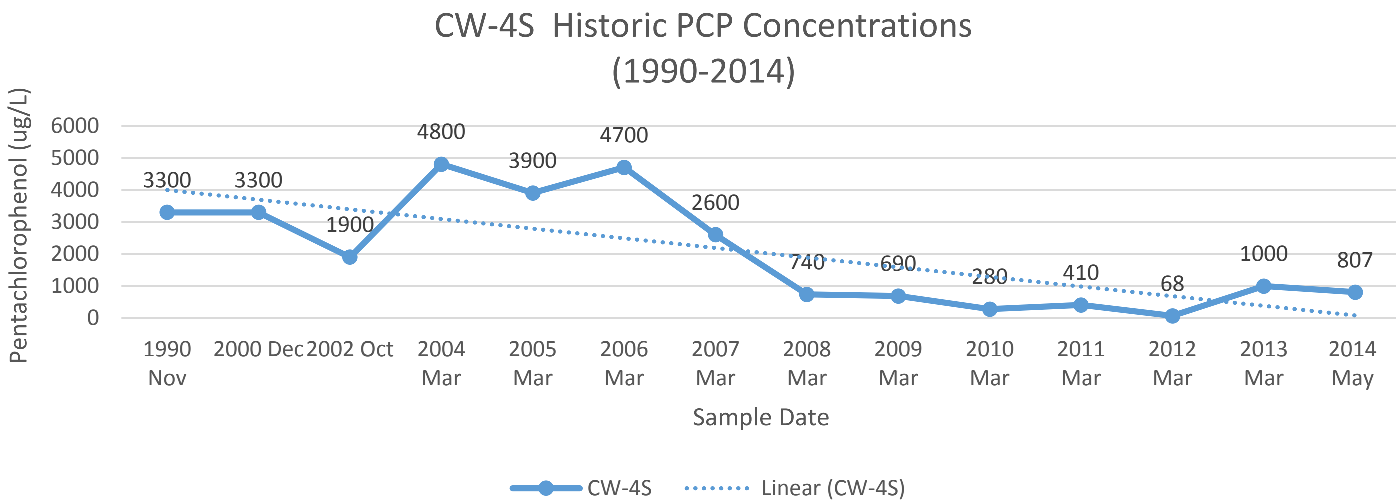


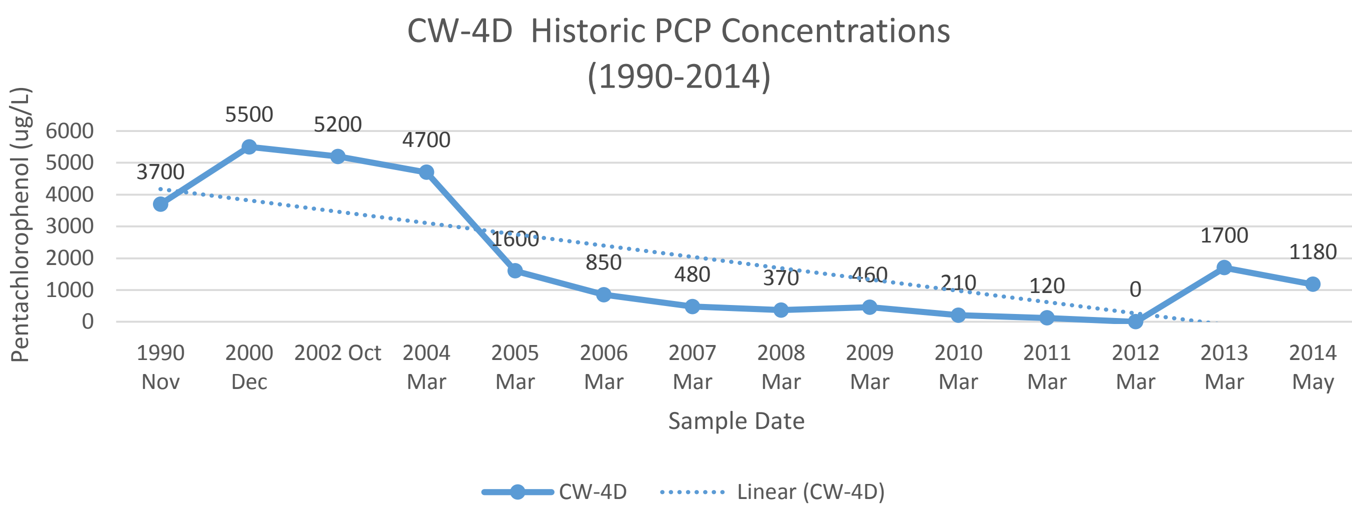
CW-3D Historic PCP Concentrations (1990-2014)

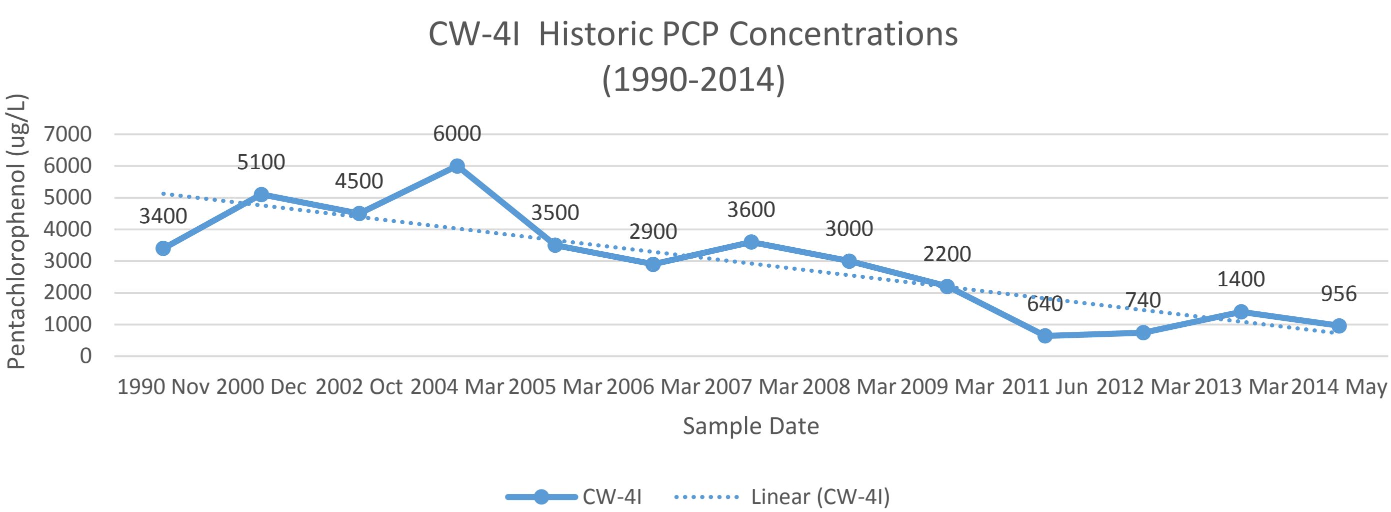


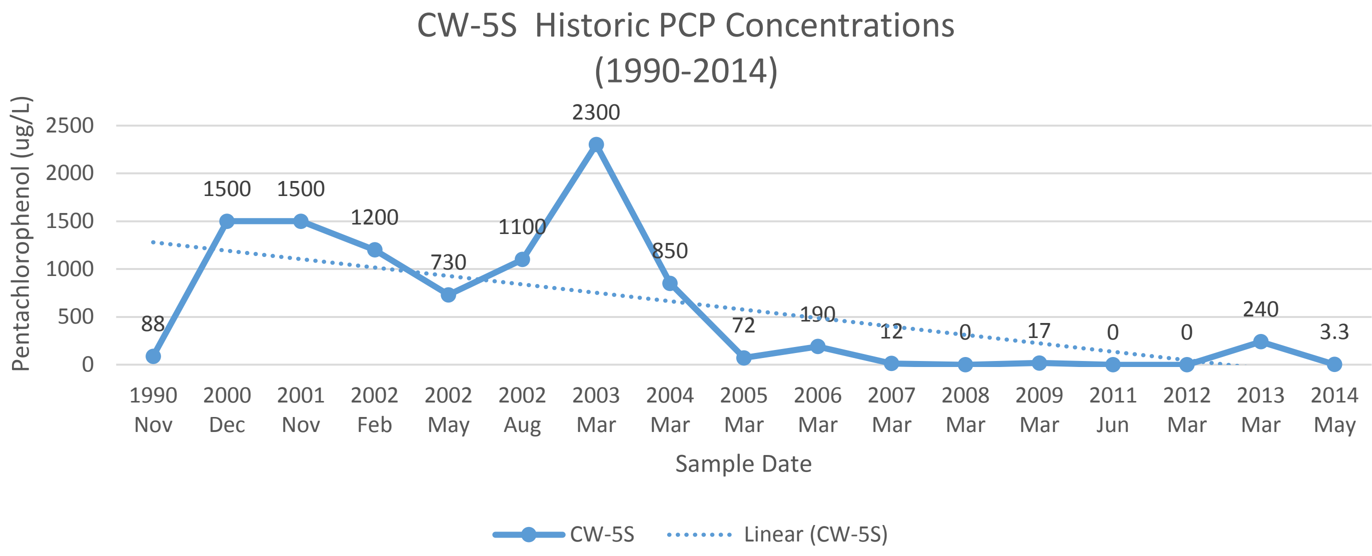
CW-3I Historic PCP Concentrations (1990-2009)

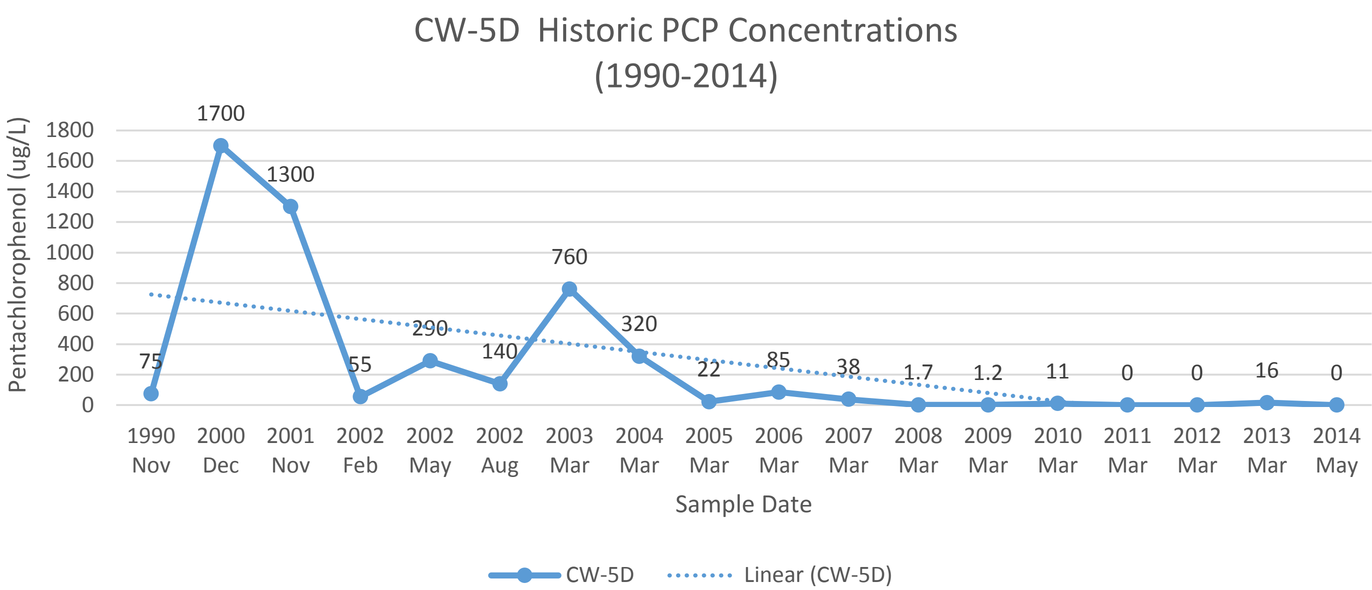


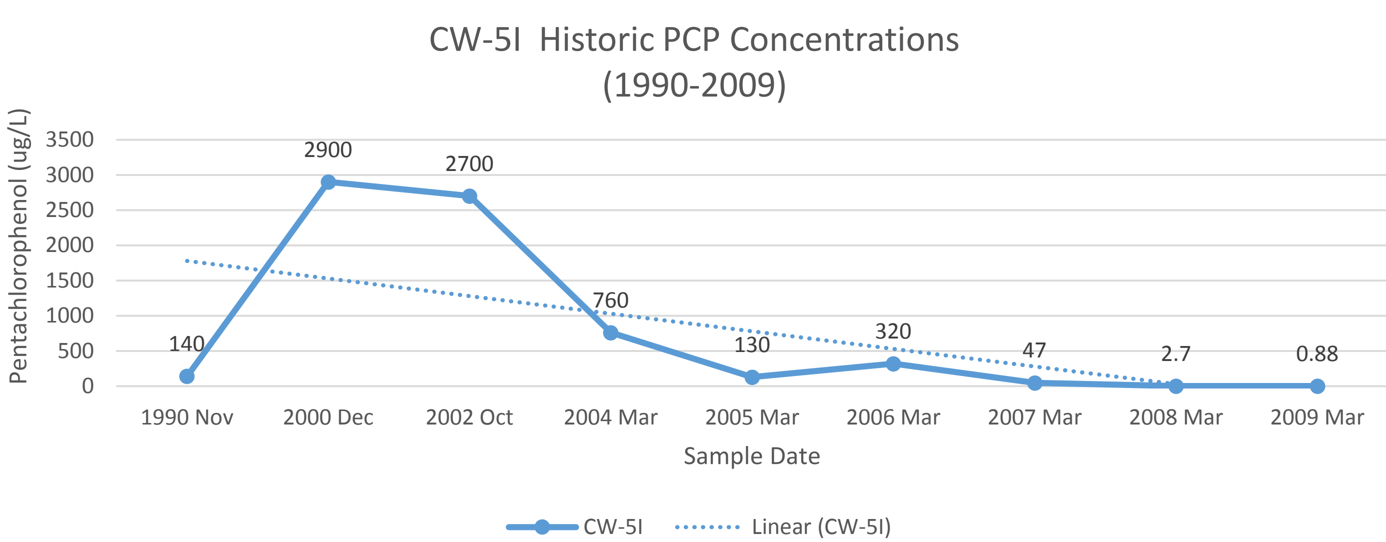

CW-4S Historic PCP Concentrations
(1990-2014)
Pentachlorophenol (ug/L)
6000
5000
4000
3000
2000
1000
0
3300
3300
1900
4800
3900
4700
2600
740
690
280
410
68
1000
807
1990 Nov
2000 Dec
2002 Oct
2004 Mar
2005 Mar
2006 Mar
2007 Mar
2008 Mar
2009 Mar
2010 Mar
2011 Mar
2012 Mar
2013 Mar
2014 May
Sample Date
CW-4S
Linear (CW-4S)

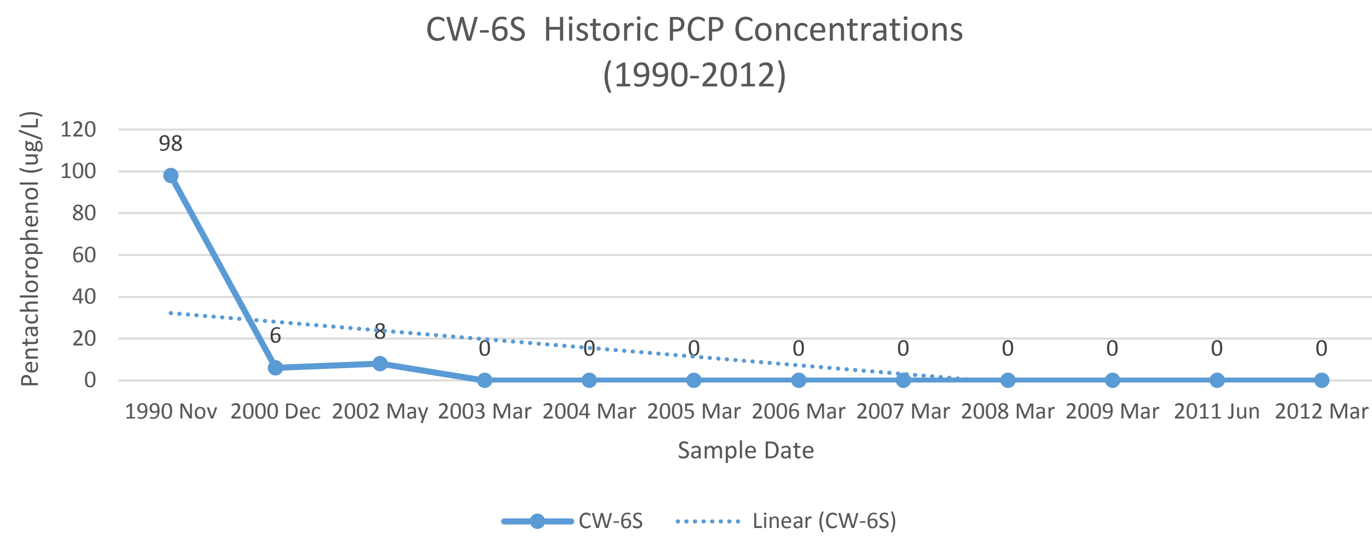

CW-4D Historic PCP Concentrations
(1990-2014)
Pentachlorophenol (ug/L)
6000
5000
4000
3000
2000
1000
0
3700
5500
5200
4700
1600
850
480
370
460
210
120
0
1700
1180
1990 Nov
2000 Dec
2002 Oct
2004 Mar
2005 Mar
2006 Mar
2007 Mar
2008 Mar
2009 Mar
2010 Mar
2011 Mar
2012 Mar
2013 Mar
2014 May
Sample Date
CW-4D
Linear (CW-4D)

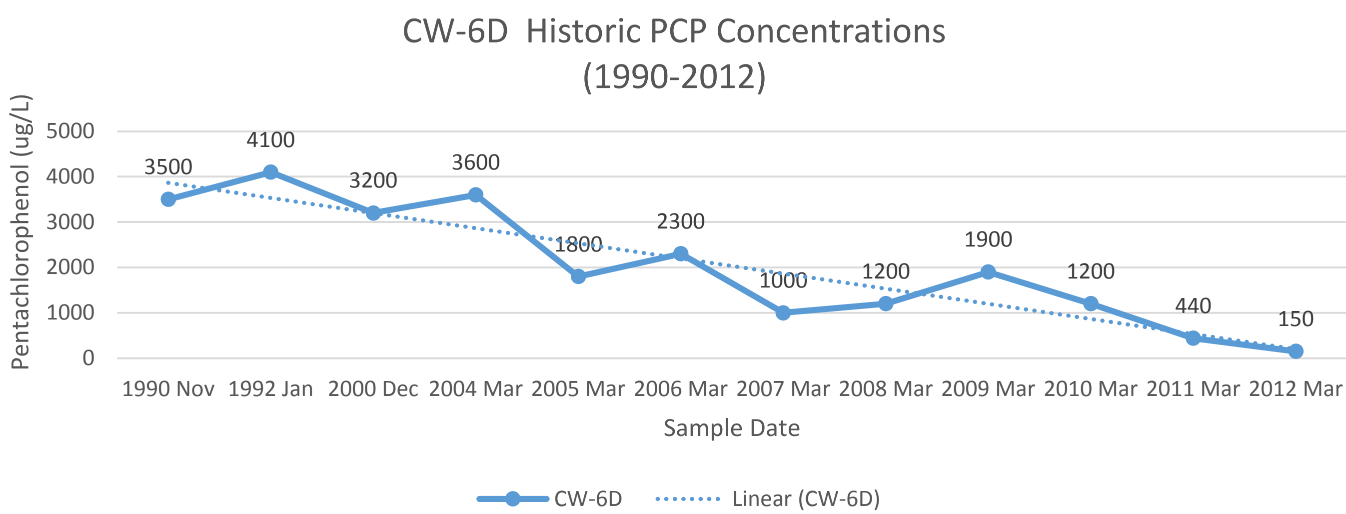

CW-4I Historic PCP Concentrations
(1990-2014)
Pentachlorophenol (ug/L)
7000
6000
5000
4000
3000
2000
1000
0
3400
5100
4500
6000
3500
2900
3600
3000
2200
640
740
1400
956
1990 Nov
2000 Dec
2002 Oct
2004 Mar
2005 Mar
2006 Mar
2007 Mar
2008 Mar
2009 Mar
2011 Jun
2012 Mar
2013 Mar
2014 May
Sample Date
CW-4I
Linear (CW-4I)

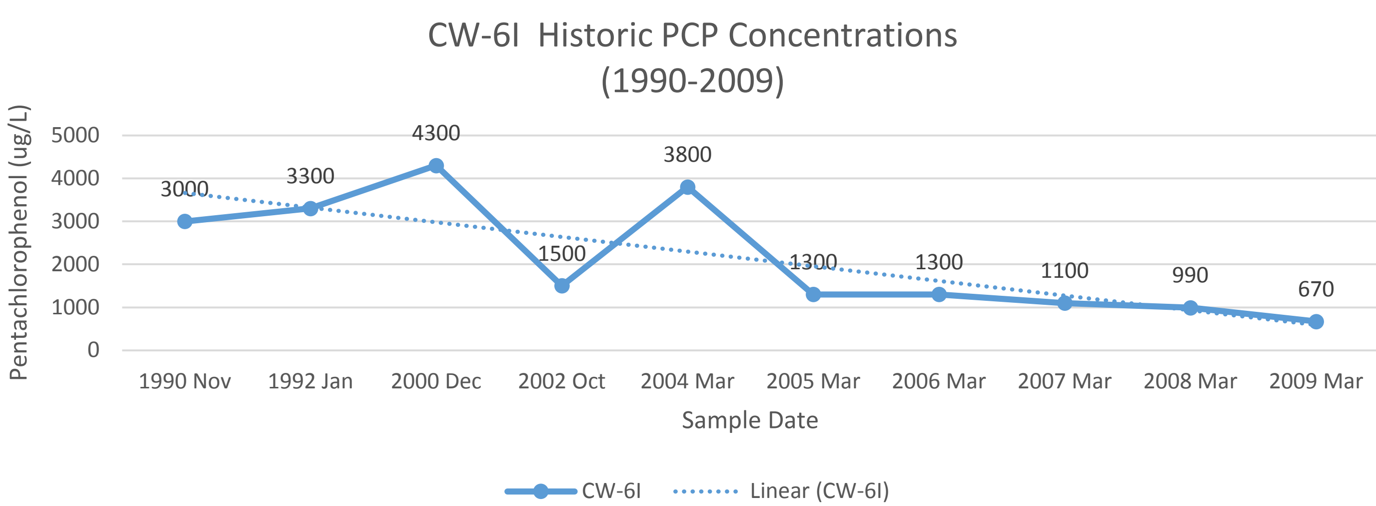

CW-5S Historic PCP Concentrations (1990-2014)
Pentachlorophenol (ug/L)
2500
2000
1500
1000
500
0
88
1500
1500
1200
730
1100
2300
850
72
190
12
0
17
0
0
240
3.3
1990 Nov
2000 Dec
2001 Nov
2002 Feb
2002 May
2002 Aug
2003 Mar
2004 Mar
2005 Mar
2006 Mar
2007 Mar
2008 Mar
2009 Mar
2011 Jun
2012 Mar
2013 Mar
2014 May
Sample Date
CW-5S
Linear (CW-5S)

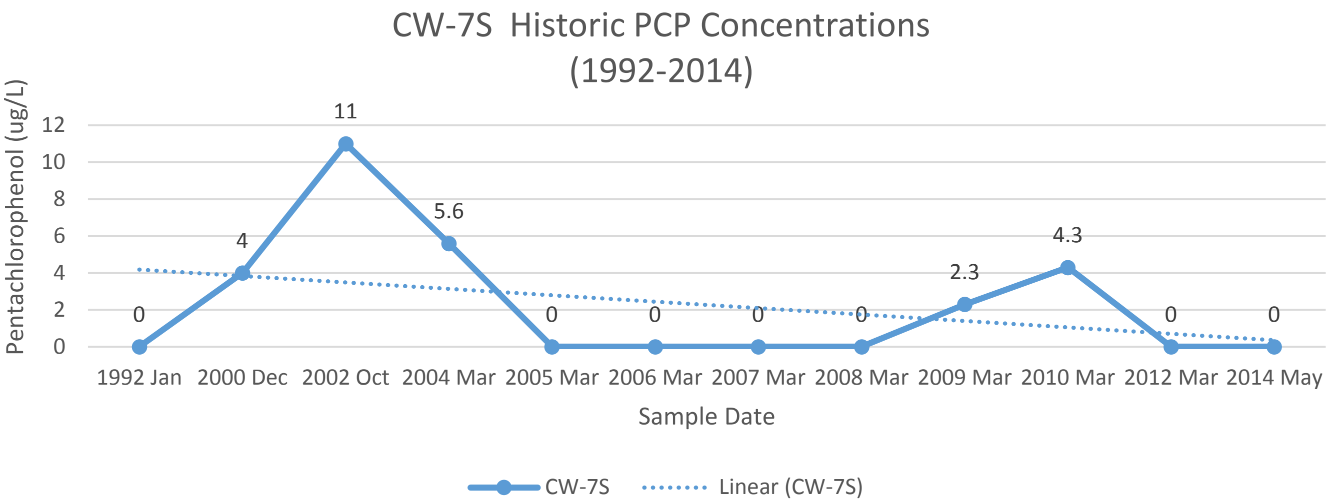

CW-5D Historic PCP Concentrations (1990-2014)
Pentachlorophenol (ug/L)
1800
1600
1400
1200
1000
800
600
400
200
0
75
1700
1300
55
290
140
760
320
22
85
38
1.7
1.2
11
0
0
16
0
1990 Nov
2000 Dec
2001 Nov
2002 Feb
2002 May
2002 Aug
2003 Mar
2004 Mar
2005 Mar
2006 Mar
2007 Mar
2008 Mar
2009 Mar
2010 Mar
2011 Mar
2012 Mar
2013 Mar
2014 May
Sample Date
CW-5D
Linear (CW-5D)

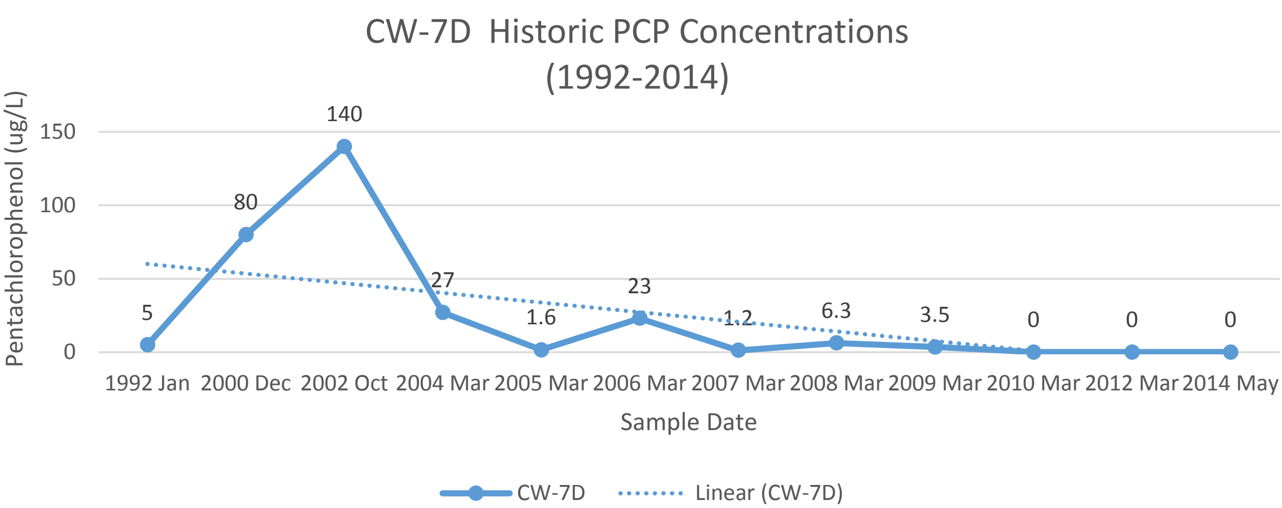

CW-5I Historic PCP Concentrations (1990-2009)
Pentachlorophenol (ug/L)
3500
3000
2500
2000
1500
1000
500
0
140
2900
2700
760
130
320
47
2.7
0.88
1990 Nov
2000 Dec
2002 Oct
2004 Mar
2005 Mar
2006 Mar
2007 Mar
2008 Mar
2009 Mar
Sample Date
CW-5I
Linear (CW-5I)

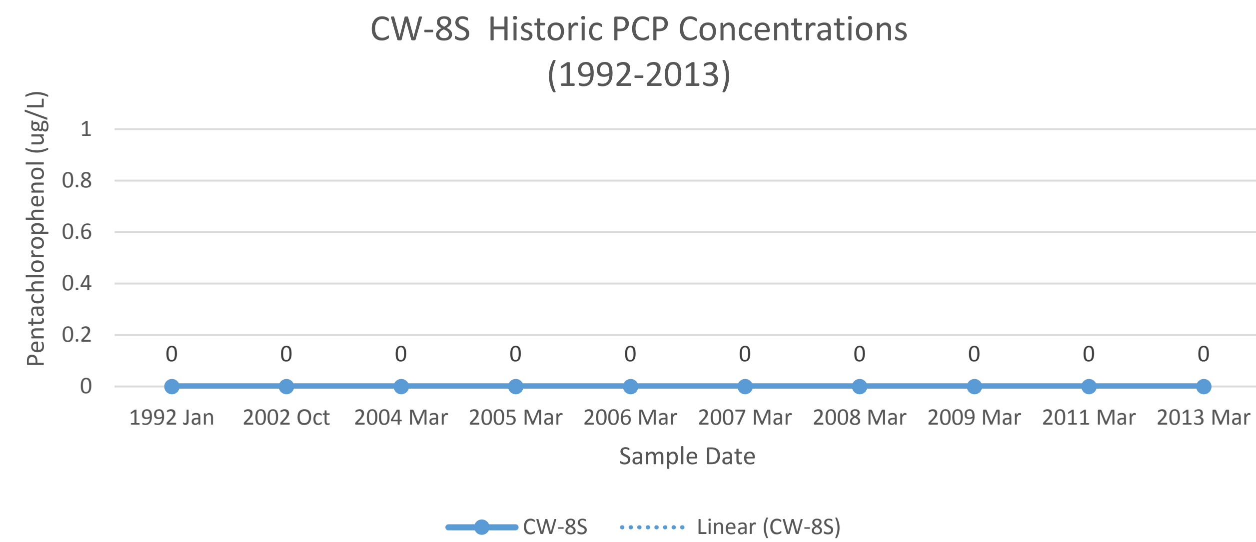

CW-6S Historic PCP Concentrations (1990-2012)
Pentachlorophenol (ug/L)
120
100
80
60
40
20
0
98
6
8
1990 Nov
2000 Dec
2002 May
2003 Mar
2004 Mar
2005 Mar
2006 Mar
2007 Mar
2008 Mar
2009 Mar
2011 Jun
2012 Mar
Sample Date
CW-6S
Linear (CW-6S)

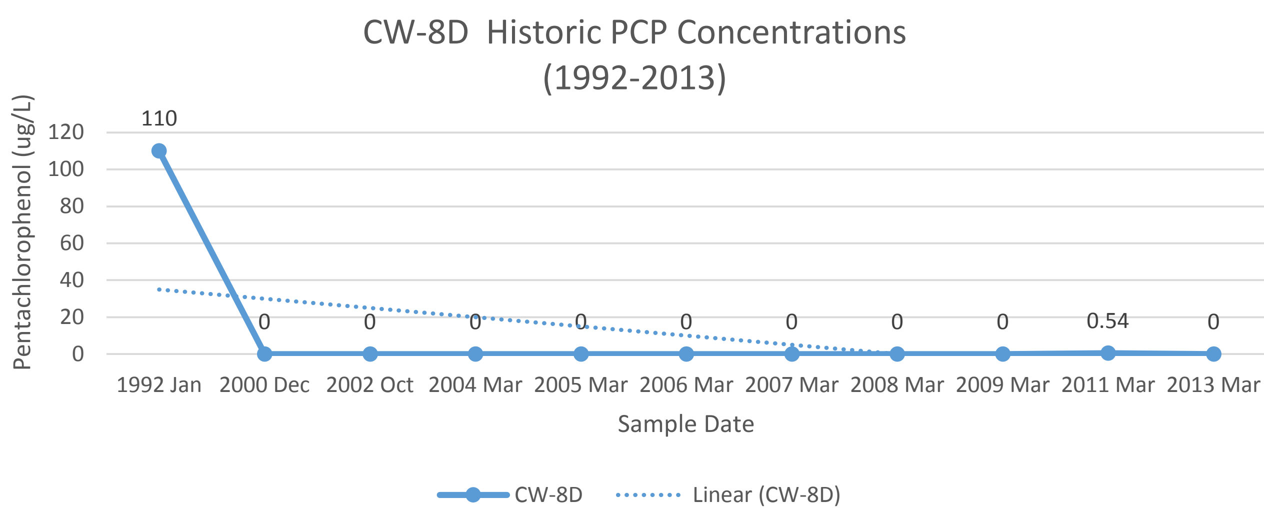

CW-6D Historic PCP Concentrations (1990-2012)
Pentachlorophenol (ug/L)
5000
4000
3000
2000
1000
0
3500
4100
3200
3600
1800
2300
1000
1200
1900
1200
440
150
1990 Nov
1992 Jan
2000 Dec
2004 Mar
2005 Mar
2006 Mar
2007 Mar
2008 Mar
2009 Mar
2010 Mar
2011 Mar
2012 Mar
Sample Date
CW-6D
Linear (CW-6D)

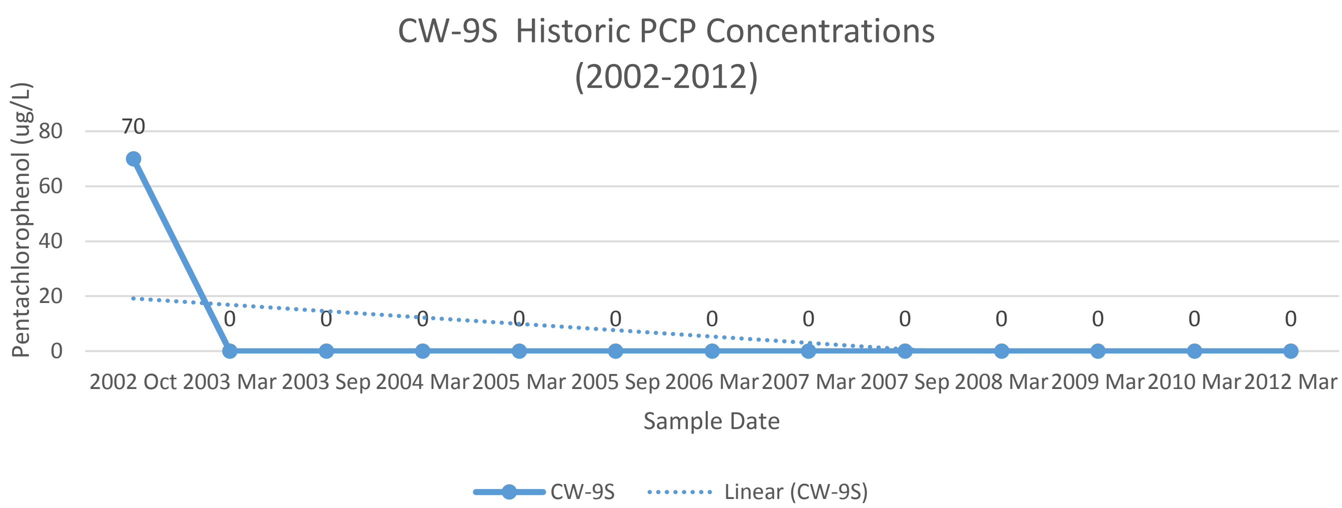

CW-6I Historic PCP Concentrations (1990-2009)
Pentachlorophenol (ug/L)
5000
4000
3000
2000
1000
0
3000
3300
4300
1500
3800
1300
1300
1100
990
670
1990 Nov
1992 Jan
2000 Dec
2002 Oct
2004 Mar
2005 Mar
2006 Mar
2007 Mar
2008 Mar
2009 Mar
Sample Date
CW-6I
Linear (CW-6I)

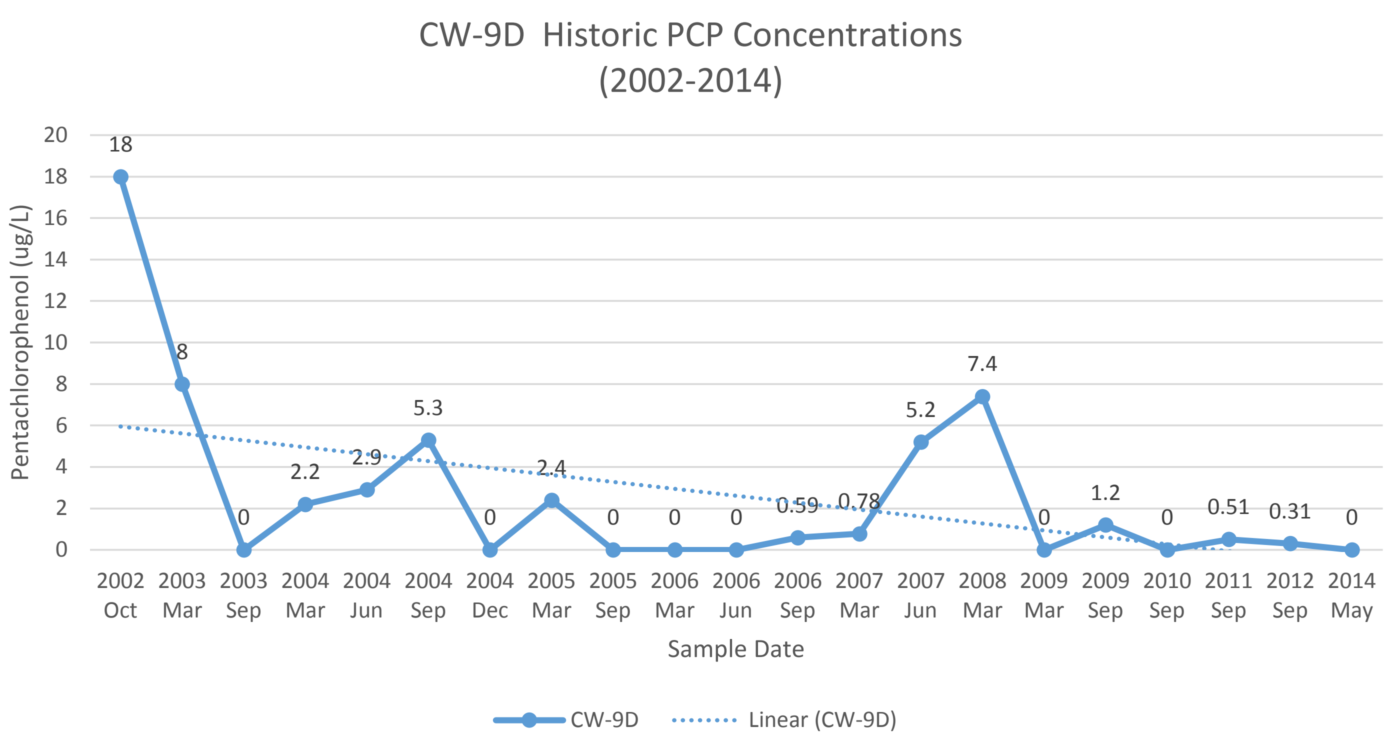

CW-7S Historic PCP Concentrations
(1992-2014)
Pentachlorophenol (ug/L)
12
10
8
6
4
2
0
11
5.6
4
4.3
2.3
0
0
0
0
0
0
0
1992 Jan
2000 Dec
2002 Oct
2004 Mar
2005 Mar
2006 Mar
2007 Mar
2008 Mar
2009 Mar
2010 Mar
2012 Mar
2014 May
Sample Date
CW-7S
Linear (CW-7S)

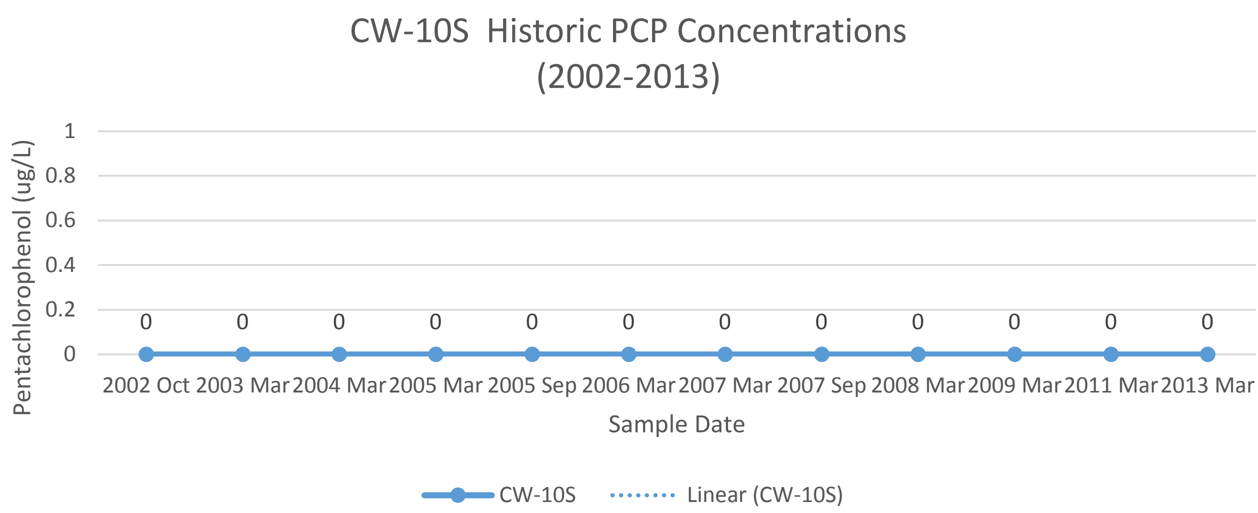

CW-7D Historic PCP Concentrations
(1992-2014)
Pentachlorophenol (ug/L)
150
100
50
0
140
80
27
23
5
1.6
1.2
6.3
3.5
0
0
0
1992 Jan
2000 Dec
2002 Oct
2004 Mar
2005 Mar
2006 Mar
2007 Mar
2008 Mar
2009 Mar
2010 Mar
2012 Mar
2014 May
Sample Date
CW-7D
Linear (CW-7D)

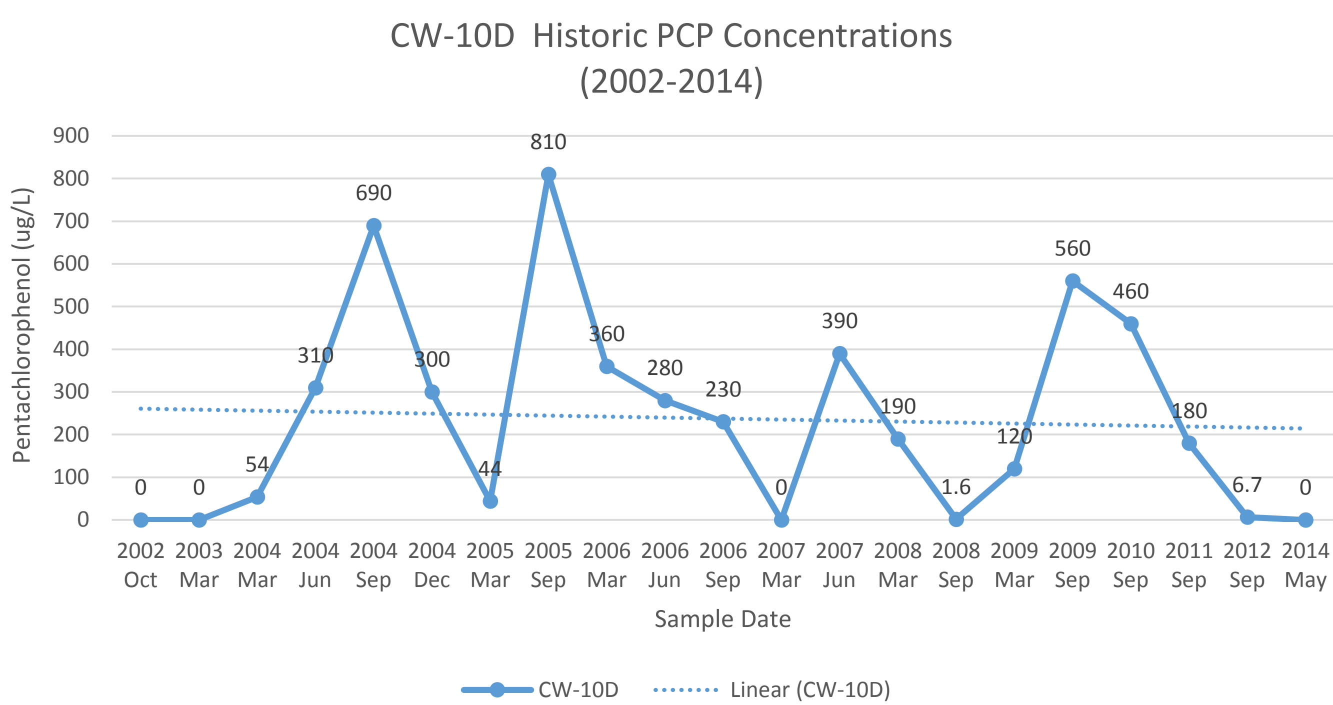

CW-8S Historic PCP Concentrations
(1992-2013)
Pentachlorophenol (ug/L)
1
0.8
0.6
0.4
0.2
0
0 0 0 0 0 0 0 0 0 0
1992 Jan 2002 Oct 2004 Mar 2005 Mar 2006 Mar 2007 Mar 2008 Mar 2009 Mar 2011 Mar 2013 Mar
Sample Date
CW-8S
Linear (CW-8S)

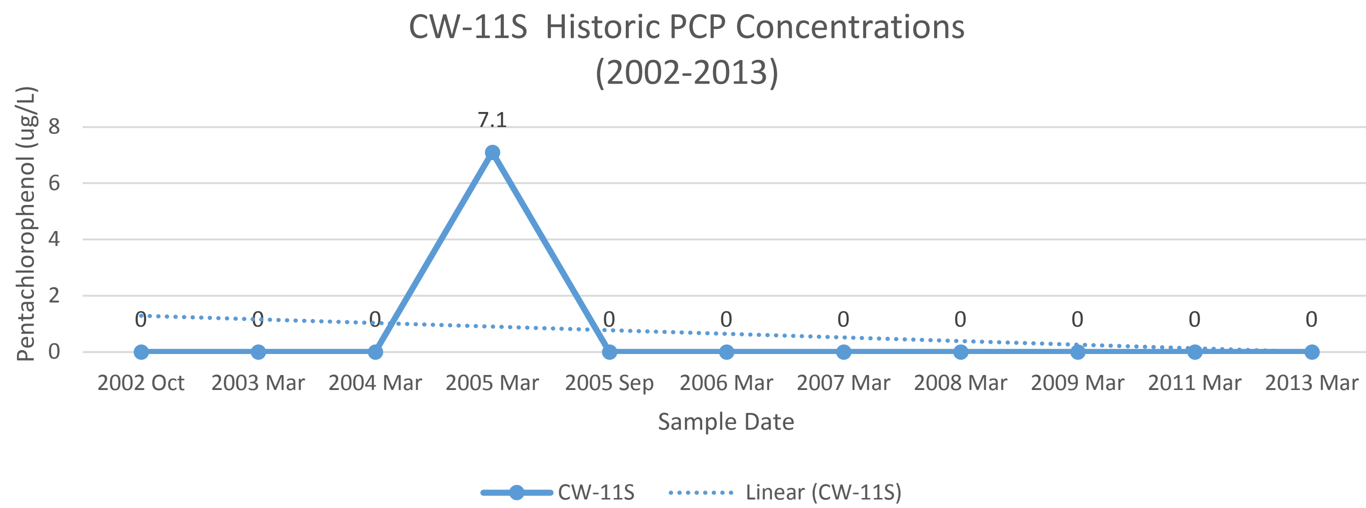

CW-8D Historic PCP Concentrations
(1992-2013)
Pentachlorophenol (ug/L)
120
100
80
60
40
20
0
110
0 0 0 0 0 0 0 0 0.54 0
1992 Jan 2000 Dec 2002 Oct 2004 Mar 2005 Mar 2006 Mar 2007 Mar 2008 Mar 2009 Mar 2011 Mar 2013 Mar
Sample Date
CW-8D
Linear (CW-8D)

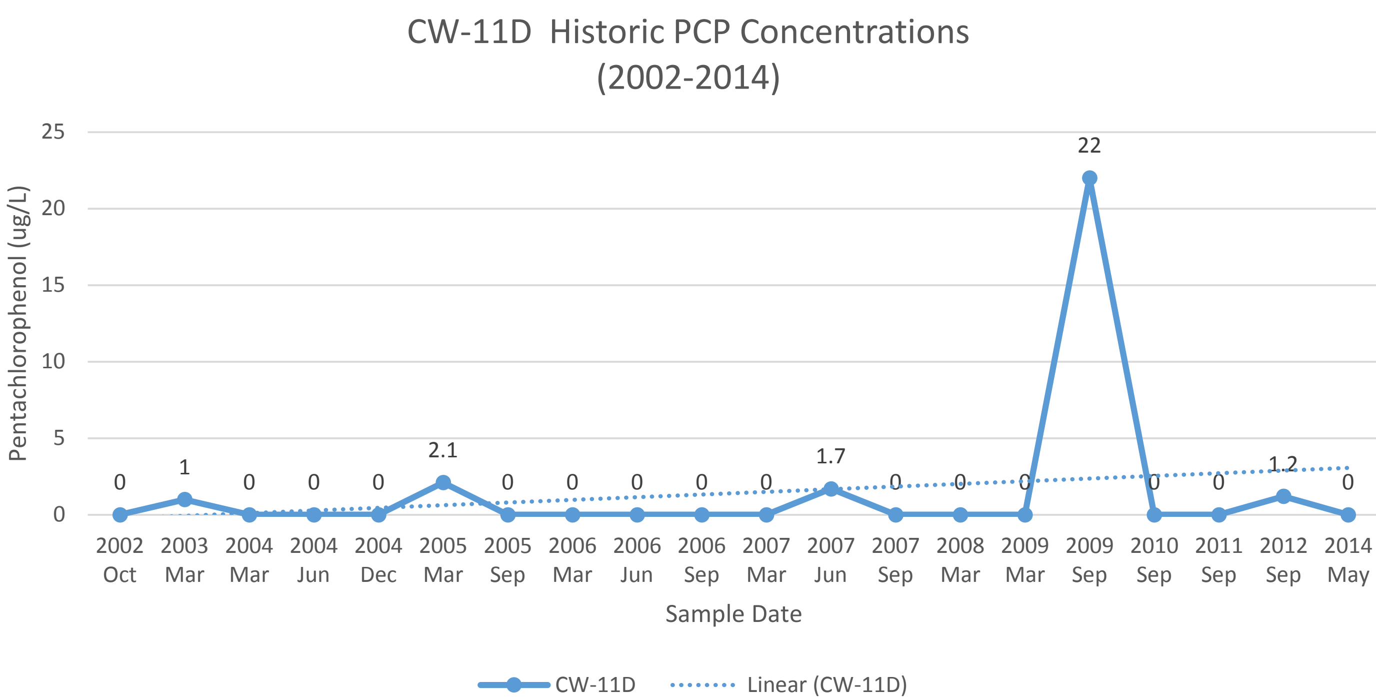

CW-9S Historic PCP Concentrations
(2002-2012)
Pentachlorophenol (ug/L)
80
60
40
20
0
70
0
2002 Oct
2003 Mar
2003 Sep
2004 Mar
2005 Mar
2005 Sep
2006 Mar
2007 Mar
2007 Sep
2008 Mar
2009 Mar
2010 Mar
2012 Mar
Sample Date
CW-9S
Linear (CW-9S)

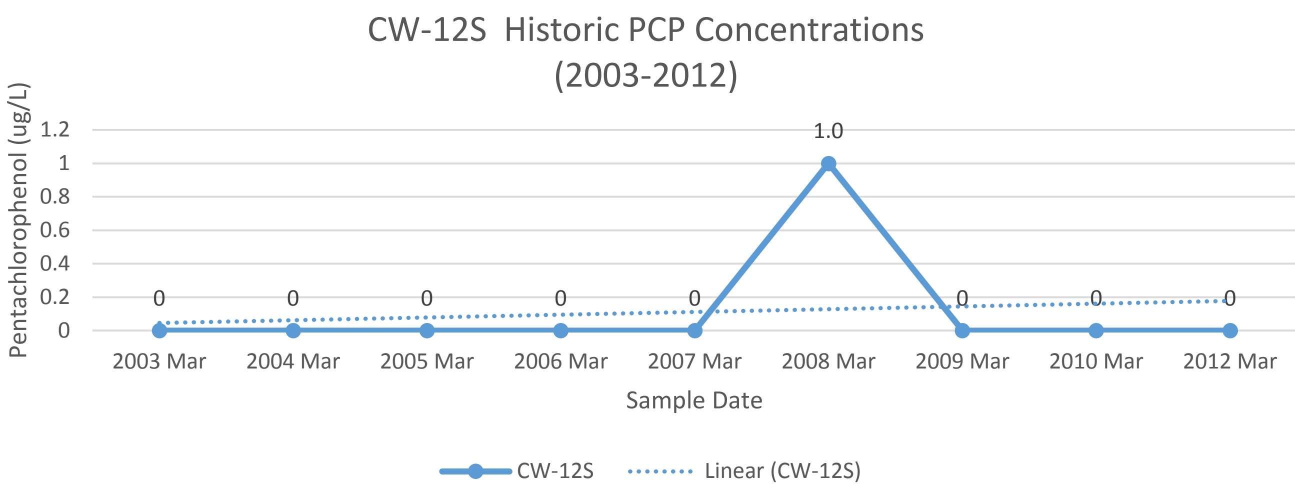

CW-9D Historic PCP Concentrations
(2002-2014)
Pentachlorophenol (ug/L)
20
18
16
14
12
10
8
6
4
2
0
18
8
0
2.2
2.9
5.3
0
2.4
0
0
0
0.59
0.78
5.2
7.4
0
1.2
0
0.51
0.31
0
2002 Oct
2003 Mar
2003 Sep
2004 Mar
2004 Jun
2004 Sep
2004 Dec
2005 Mar
2005 Sep
2006 Mar
2006 Jun
2006 Sep
2007 Mar
2007 Jun
2008 Mar
2009 Mar
2009 Sep
2010 Sep
2011 Sep
2012 Sep
2014 May
Sample Date
CW-9D
Linear (CW-9D)

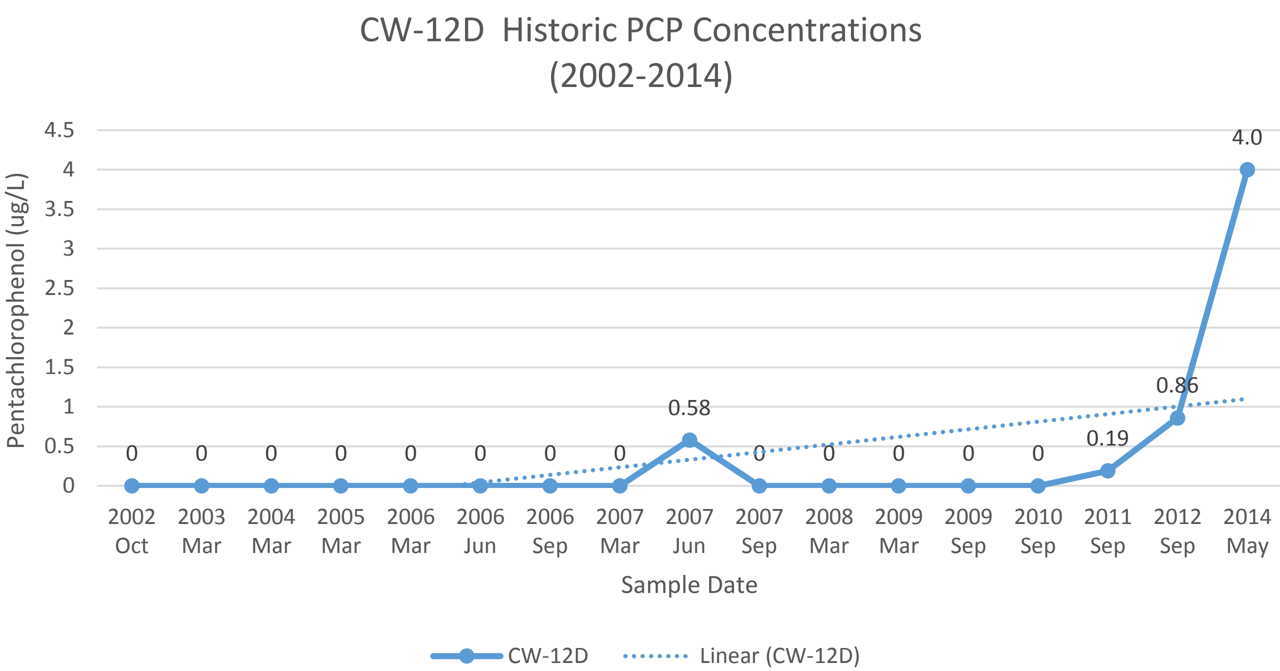

CW-10S Historic PCP Concentrations
(2002-2013)
Pentachlorophenol (ug/L)
1
0.8
0.6
0.4
0.2
0
0 0 0 0 0 0 0 0 0 0 0 0
2002 Oct 2003 Mar 2004 Mar 2005 Mar 2005 Sep 2006 Mar 2007 Mar 2007 Sep 2008 Mar 2009 Mar 2011 Mar 2013 Mar
Sample Date
CW-10S
Linear (CW-10S)

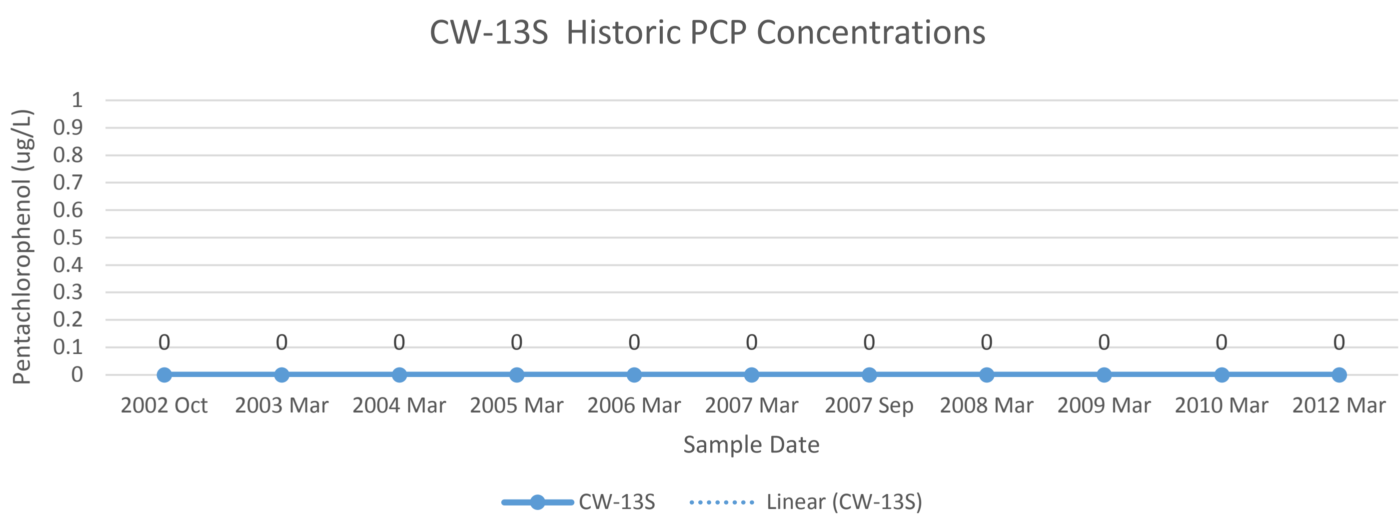

CW-10D Historic PCP Concentrations
(2002-2014)
Pentachlorophenol (ug/L)
900
800
700
600
500
400
300
200
100
0
0 0 54 310 690 300 44 810 360 280 230 0 390 190 1.6 120 560 460 180 6.7 0
2002 Oct
2003 Mar
2004 Mar
2004 Jun
2004 Sep
2004 Dec
2005 Mar
2005 Sep
2006 Mar
2006 Jun
2006 Sep
2007 Mar
2007 Jun
2008 Mar
2008 Sep
2009 Mar
2009 Sep
2010 Sep
2011 Sep
2012 Sep
2014 May
Sample Date
CW-10D
Linear (CW-10D)

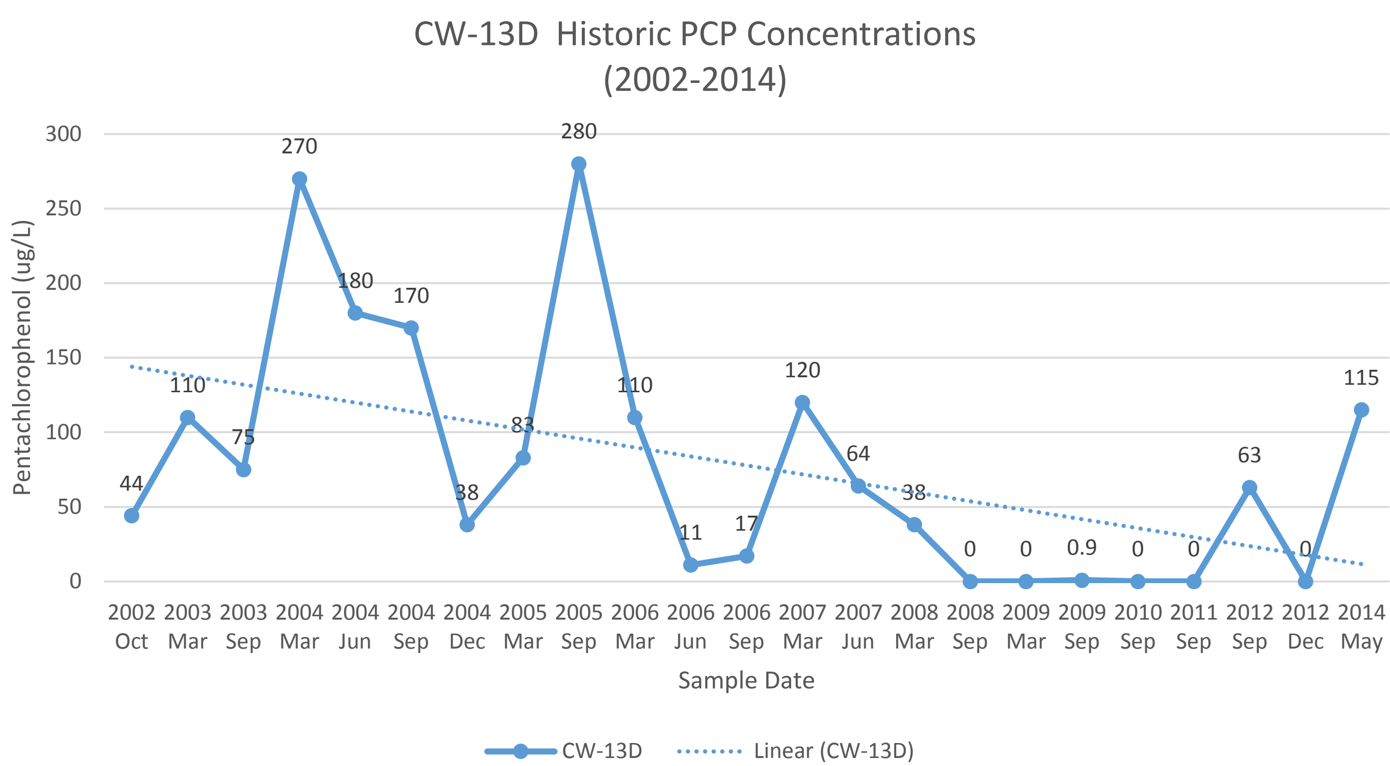

CW-11S Historic PCP Concentrations
(2002-2013)
Pentachlorophenol (ug/L)
8
6
4
2
0
7.1
0
2002 Oct
2003 Mar
2004 Mar
2005 Mar
2005 Sep
2006 Mar
2007 Mar
2008 Mar
2009 Mar
2011 Mar
2013 Mar
Sample Date
CW-11S
Linear (CW-11S)

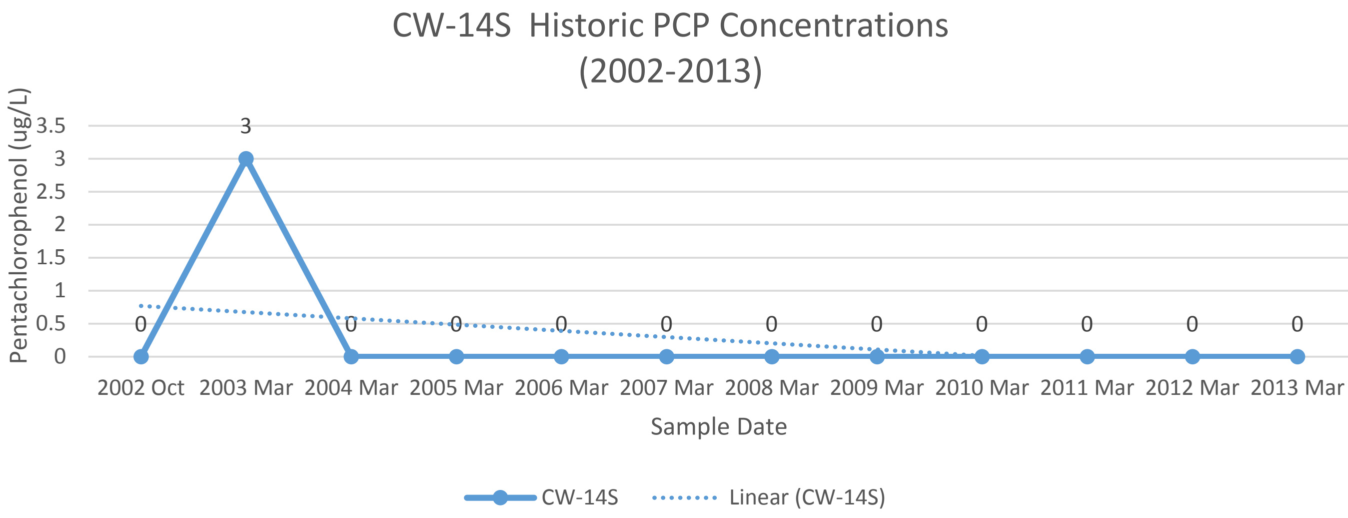

CW-11D Historic PCP Concentrations
(2002-2014)
Pentachlorophenol (ug/L)
25
20
15
10
5
0
22
2.1
1.7
1.2
1
2002 Oct
2003 Mar
2004 Mar
2004 Jun
2004 Dec
2005 Mar
2005 Sep
2006 Mar
2006 Jun
2006 Sep
2007 Mar
2007 Jun
2007 Sep
2008 Mar
2009 Mar
2009 Sep
2010 Sep
2011 Sep
2012 Sep
2014 May
Sample Date
CW-11D
Linear (CW-11D)

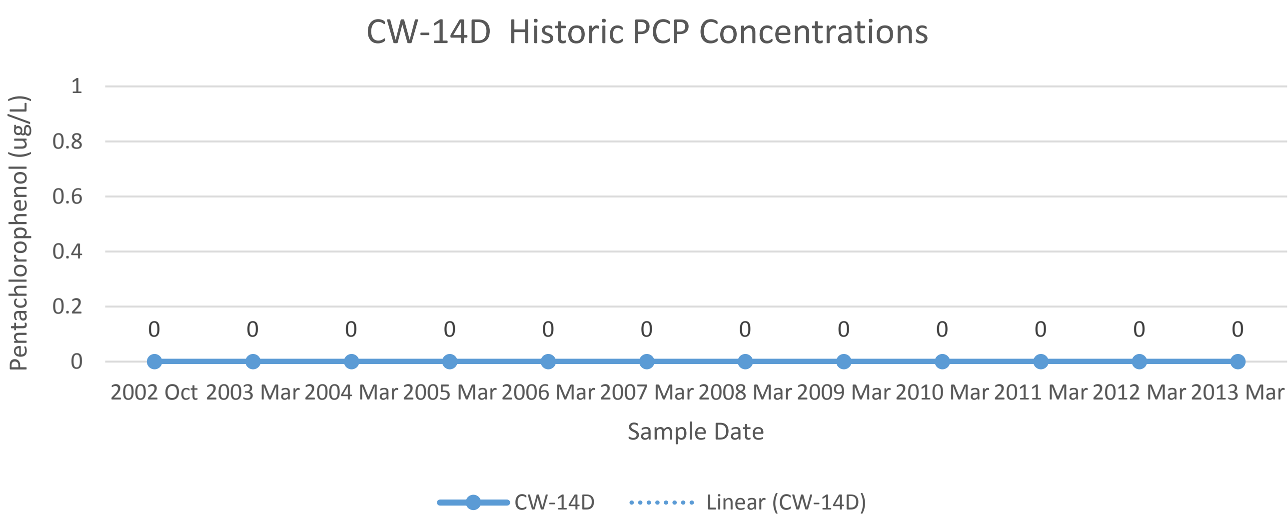

CW-12S Historic PCP Concentrations
(2003-2012)
Pentachlorophenol (ug/L)
1.2
1
0.8
0.6
0.4
0.2
0
1.0
0
2003 Mar
2004 Mar
2005 Mar
2006 Mar
2007 Mar
2008 Mar
2009 Mar
2010 Mar
2012 Mar
Sample Date
CW-12S
Linear (CW-12S)

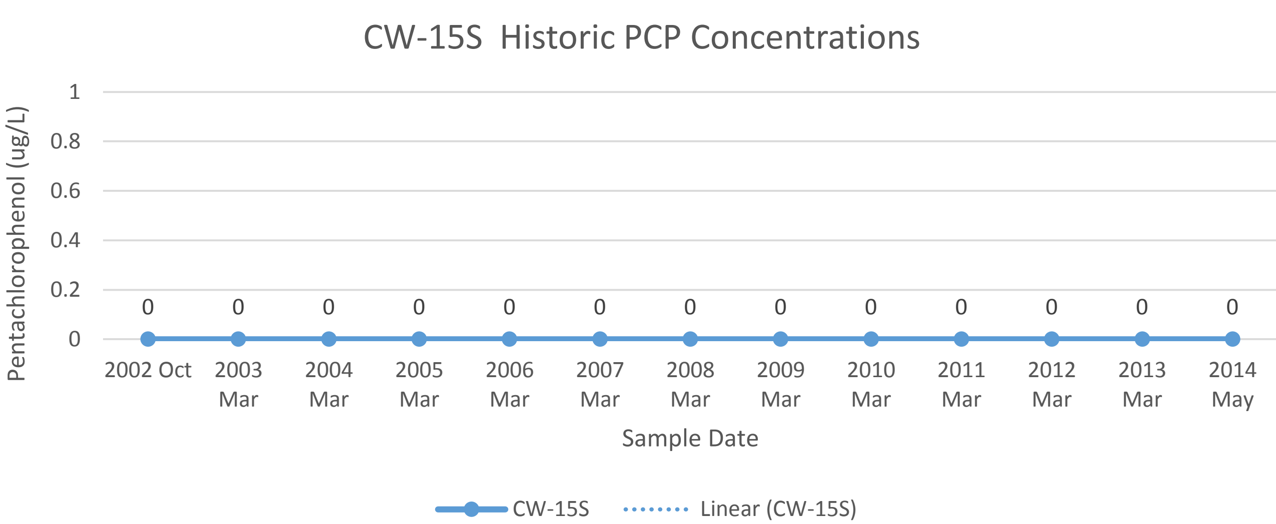

CW-12D Historic PCP Concentrations
(2002-2014)
Pentachlorophenol (ug/L)
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
4.0
0.86
0.58
0.19
0
2002 Oct
2003 Mar
2004 Mar
2005 Mar
2006 Mar
2006 Jun
2006 Sep
2007 Mar
2007 Jun
2007 Sep
2008 Mar
2009 Mar
2009 Sep
2010 Sep
2011 Sep
2012 Sep
2014 May
Sample Date
CW-12D
Linear (CW-12D)

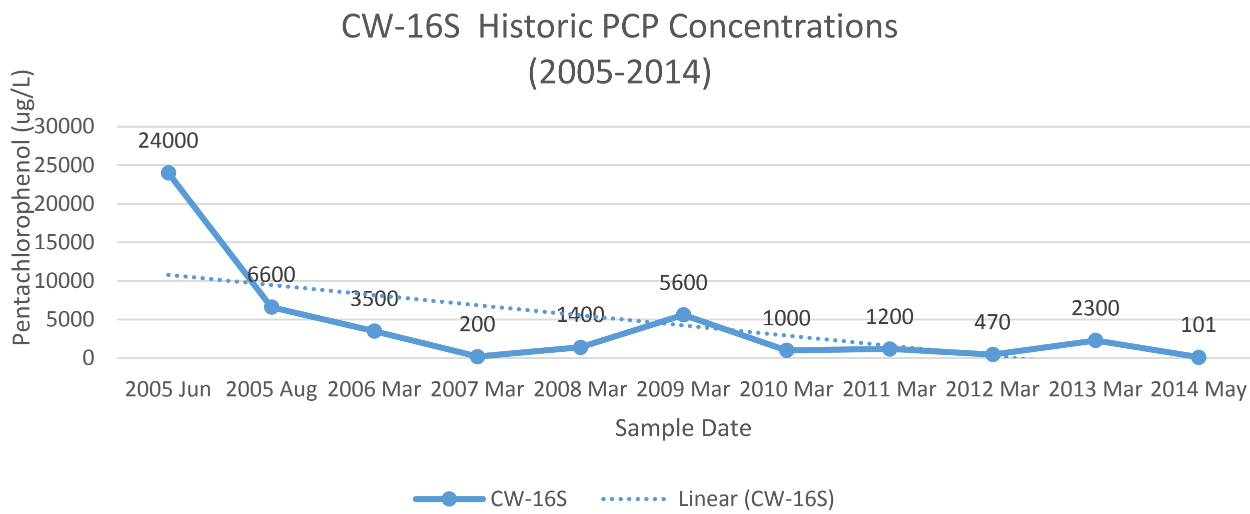

CW-13S Historic PCP Concentrations
Pentachlorophenol (ug/L)
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0 0 0 0 0 0 0 0 0 0 0
2002 Oct 2003 Mar 2004 Mar 2005 Mar 2006 Mar 2007 Mar 2007 Sep 2008 Mar 2009 Mar 2010 Mar 2012 Mar
Sample Date
CW-13S
Linear (CW-13S)

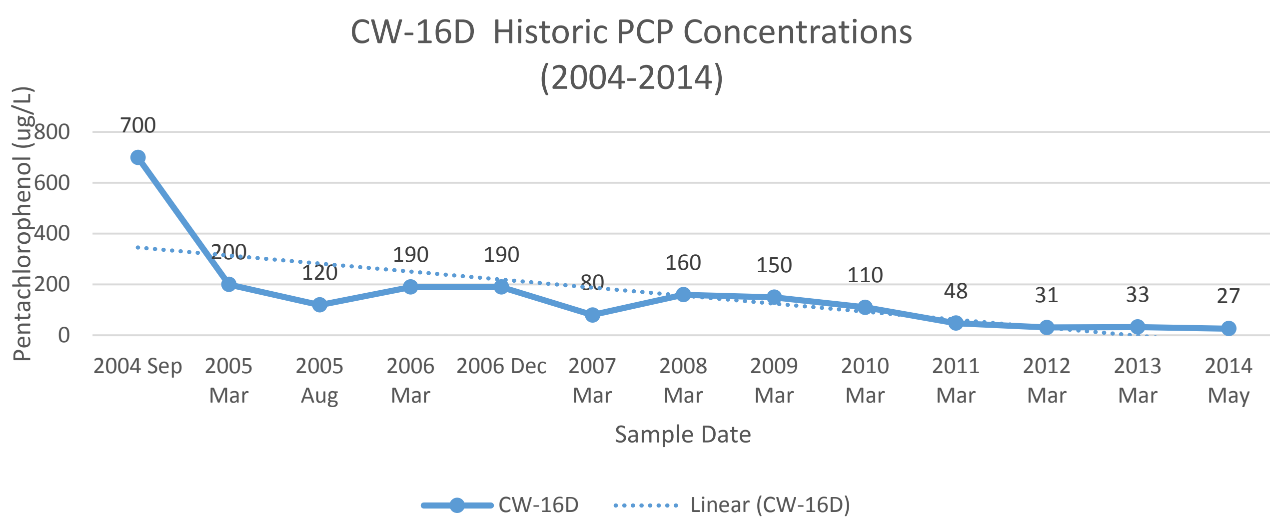

CW-13D Historic PCP Concentrations
(2002-2014)
Pentachlorophenol (ug/L)
300
250
200
150
100
50
0
44 110 75 270 180 170 38 83 280 110 11 17 120 64 38 0 0 0.9 0 0 63 0 115
2002 Oct 2003 Mar 2003 Sep 2004 Mar 2004 Jun 2004 Sep 2004 Dec 2005 Mar 2005 Sep 2006 Mar 2006 Jun 2006 Sep 2007 Mar 2007 Jun 2008 Mar 2008 Sep 2009 Mar 2009 Sep 2010 Sep 2011 Sep 2012 Sep 2012 Dec 2014 May
Sample Date
CW-13D
Linear (CW-13D)

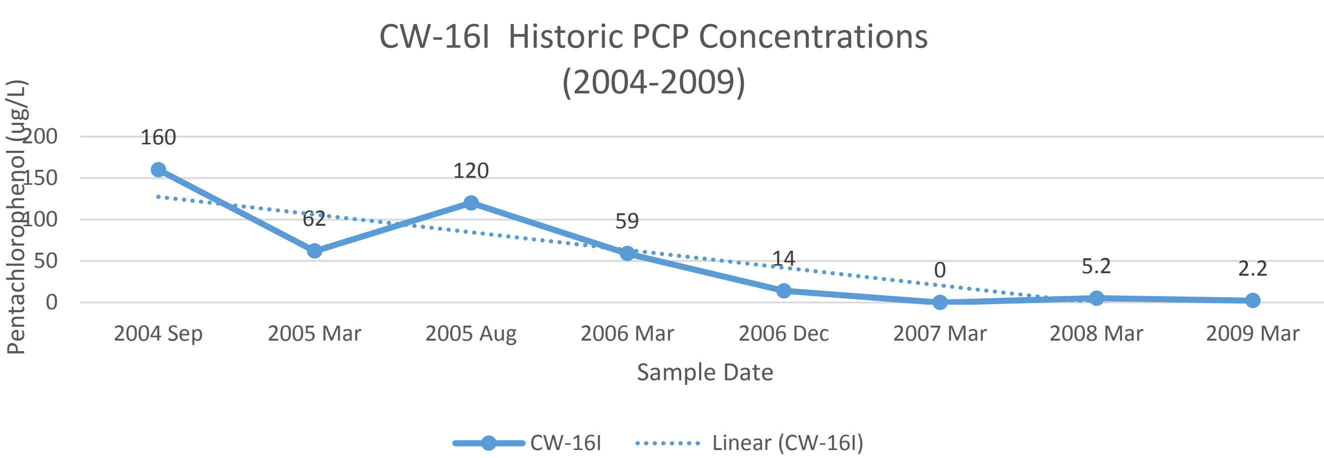

CW-14S Historic PCP Concentrations
(2002-2013)
Pentachlorophenol (ug/L)
3.5
3
2.5
2
1.5
1
0.5
0
3
0 0 0 0 0 0 0 0 0 0 0
2002 Oct 2003 Mar 2004 Mar 2005 Mar 2006 Mar 2007 Mar 2008 Mar 2009 Mar 2010 Mar 2011 Mar 2012 Mar 2013 Mar
Sample Date
CW-14S
Linear (CW-14S)

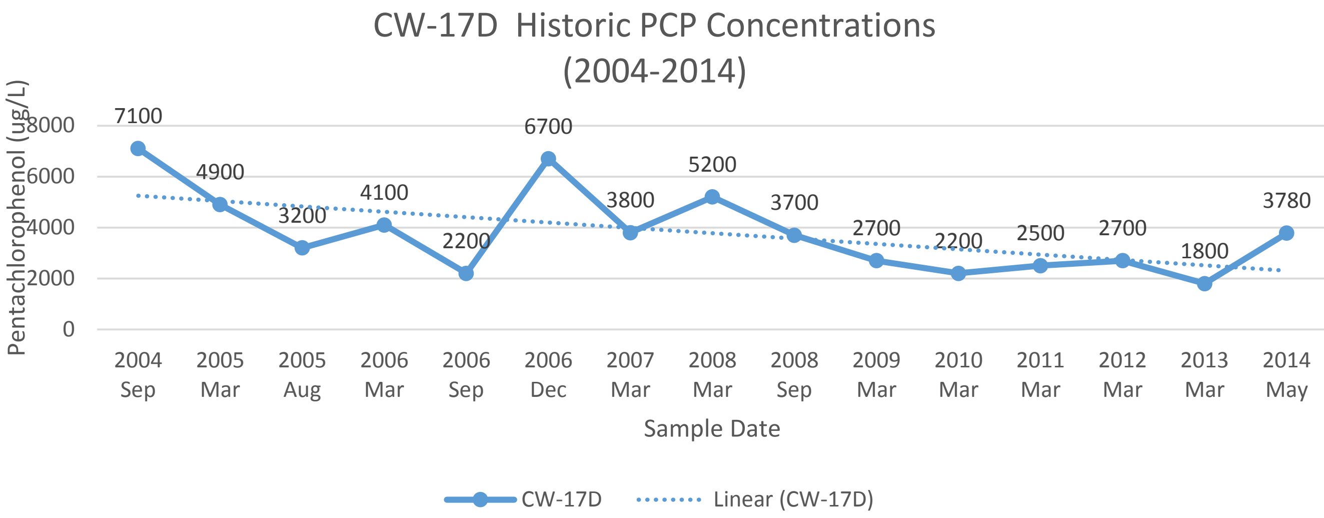

CW-14D Historic PCP Concentrations
Pentachlorophenol (ug/L)
1
0.8
0.6
0.4
0.2
0
0 0 0 0 0 0 0 0 0 0 0 0
2002 Oct 2003 Mar 2004 Mar 2005 Mar 2006 Mar 2007 Mar 2008 Mar 2009 Mar 2010 Mar 2011 Mar 2012 Mar 2013 Mar
Sample Date
CW-14D
Linear (CW-14D)

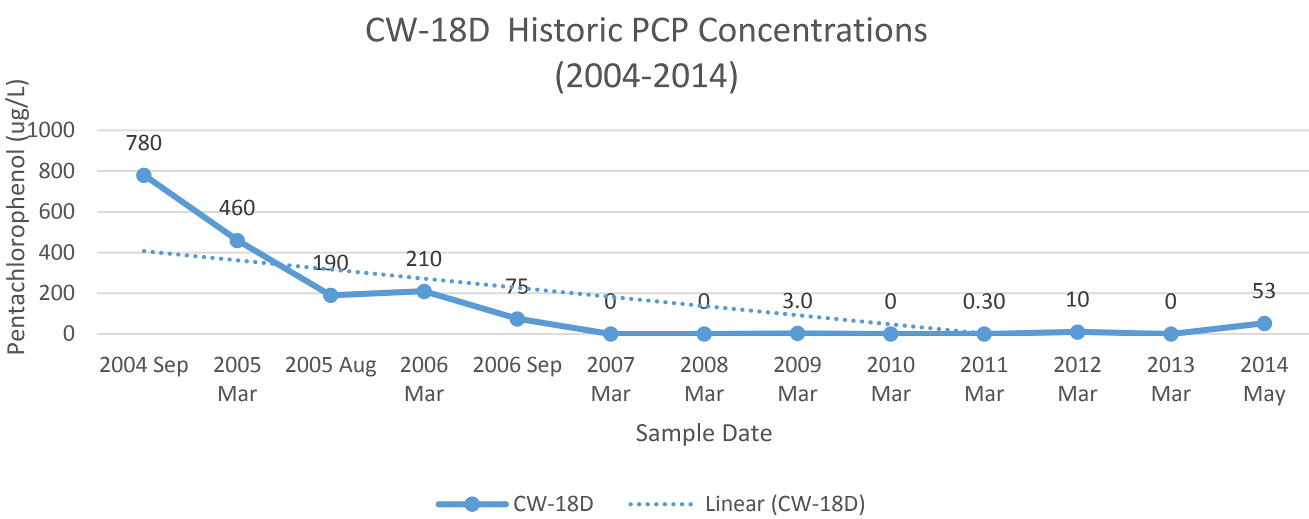

CW-15S Historic PCP Concentrations
Pentachlorophenol (ug/L)
1
0.8
0.6
0.4
0.2
0
0 0 0 0 0 0 0 0 0 0 0 0 0
2002 Oct 2003 Mar 2004 Mar 2005 Mar 2006 Mar 2007 Mar 2008 Mar 2009 Mar 2010 Mar 2011 Mar 2012 Mar 2013 Mar 2014 May
Sample Date
CW-15S
Linear (CW-15S)

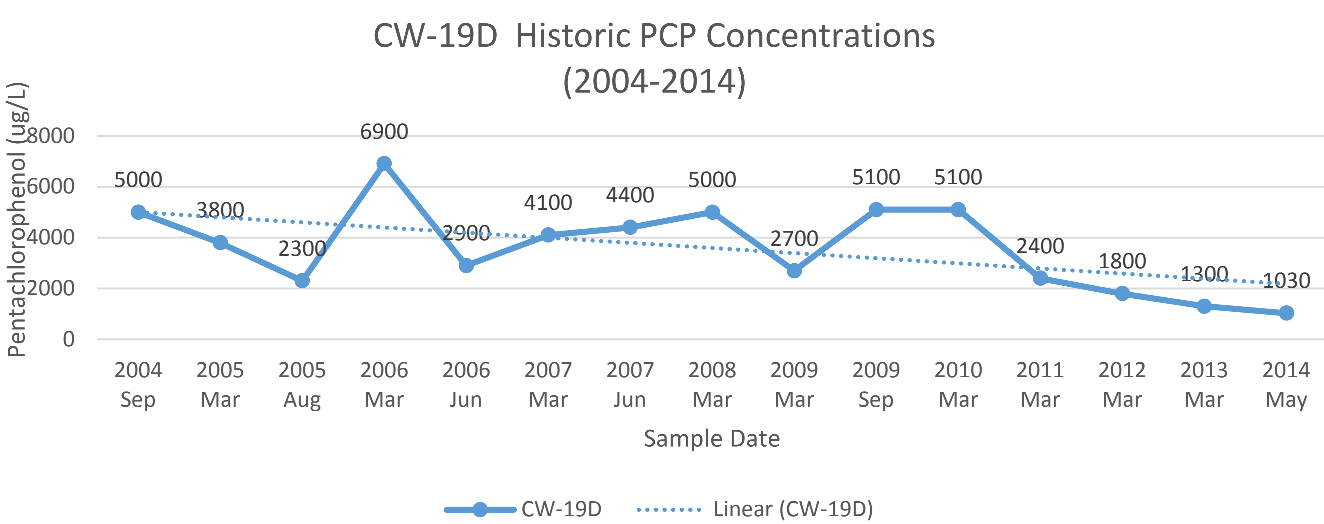

CW-16S Historic PCP Concentrations
(2005-2014)
Pentachlorophenol (ug/L)
30000
25000
20000
15000
10000
5000
0
24000
6600
3500
200
1400
5600
1000
1200
470
2300
101
2005 Jun
2005 Aug
2006 Mar
2007 Mar
2008 Mar
2009 Mar
2010 Mar
2011 Mar
2012 Mar
2013 Mar
2014 May
Sample Date
CW-16S
Linear (CW-16S)

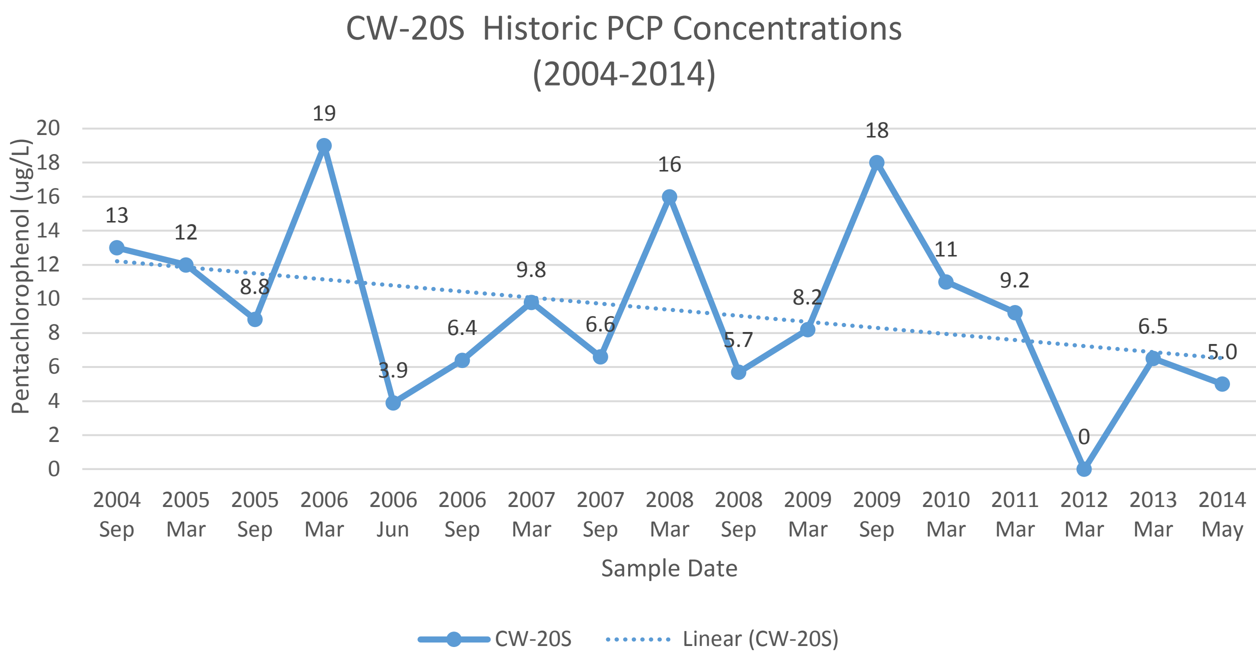

CW-16D Historic PCP Concentrations
(2004-2014)
Pentachlorophenol (ug/L)
800
600
400
200
0
700
200
120
190
190
80
160
150
110
48
31
33
27
2004 Sep
2005 Mar
2005 Aug
2006 Mar
2006 Dec
2007 Mar
2008 Mar
2009 Mar
2010 Mar
2011 Mar
2012 Mar
2013 Mar
2014 May
Sample Date
CW-16D
Linear (CW-16D)

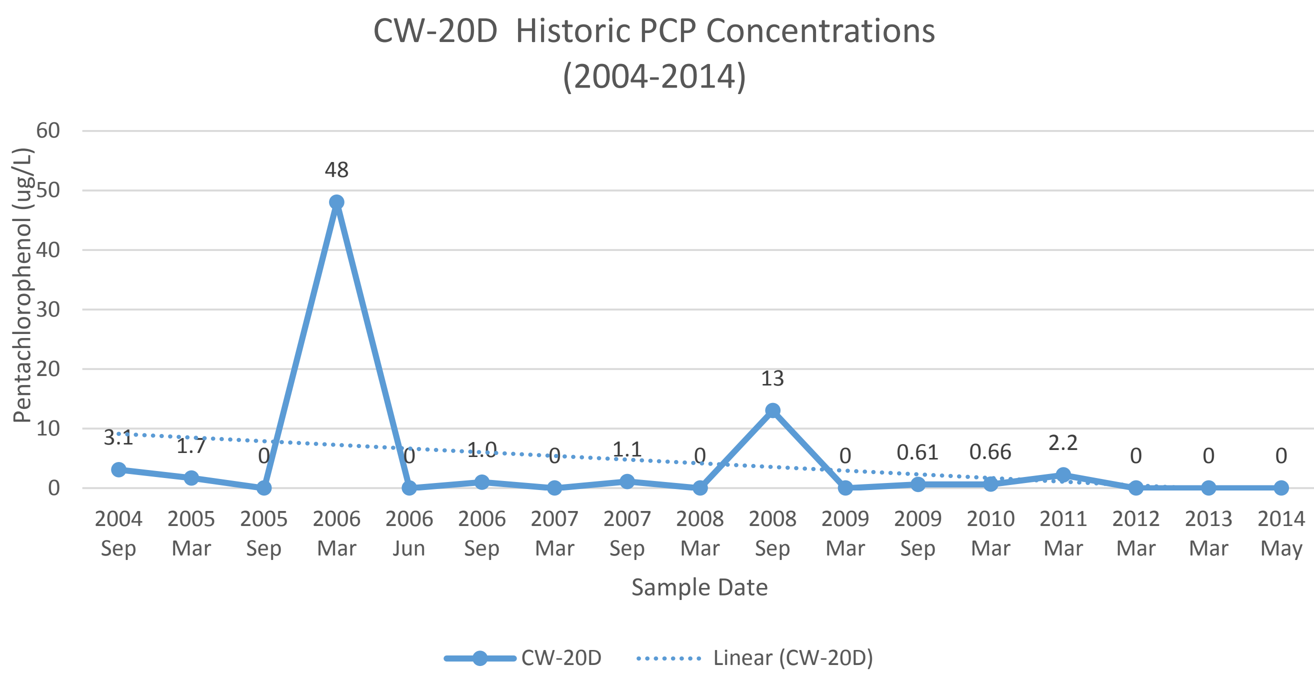

CW-16I Historic PCP Concentrations
(2004-2009)
Pentachlorophenol (ug/L)
200
150
100
50
0
160
62
120
59
14
0
5.2
2.2
2004 Sep
2005 Mar
2005 Aug
2006 Mar
2006 Dec
2007 Mar
2008 Mar
2009 Mar
Sample Date
CW-16I
Linear (CW-16I)

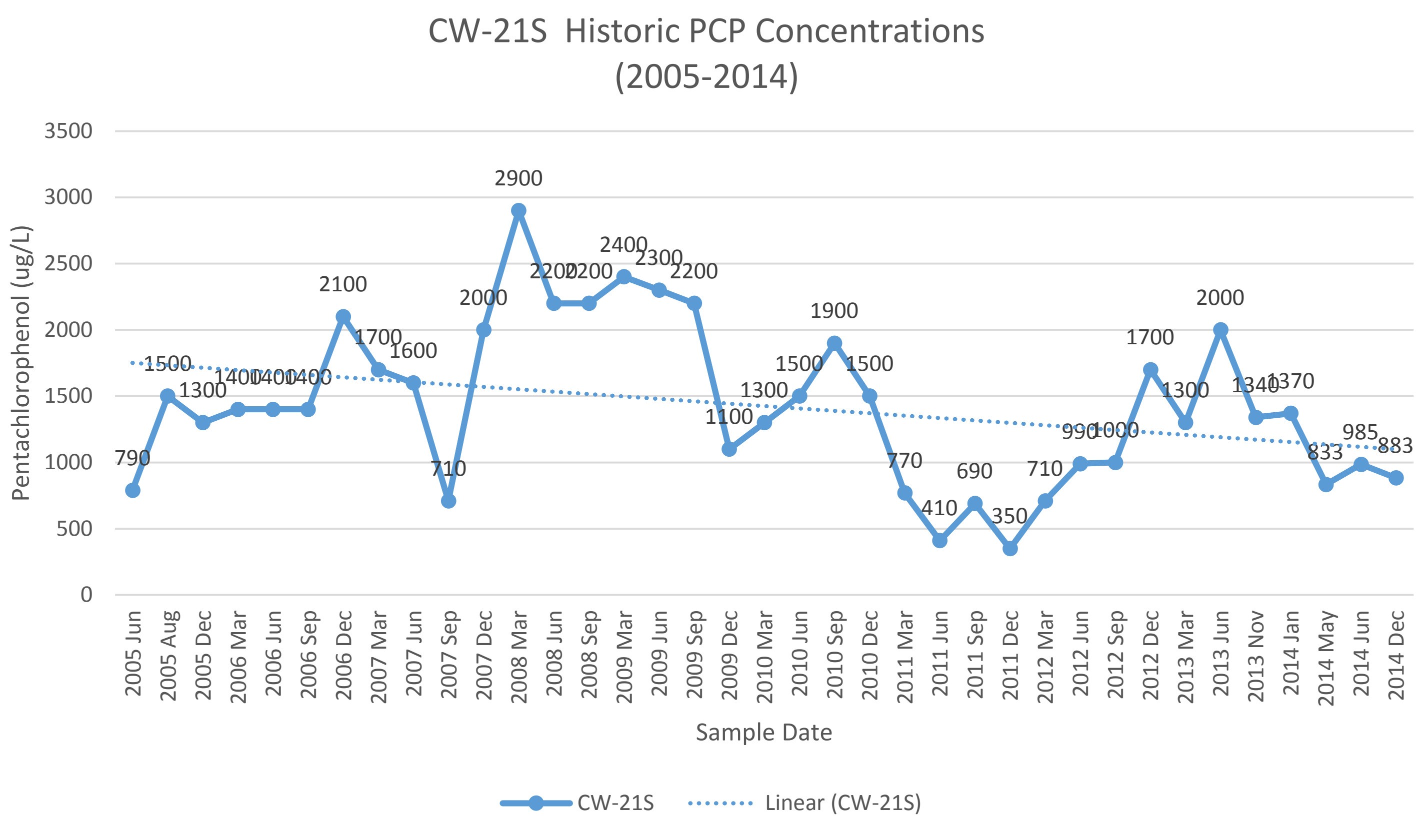

CW-17D Historic PCP Concentrations
(2004-2014)
Pentachlorophenol (ug/L)
8000
6000
4000
2000
0
7100
4900
3200
4100
2200
6700
3800
5200
3700
2700
2200
2500
2700
1800
3780
2004 Sep
2005 Mar
2005 Aug
2006 Mar
2006 Sep
2006 Dec
2007 Mar
2008 Mar
2008 Sep
2009 Mar
2010 Mar
2011 Mar
2012 Mar
2013 Mar
2014 May
Sample Date
CW-17D
Linear (CW-17D)

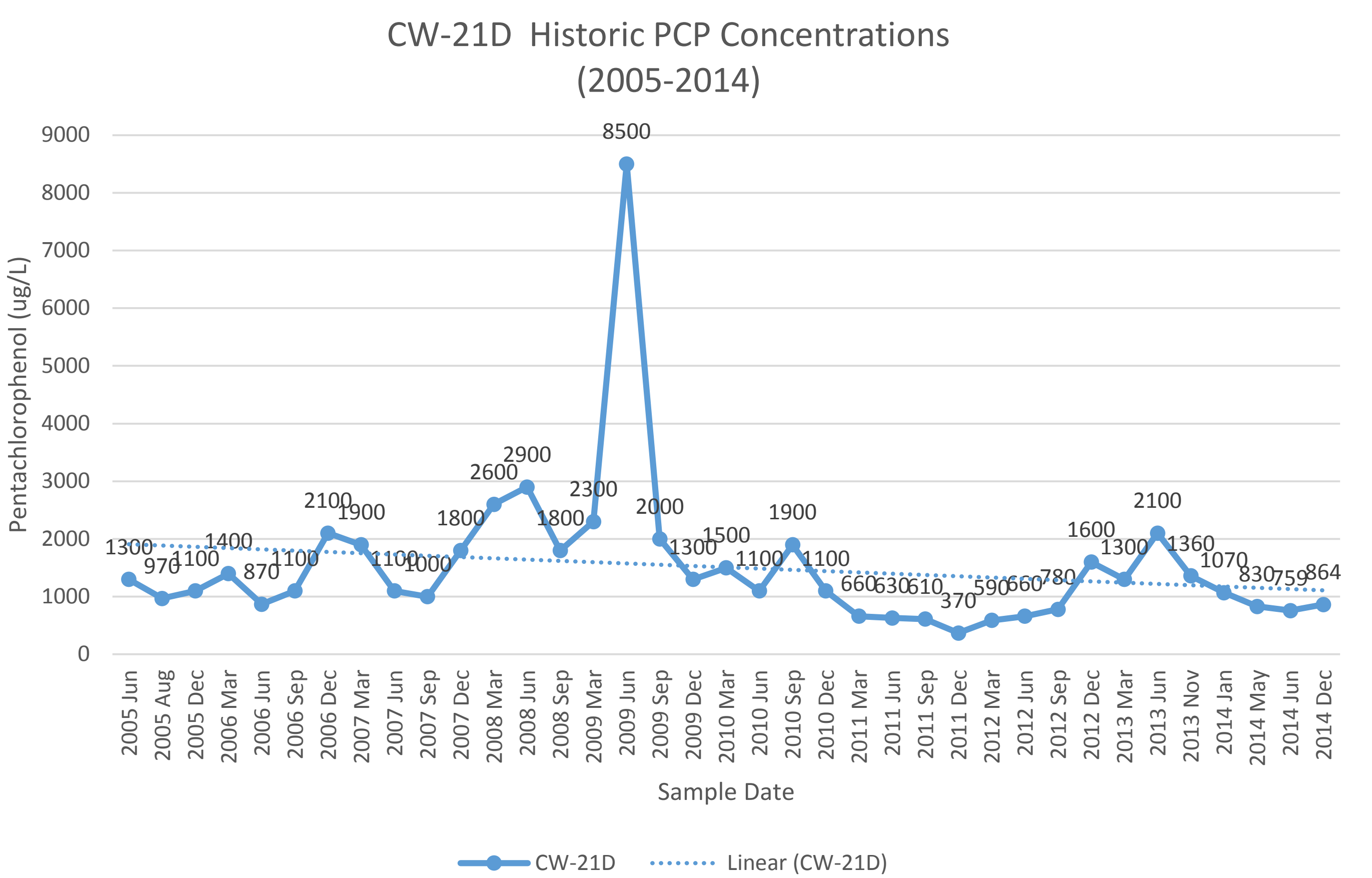

CW-18D Historic PCP Concentrations
(2004-2014)
Pentachlorophenol (ug/L)
1000
800
600
400
200
0
780
460
190
210
75
0
0
3.0
0
0.30
10
0
53
2004 Sep
2005 Mar
2005 Aug
2006 Mar
2006 Sep
2007 Mar
2008 Mar
2009 Mar
2010 Mar
2011 Mar
2012 Mar
2013 Mar
2014 May
Sample Date
CW-18D
Linear (CW-18D)

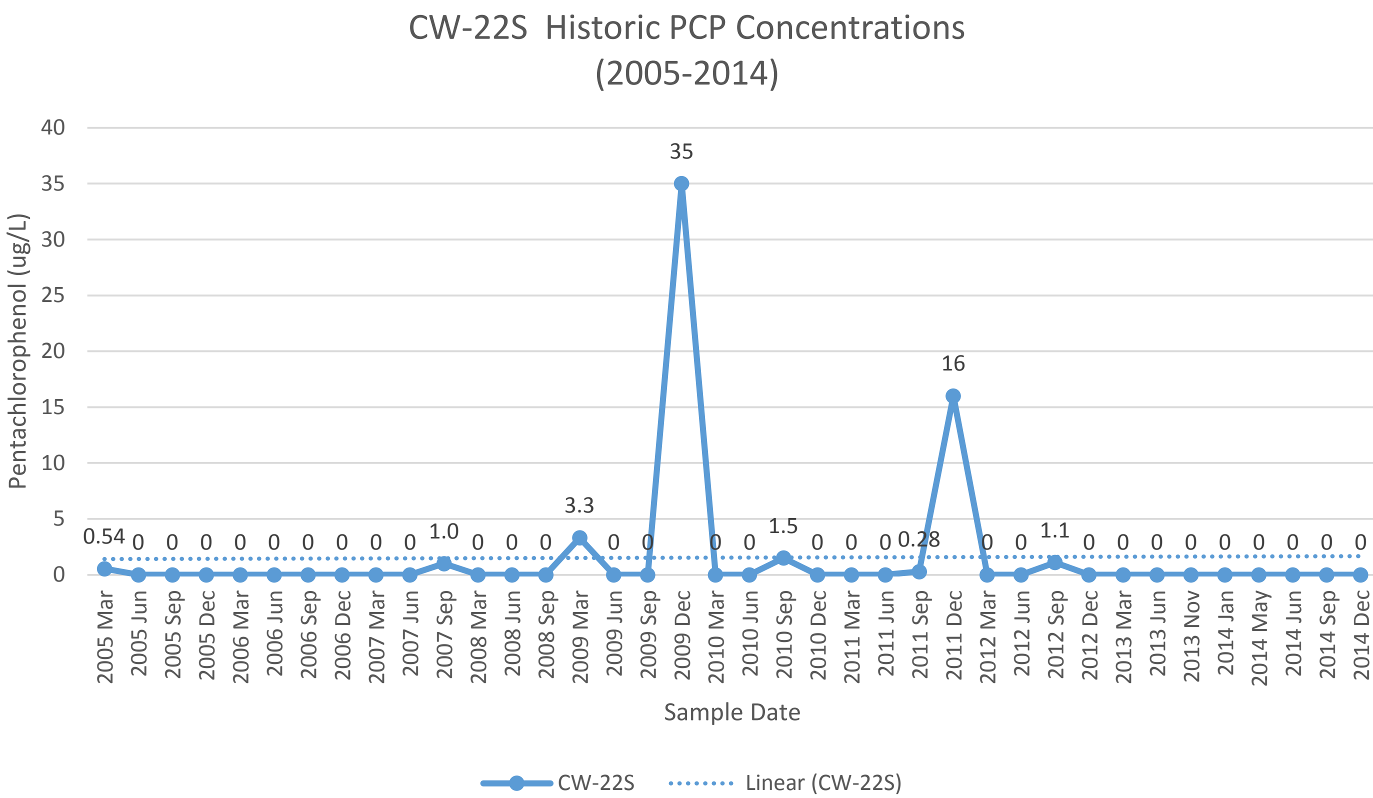

CW-19D Historic PCP Concentrations
(2004-2014)
Pentachlorophenol (ug/L)
8000
6000
4000
2000
0
5000
3800
2300
6900
2900
4100
4400
5000
2700
5100
5100
2400
1800
1300
1030
2004 Sep
2005 Mar
2005 Aug
2006 Mar
2006 Jun
2007 Mar
2007 Jun
2008 Mar
2009 Mar
2009 Sep
2010 Mar
2011 Mar
2012 Mar
2013 Mar
2014 May
Sample Date
CW-19D
Linear (CW-19D)

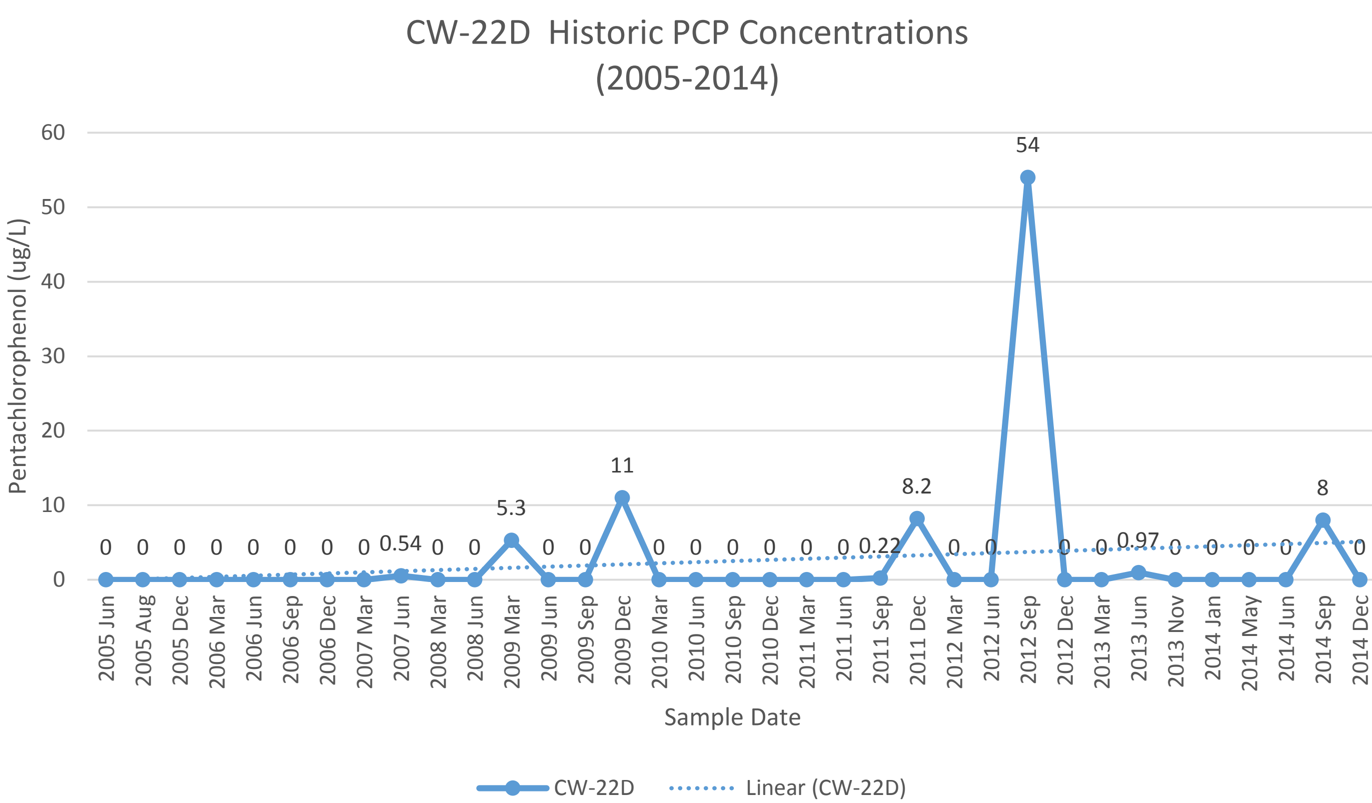

CW-20S Historic PCP Concentrations
(2004-2014)
Pentachlorophenol (ug/L)
0
2
4
6
8
10
12
14
16
18
20
13
12
8.8
19
3.9
6.4
9.8
6.6
16
5.7
8.2
18
11
9.2
0
6.5
5.0
2004 Sep
2005 Mar
2005 Sep
2006 Mar
2006 Jun
2006 Sep
2007 Mar
2007 Sep
2008 Mar
2008 Sep
2009 Mar
2009 Sep
2010 Mar
2011 Mar
2012 Mar
2013 Mar
2014 May
Sample Date
CW-20S
Linear (CW-20S)

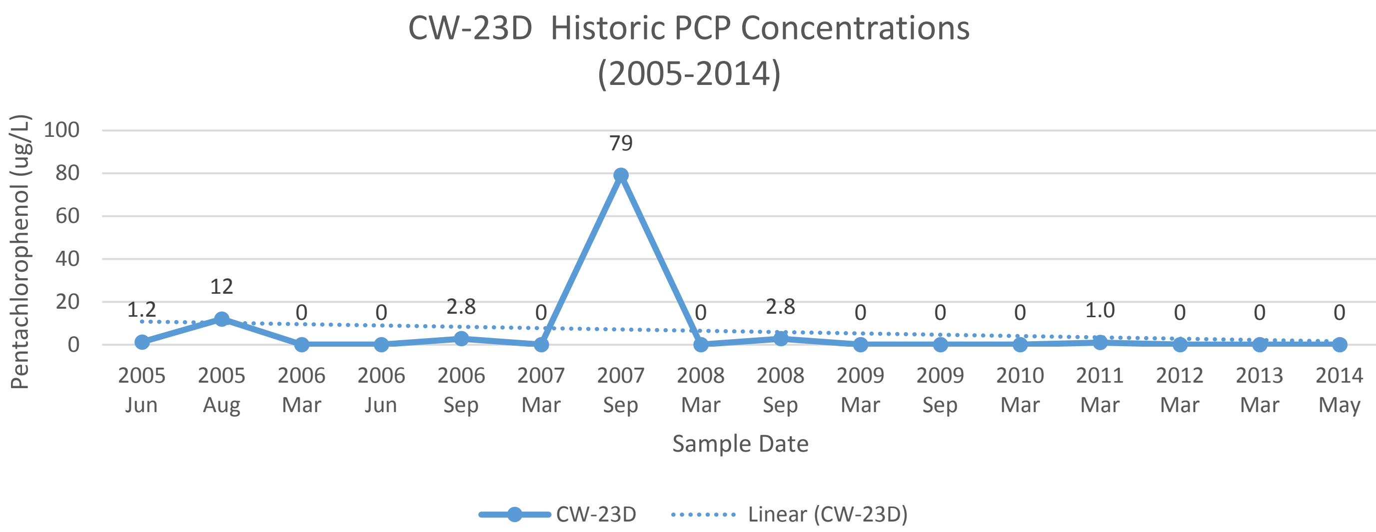

CW-20D Historic PCP Concentrations
(2004-2014)
Pentachlorophenol (ug/L)
0
10
20
30
40
50
60
3.1
1.7
0
48
0
1.0
0
1.1
0
13
0
0.61
0.66
2.2
0
0
0
2004 Sep
2005 Mar
2005 Sep
2006 Mar
2006 Jun
2006 Sep
2007 Mar
2007 Sep
2008 Mar
2008 Sep
2009 Mar
2009 Sep
2010 Mar
2011 Mar
2012 Mar
2013 Mar
2014 May
Sample Date
CW-20D
Linear (CW-20D)

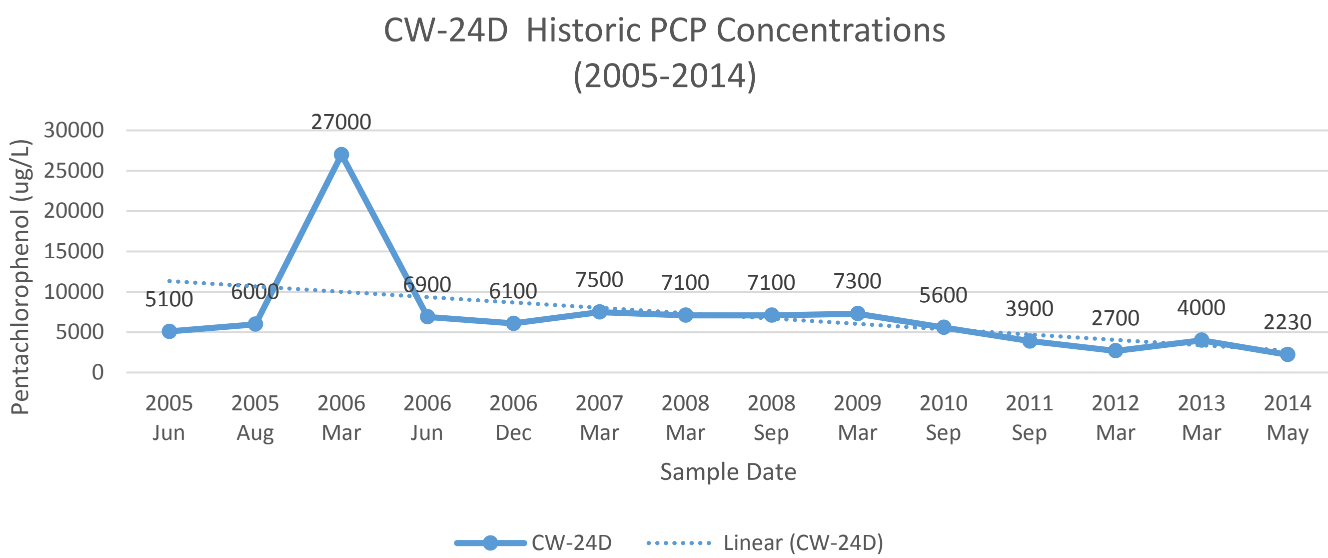

CW-21S Historic PCP Concentrations
(2005-2014)
Pentachlorophenol (ug/L)
Sample Date
CW-21S
Linear (CW-21S)

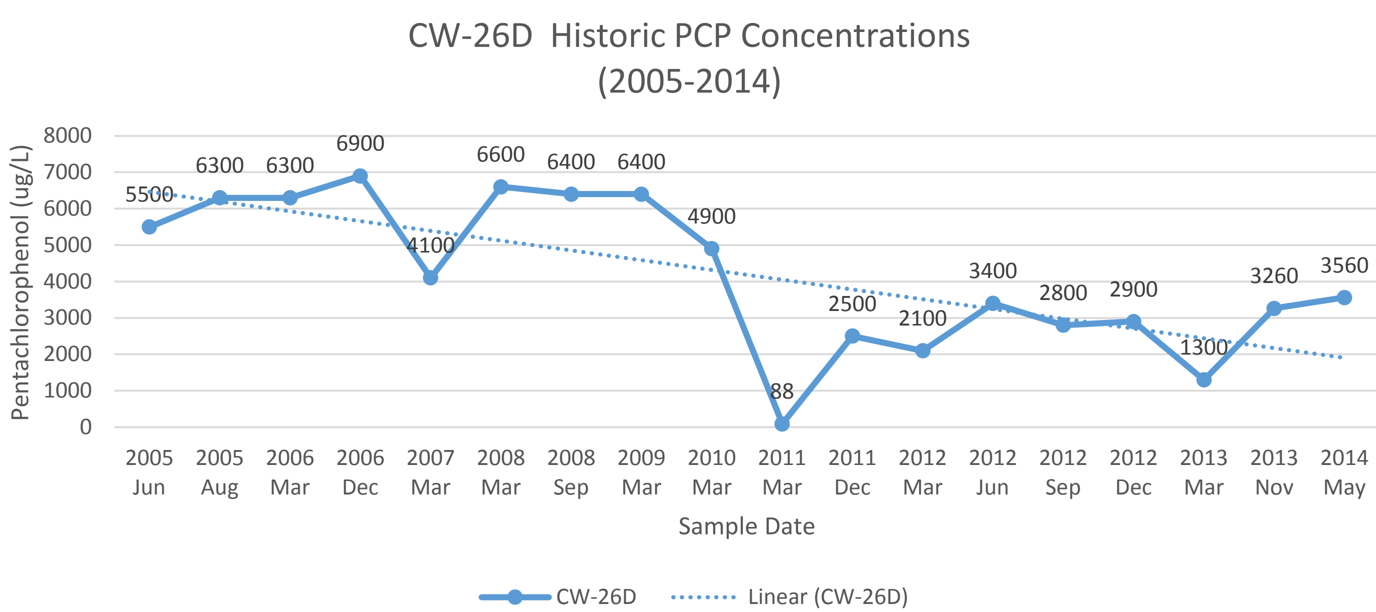

CW-21D Historic PCP Concentrations
(2005-2014)
Pentachlorophenol (ug/L)
Sample Date
CW-21D
Linear (CW-21D)

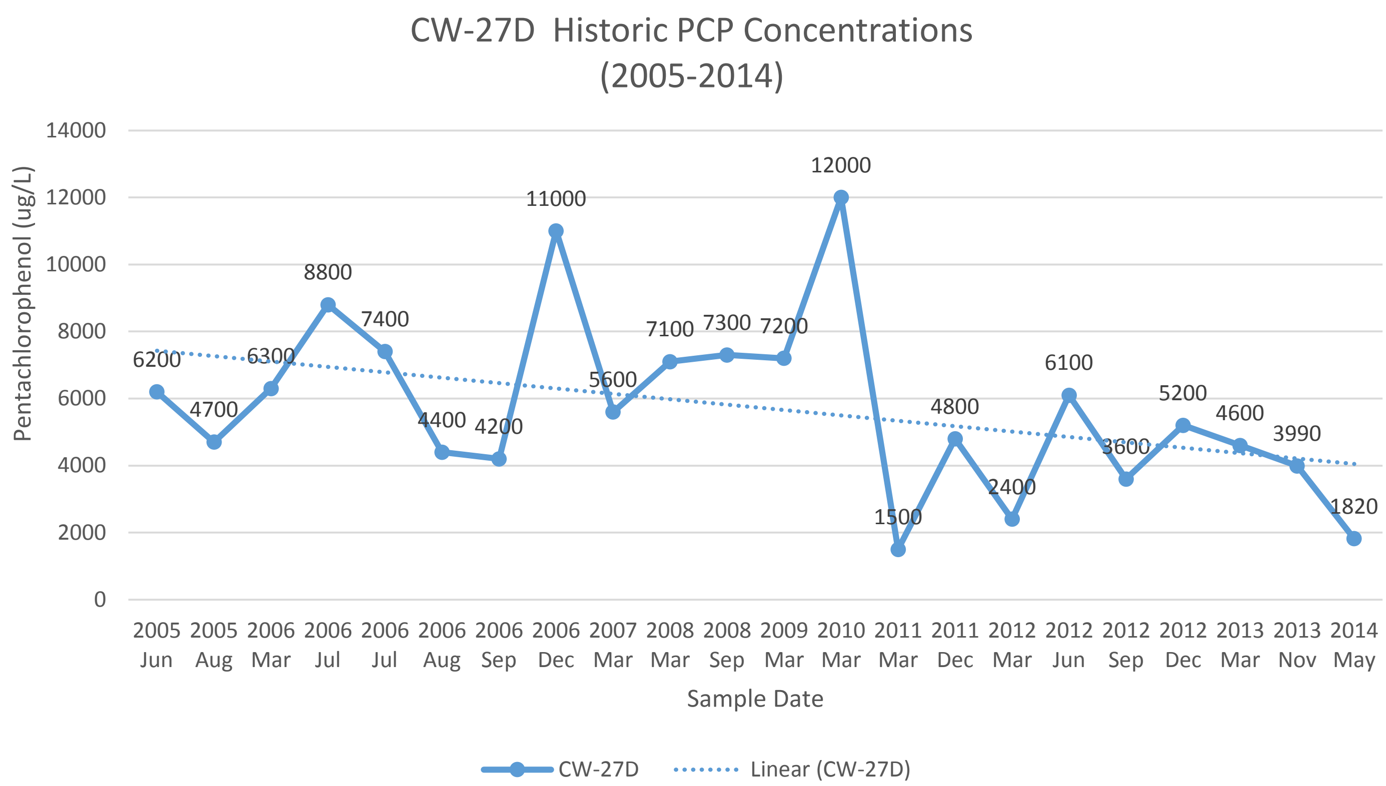

CW-22S Historic PCP Concentrations
(2005-2014)
Pentachlorophenol (ug/L)
Sample Date
CW-22S
Linear (CW-22S)

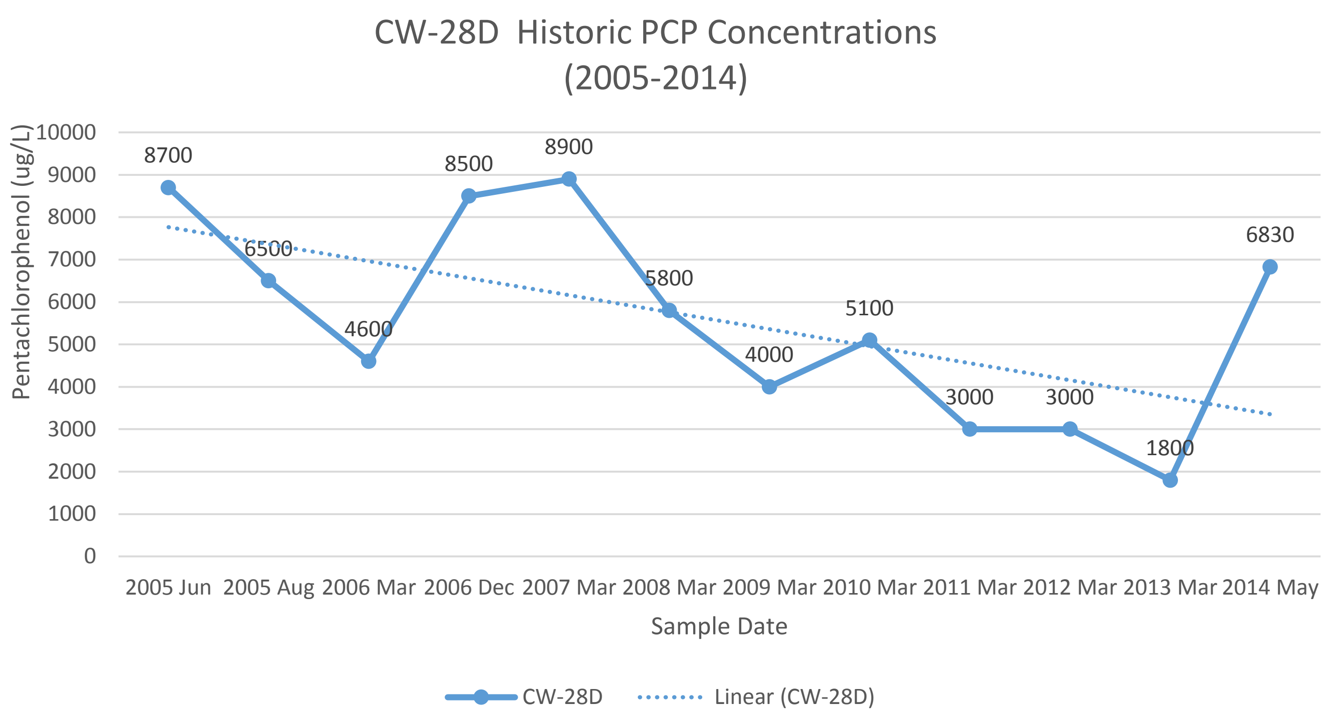

CW-22D Historic PCP Concentrations
(2005-2014)
Pentachlorophenol (ug/L)
Sample Date
CW-22D
Linear (CW-22D)

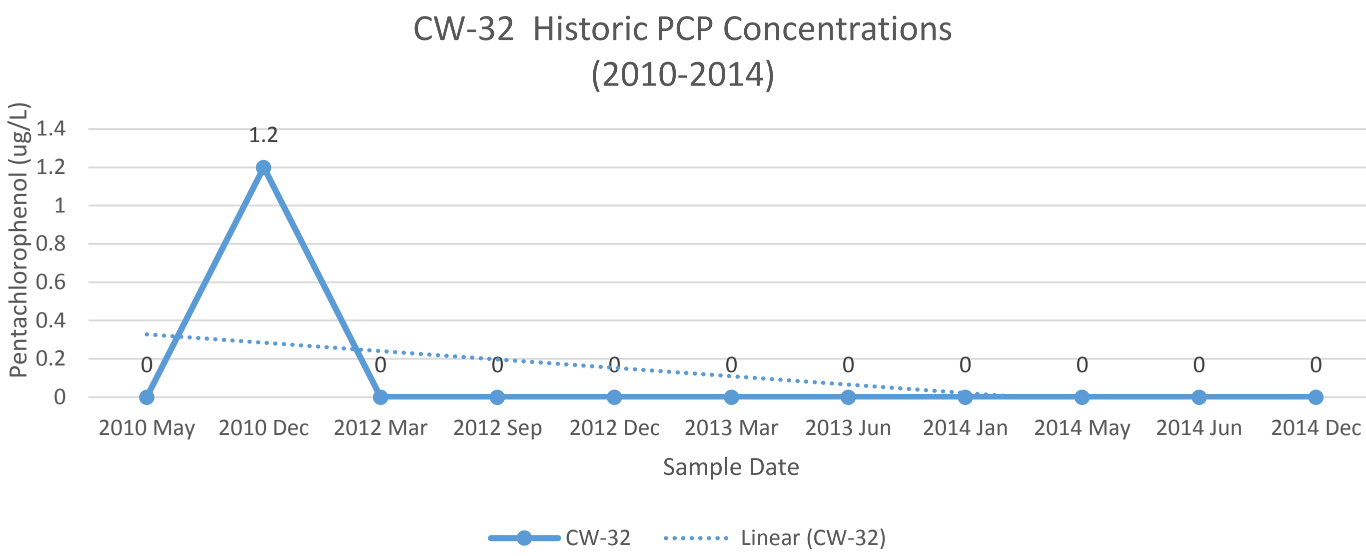

CW-23D Historic PCP Concentrations
(2005-2014)
Pentachlorophenol (ug/L)
100
80
60
40
20
0
1.2
12
0
0
2.8
0
79
0
2.8
0
0
0
1.0
0
0
0
2005 Jun
2005 Aug
2006 Mar
2006 Jun
2006 Sep
2007 Mar
2007 Sep
2008 Mar
2008 Sep
2009 Mar
2009 Sep
2010 Mar
2011 Mar
2012 Mar
2013 Mar
2014 May
Sample Date
CW-23D
Linear (CW-23D)

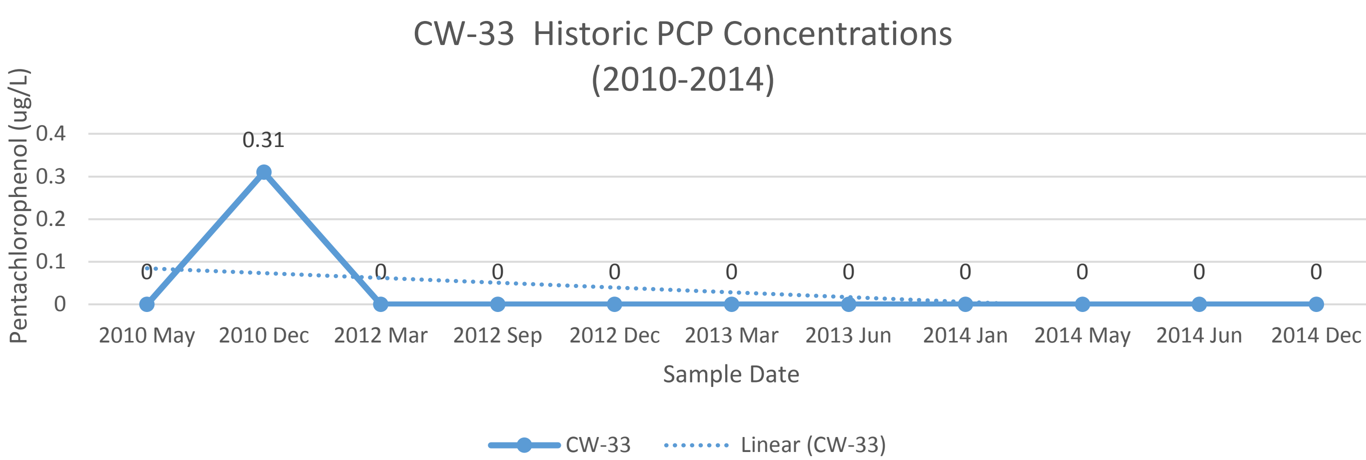

CW-24D Historic PCP Concentrations
(2005-2014)
Pentachlorophenol (ug/L)
30000
25000
20000
15000
10000
5000
0
5100
6000
27000
6900
6100
7500
7100
7100
7300
5600
3900
2700
4000
2230
2005 Jun
2005 Aug
2006 Mar
2006 Jun
2006 Dec
2007 Mar
2008 Mar
2008 Sep
2009 Mar
2010 Sep
2011 Sep
2012 Mar
2013 Mar
2014 May
Sample Date
CW-24D
Linear (CW-24D)

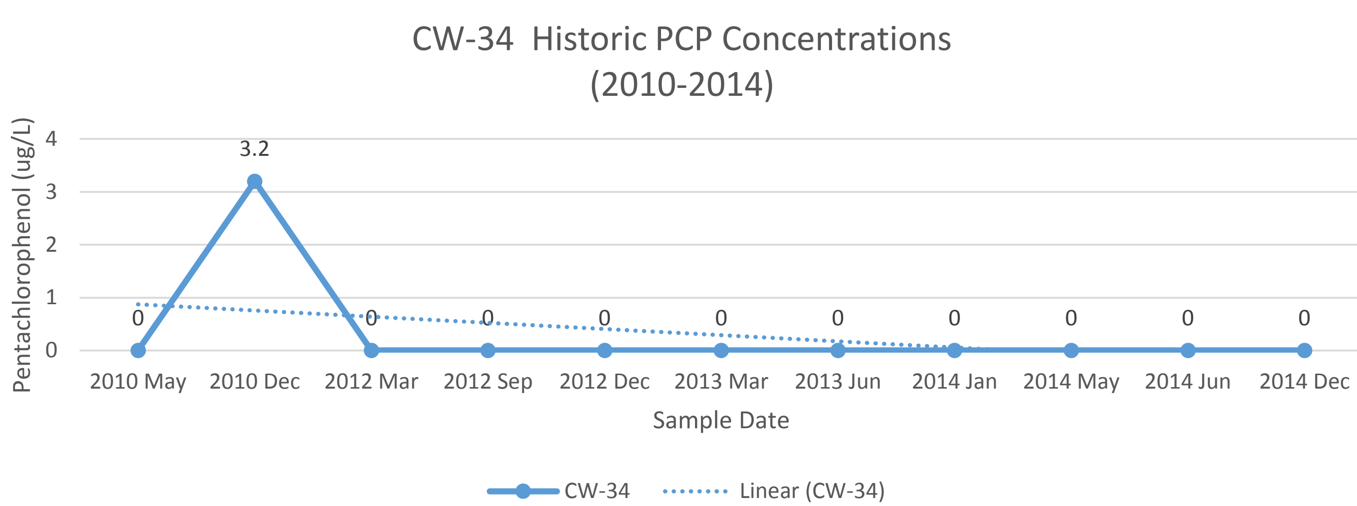

CW-26D Historic PCP Concentrations
(2005-2014)
Pentachlorophenol (ug/L)
8000
7000
6000
5000
4000
3000
2000
1000
0
5500
6300
6300
6900
4100
6600
6400
6400
4900
88
2500
2100
3400
2800
2900
1300
3260
3560
2005 Jun
2005 Aug
2006 Mar
2006 Dec
2007 Mar
2008 Mar
2008 Sep
2009 Mar
2010 Mar
2011 Mar
2011 Dec
2012 Mar
2012 Jun
2012 Sep
2012 Dec
2013 Mar
2013 Nov
2014 May
Sample Date
CW-26D
Linear (CW-26D)

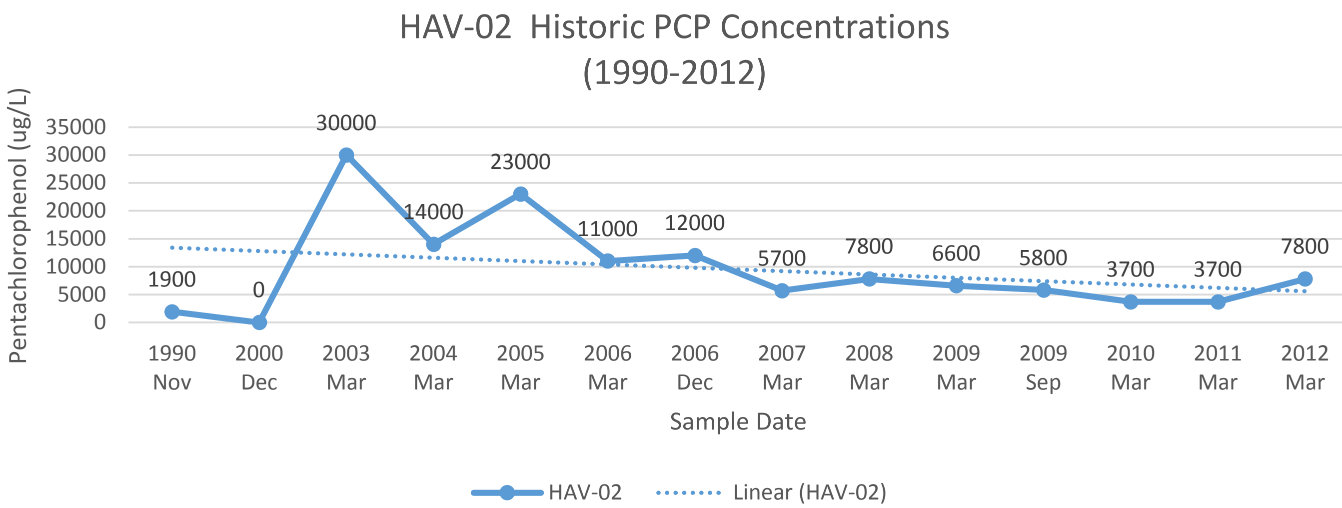

CW-27D Historic PCP Concentrations
(2005-2014)
Pentachlorophenol (ug/L)
14000
12000
10000
8000
6000
4000
2000
0
6200
4700
6300
8800
7400
4400
4200
11000
5600
7100
7300
7200
12000
1500
4800
2400
6100
3600
5200
4600
3990
1820
2005 Jun
2005 Aug
2006 Mar
2006 Jul
2006 Jul
2006 Aug
2006 Sep
2006 Dec
2007 Mar
2008 Mar
2008 Sep
2009 Mar
2010 Mar
2011 Mar
2011 Dec
2012 Mar
2012 Jun
2012 Sep
2012 Dec
2013 Mar
2013 Nov
2014 May
Sample Date
CW-27D
Linear (CW-27D)

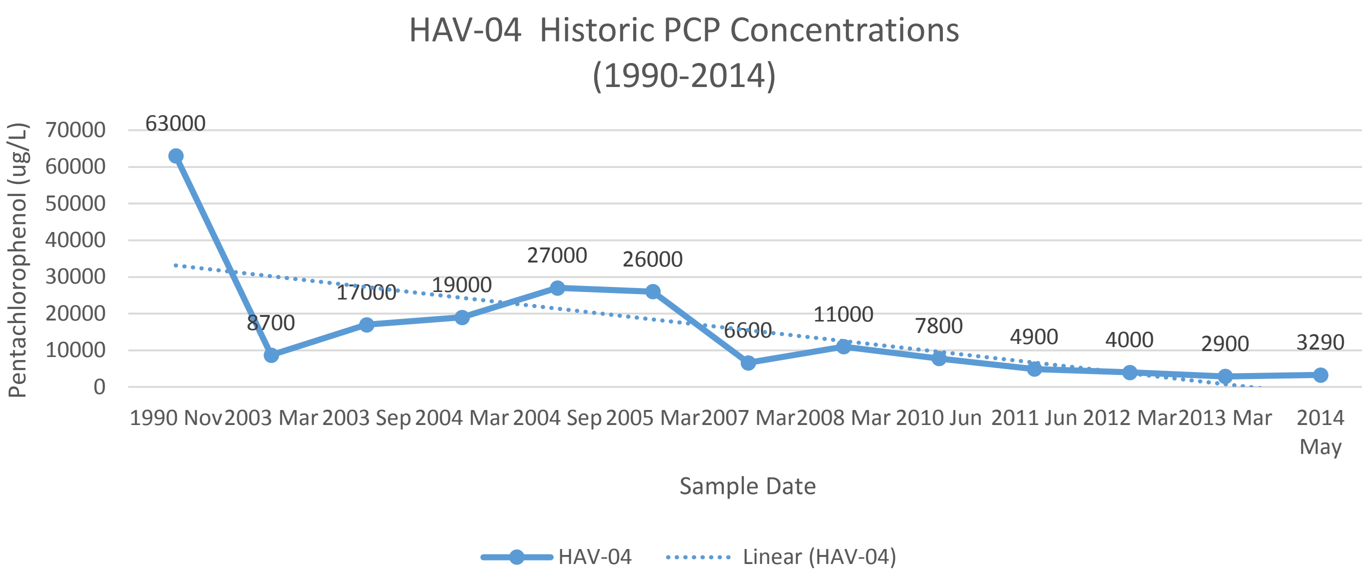

CW-28D Historic PCP Concentrations
(2005-2014)
Pentachlorophenol (ug/L)
10000
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
8700
6500
4600
8500
8900
5800
4000
5100
3000
3000
1800
6830
2005 Jun
2005 Aug
2006 Mar
2006 Dec
2007 Mar
2008 Mar
2009 Mar
2010 Mar
2011 Mar
2012 Mar
2013 Mar
2014 May
Sample Date
CW-28D
Linear (CW-28D)

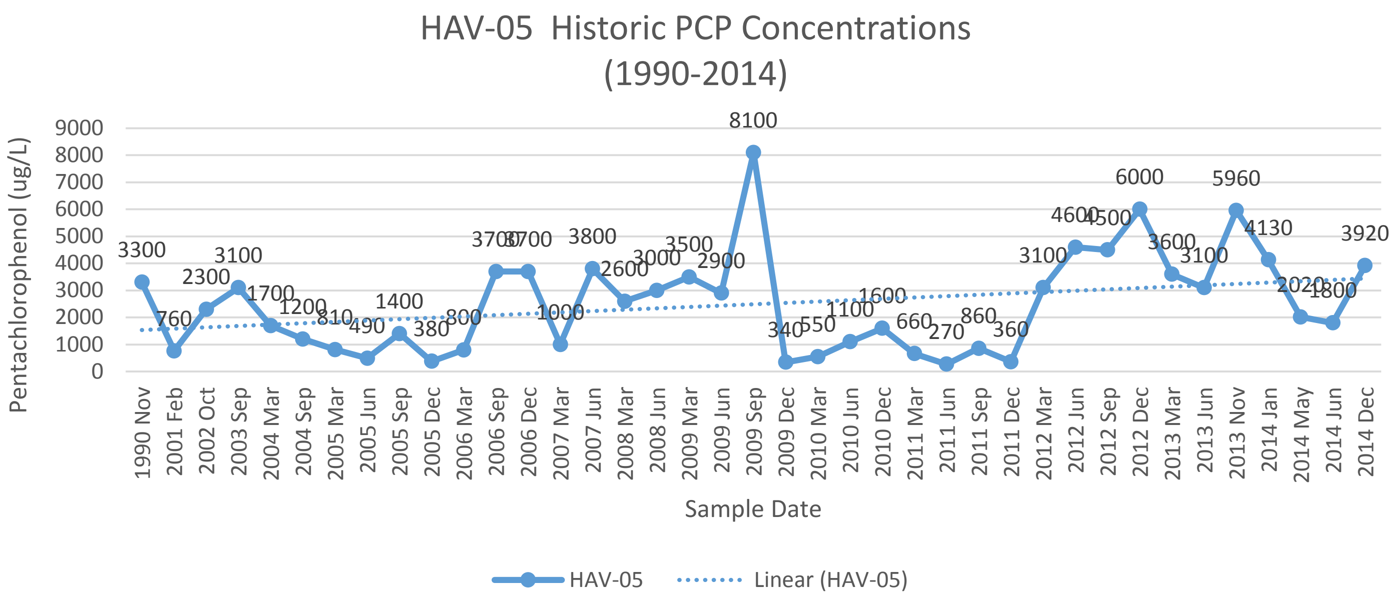

CW-32 Historic PCP Concentrations
(2010-2014)
Pentachlorophenol (ug/L)
1.4
1.2
1
0.8
0.6
0.4
0.2
0
1.2
0
0
0
0
0
0
0
0
0
0
2010 May
2010 Dec
2012 Mar
2012 Sep
2012 Dec
2013 Mar
2013 Jun
2014 Jan
2014 May
2014 Jun
2014 Dec
Sample Date
CW-32
Linear (CW-32)

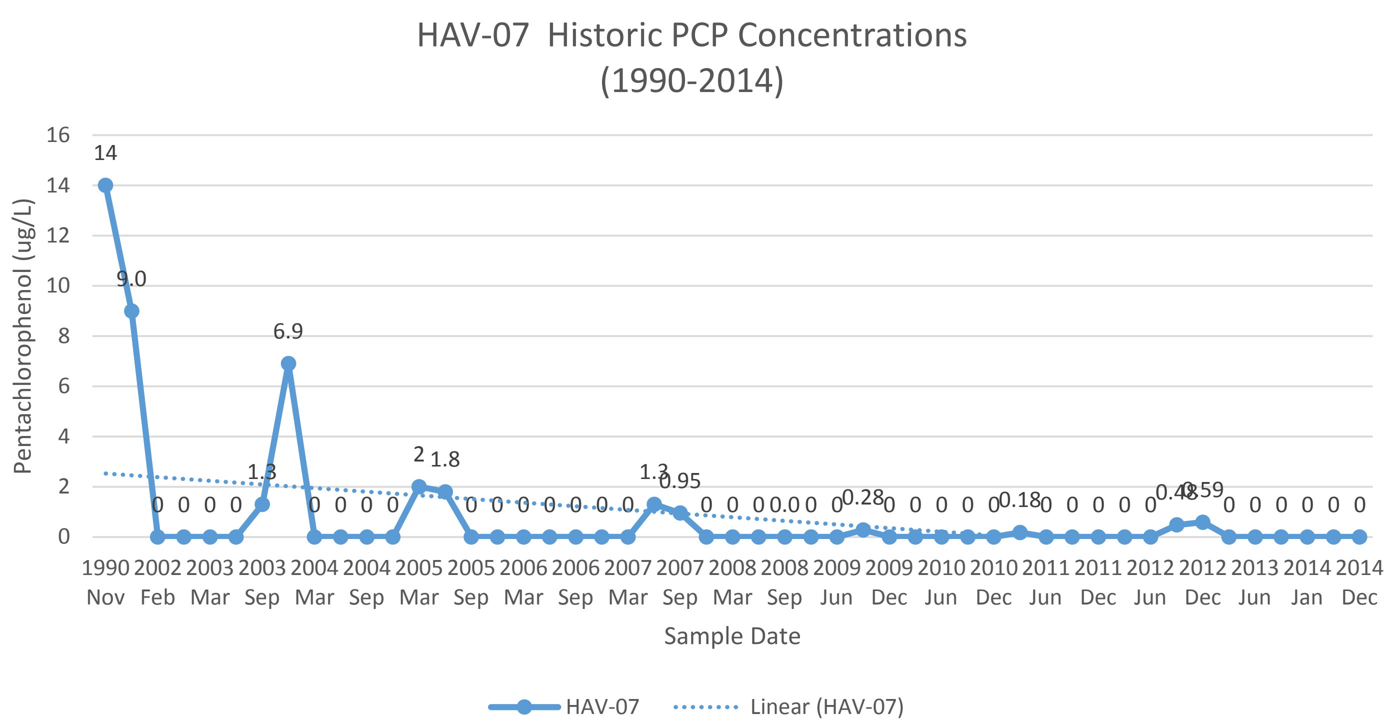

CW-33 Historic PCP Concentrations
(2010-2014)
Pentachlorophenol (ug/L)
0.4
0.3
0.2
0.1
0
0.31
0
0
0
0
0
0
0
0
0
0
2010 May
2010 Dec
2012 Mar
2012 Sep
2012 Dec
2013 Mar
2013 Jun
2014 Jan
2014 May
2014 Jun
2014 Dec
Sample Date
CW-33
Linear (CW-33)

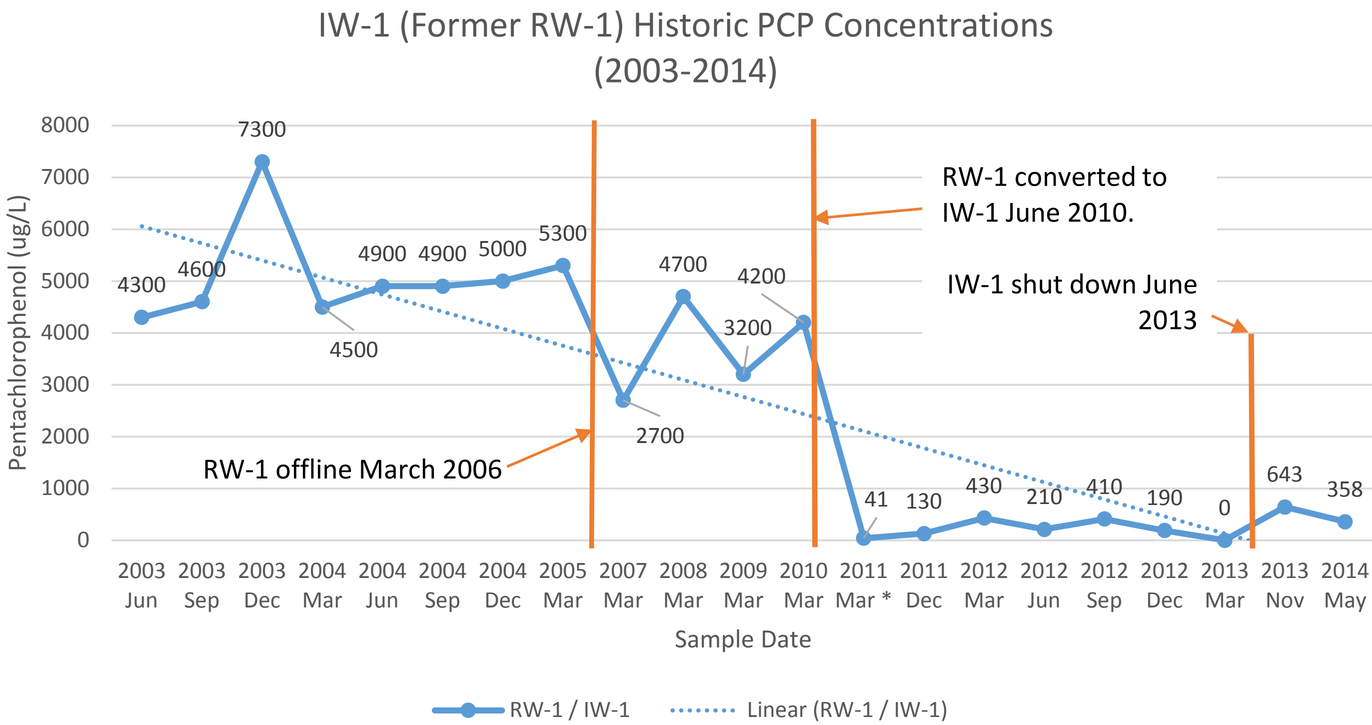

CW-34 Historic PCP Concentrations
(2010-2014)
Pentachlorophenol (ug/L)
4
3
2
1
0
3.2
0
0
0
0
0
0
0
0
0
0
2010 May
2010 Dec
2012 Mar
2012 Sep
2012 Dec
2013 Mar
2013 Jun
2014 Jan
2014 May
2014 Jun
2014 Dec
Sample Date
CW-34
Linear (CW-34)

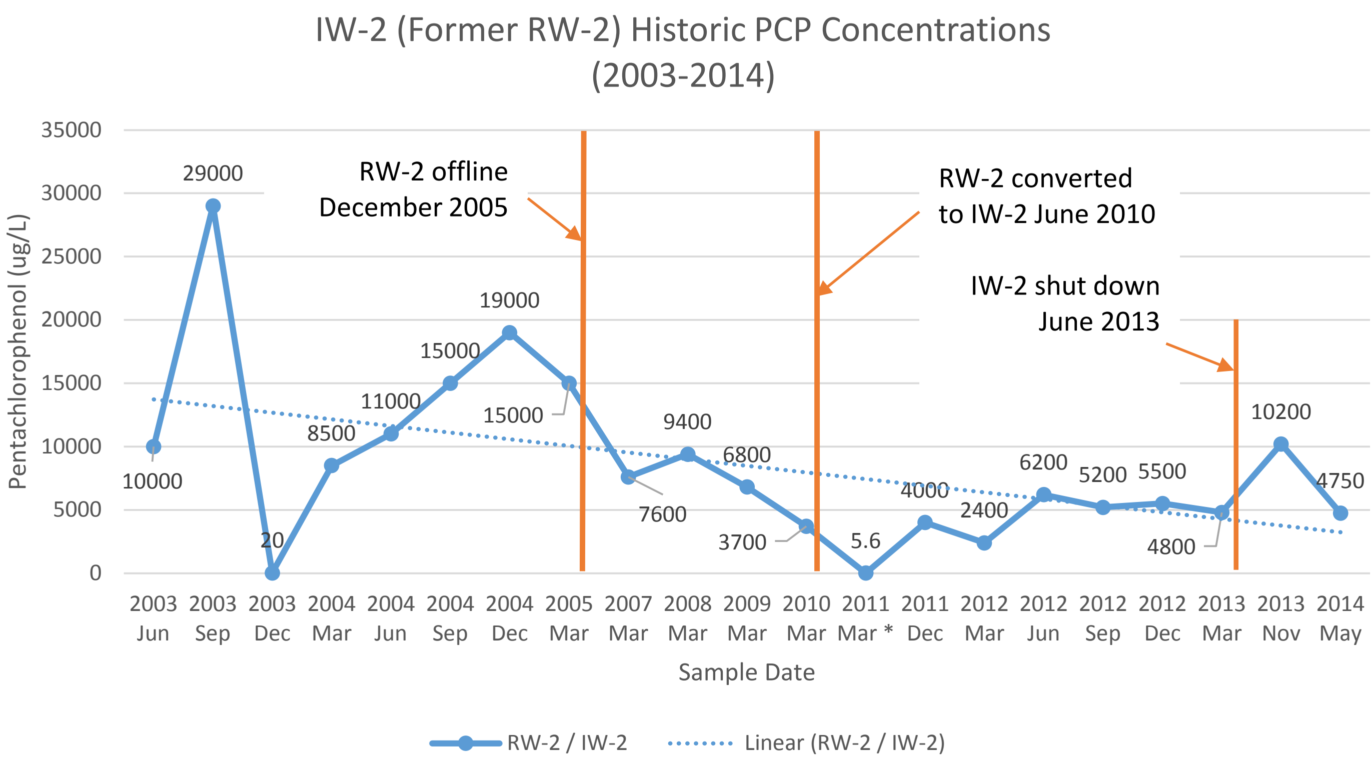

HAV-02 Historic PCP Concentrations
(1990-2012)
Pentachlorophenol (ug/L)
35000
30000
25000
20000
15000
10000
5000
0
1900
0
30000
14000
23000
11000
12000
5700
7800
6600
5800
3700
3700
7800
1990 Nov
2000 Dec
2003 Mar
2004 Mar
2005 Mar
2006 Mar
2006 Dec
2007 Mar
2008 Mar
2009 Mar
2009 Sep
2010 Mar
2011 Mar
2012 Mar
Sample Date
HAV-02
Linear (HAV-02)

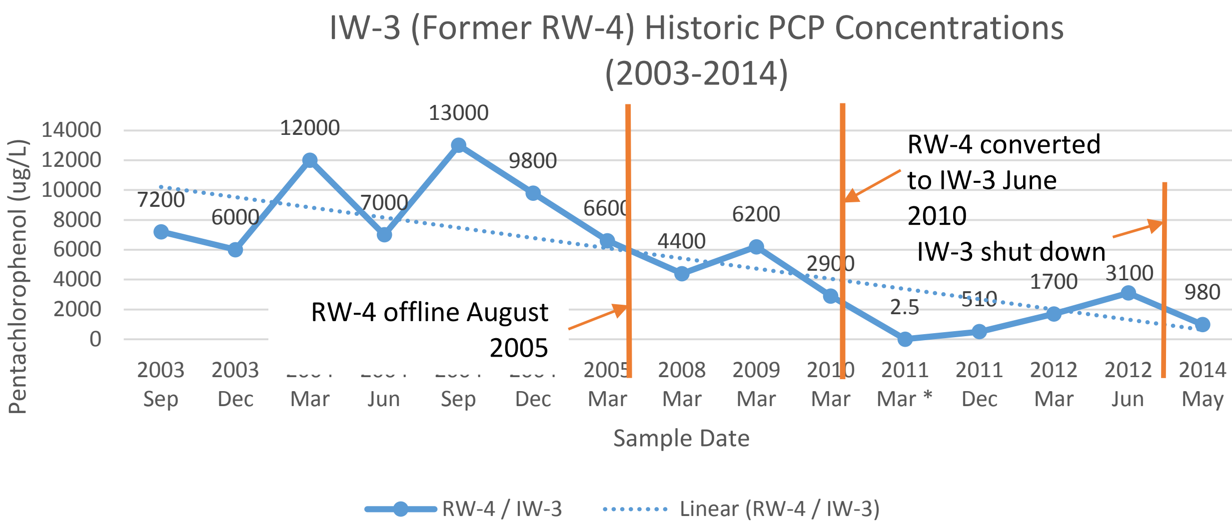

HAV-04 Historic PCP Concentrations
(1990-2014)
Pentachlorophenol (ug/L)
70000
60000
50000
40000
30000
20000
10000
0
63000
8700
17000
19000
27000
26000
6600
11000
7800
4900
4000
2900
3290
1990 Nov
2003 Mar
2003 Sep
2004 Mar
2004 Sep
2005 Mar
2007 Mar
2008 Mar
2010 Jun
2011 Jun
2012 Mar
2013 Mar
2014 May
Sample Date
HAV-04
Linear (HAV-04)

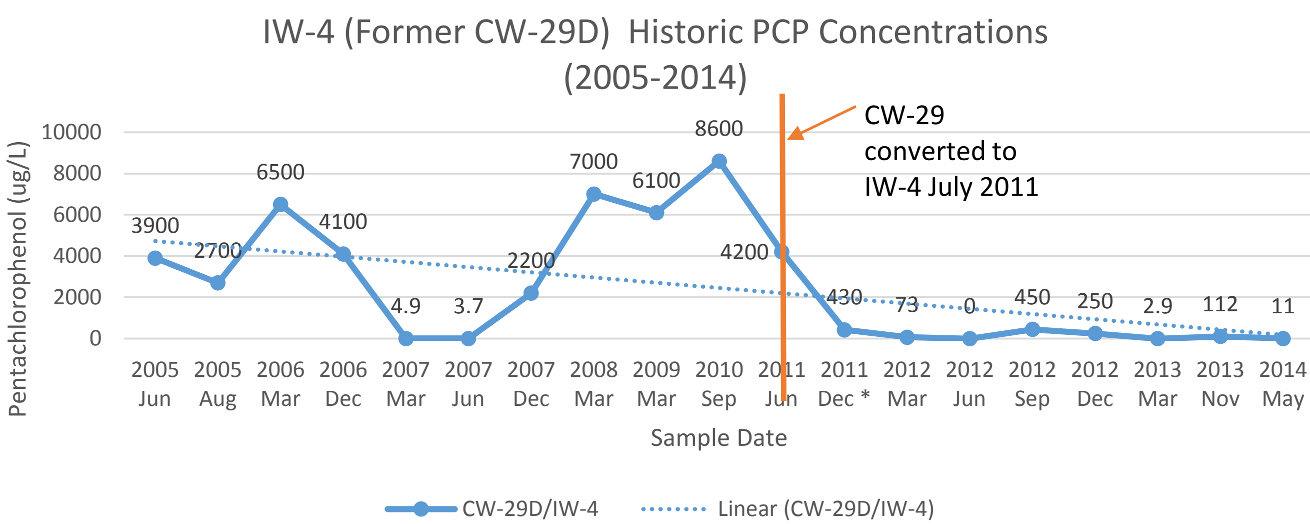

HAV-05 Historic PCP Concentrations
(1990-2014)
Pentachlorophenol (ug/L)
Sample Date
HAV-05
Linear (HAV-05)

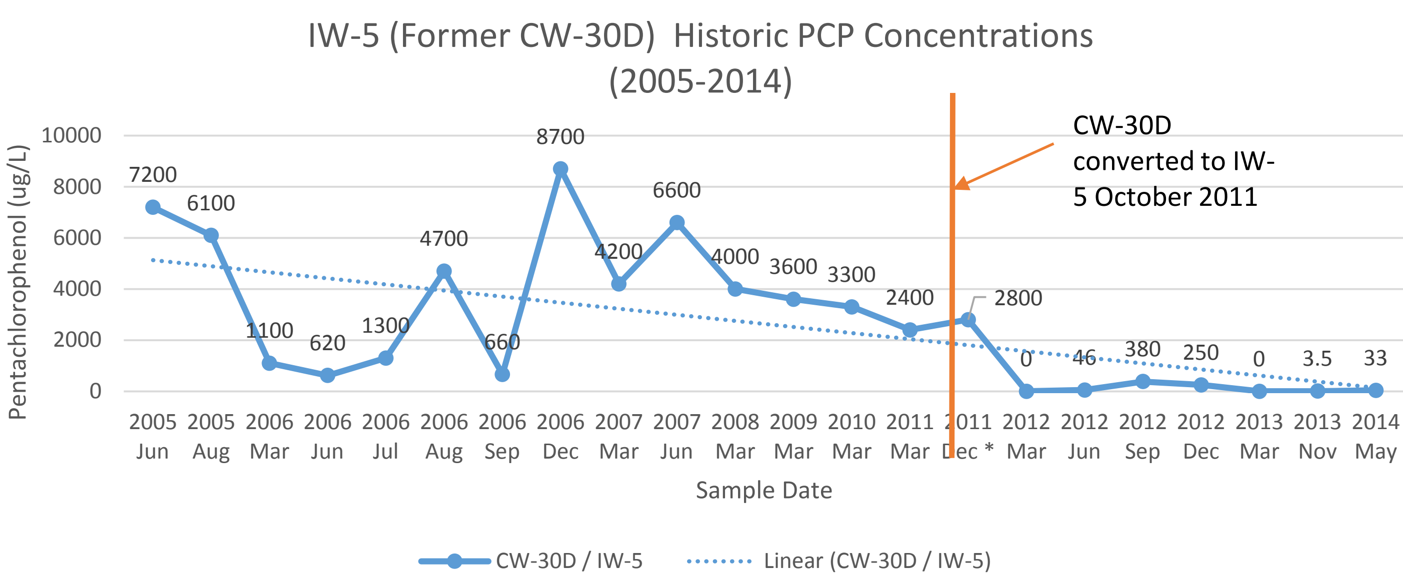

HAV-07 Historic PCP Concentrations
(1990-2014)
Pentachlorophenol (ug/L)
Sample Date
HAV-07
Linear (HAV-07)

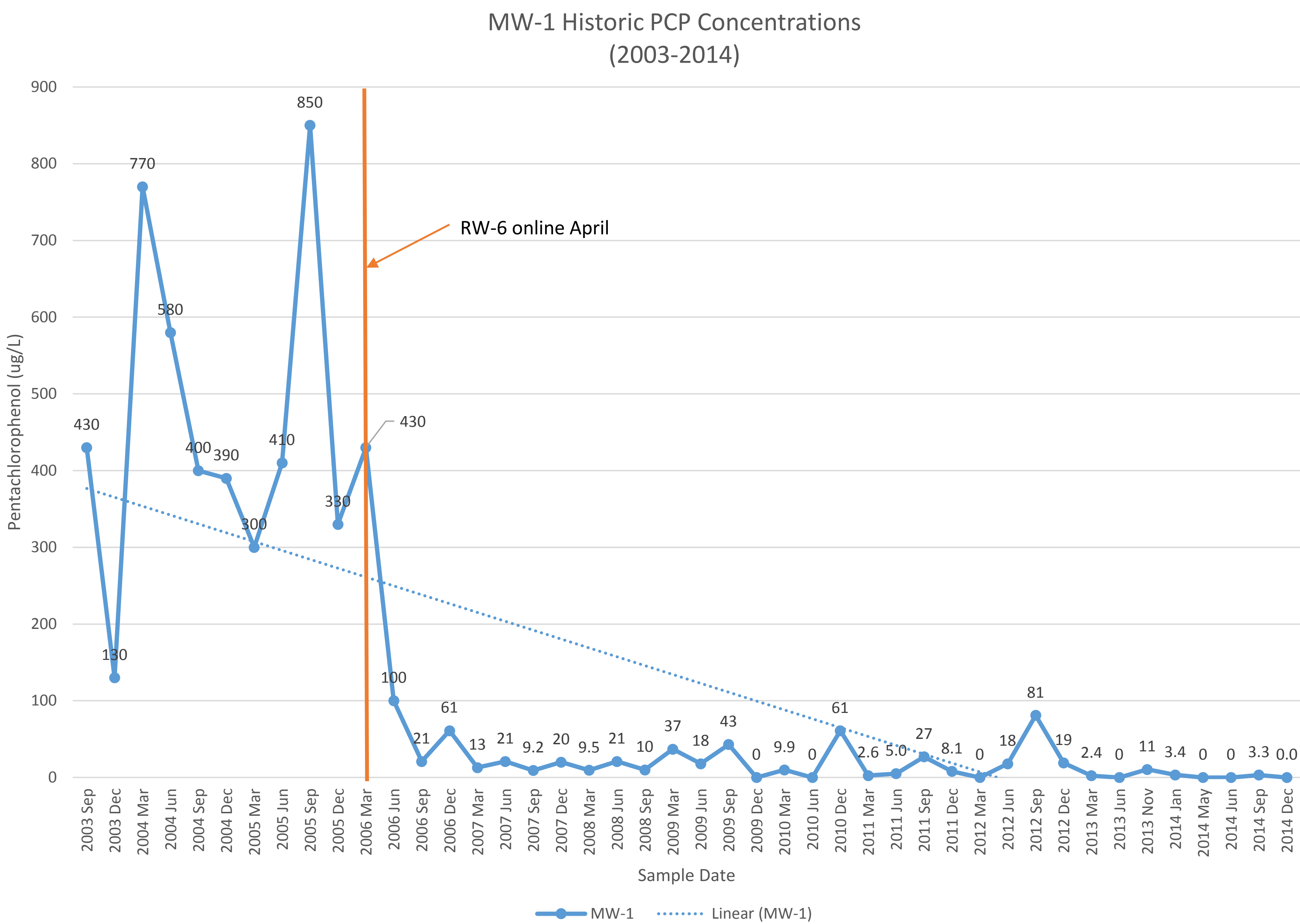

IW-1 (Former RW-1) Historic PCP Concentrations
(2003-2014)
Pentachlorophenol (ug/L)
8000
7000
6000
5000
4000
3000
2000
1000
0
4300
4600
7300
4500
4900 4900 5000
5300
2700
4700
3200
4200
41 130 430 210 410 190 0 643 358
RW-1 converted to IW-1 June 2010.
IW-1 shut down June 2013
RW-1 offline March 2006
2003 Jun 2003 Sep 2003 Dec 2004 Mar 2004 Jun 2004 Sep 2004 Dec 2005 Mar 2007 Mar 2008 Mar 2009 Mar 2010 Mar 2011 Mar * 2011 Dec 2012 Mar 2012 Jun 2012 Sep 2012 Dec 2013 Mar 2013 Nov 2014 May
Sample Date
RW-1 / IW-1
Linear (RW-1 / IW-1)


IW-2 (Former RW-2) Historic PCP Concentrations
(2003-2014)
Pentachlorophenol (ug/L)
35000
30000
25000
20000
15000
10000
5000
0
10000
29000
20
8500
11000
15000
19000
15000
7600
9400
6800
3700
5.6
4000
2400
6200
5200 5500
4800
10200
4750
RW-2 offline December 2005
RW-2 converted to IW-2 June 2010
IW-2 shut down June 2013
2003 Jun 2003 Sep 2003 Dec 2004 Mar 2004 Jun 2004 Sep 2004 Dec 2005 Mar 2007 Mar 2008 Mar 2009 Mar 2010 Mar 2011 Mar * 2011 Dec 2012 Mar 2012 Jun 2012 Sep 2012 Dec 2013 Mar 2013 Nov 2014 May
Sample Date
RW-2 / IW-2
Linear (RW-2 / IW-2)

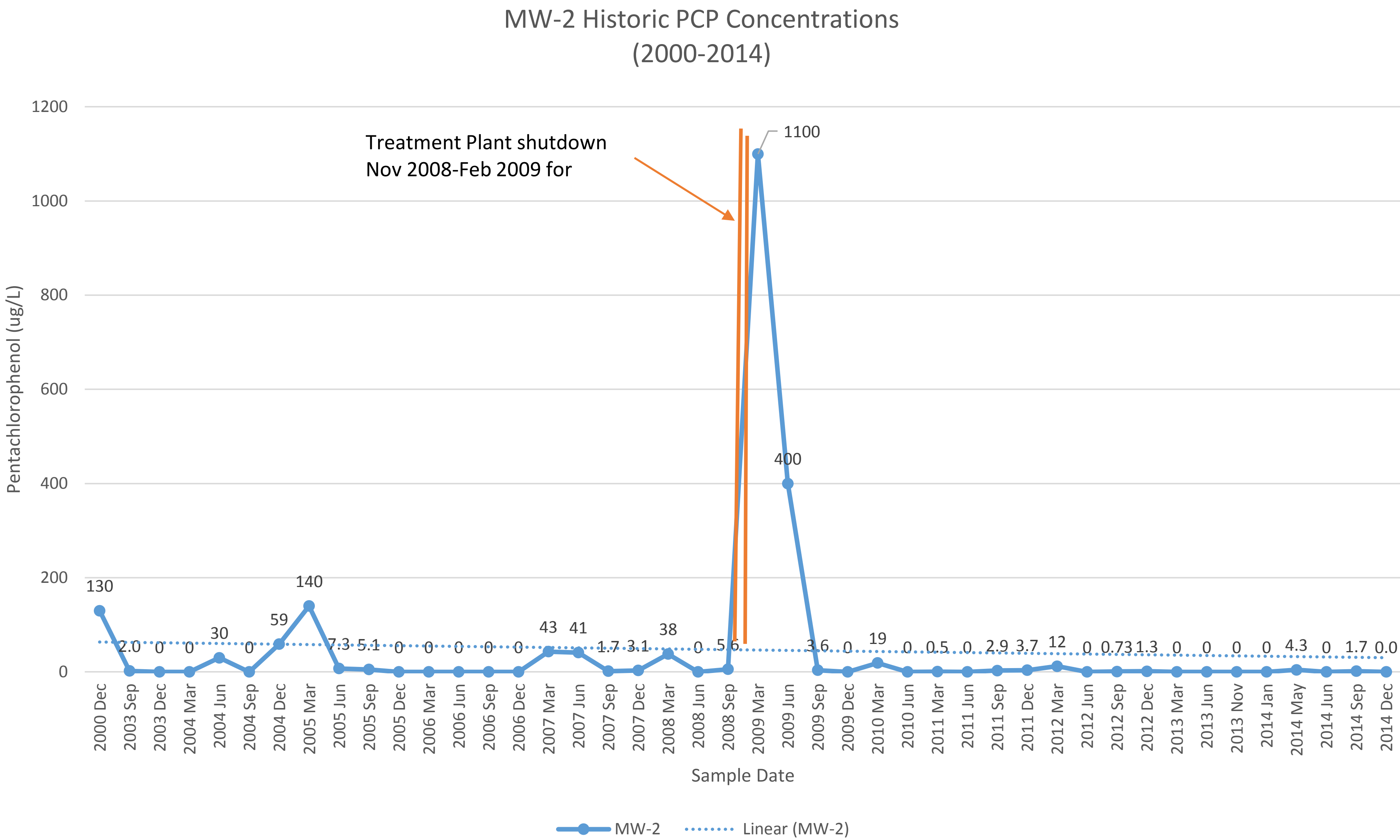

IW-3 (Former RW-4) Historic PCP Concentrations
(2003-2014)
Pentachlorophenol (ug/L)
Sample Date
RW-4 offline August 2005
RW-4 converted to IW-3 June 2010
IW-3 shut down
7200
6000
12000
7000
13000
9800
6600
4400
6200
2900
2.5
510
1700
3100
980
RW-4 / IW-3
Linear (RW-4 / IW-3)

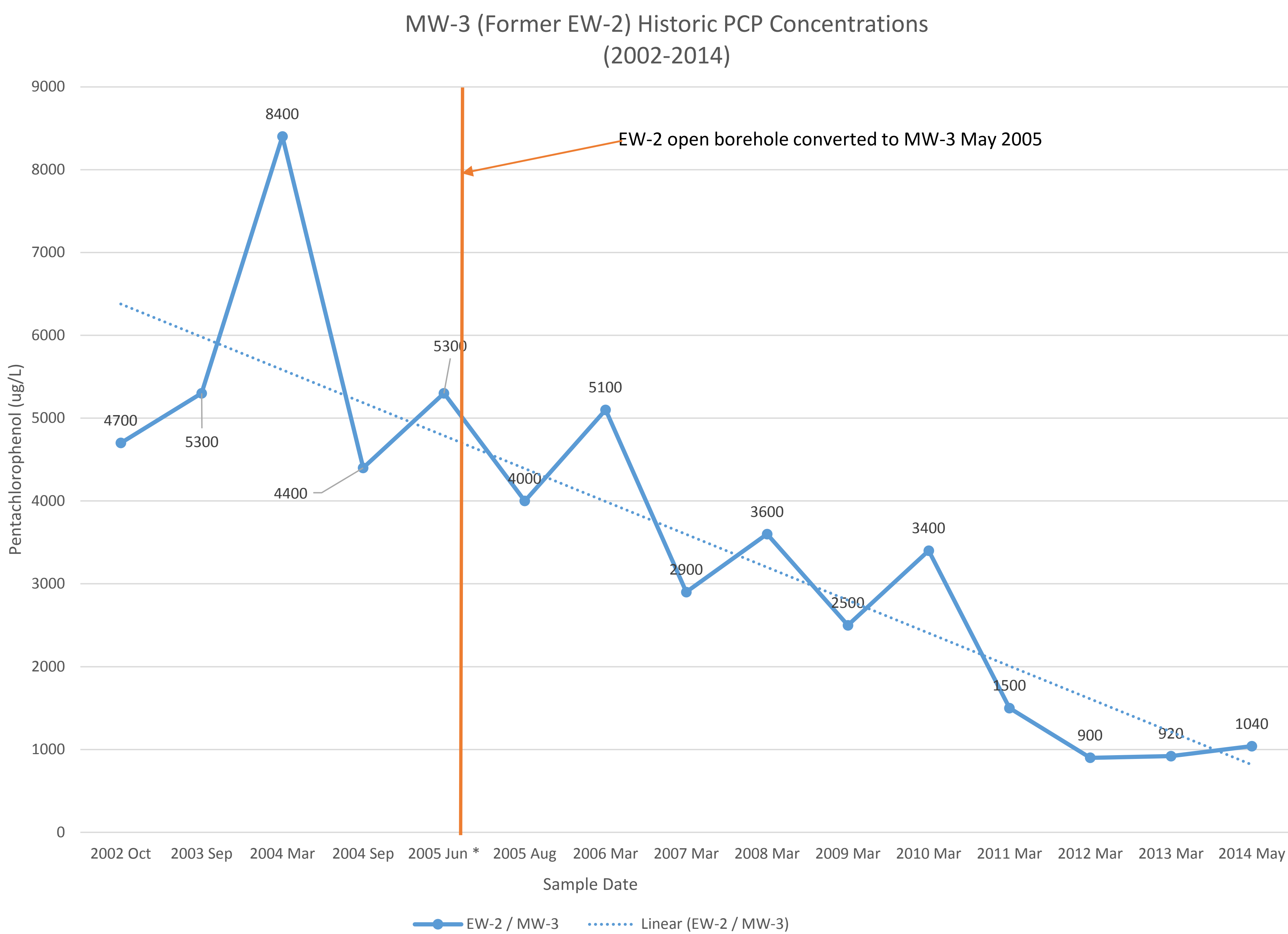

IW-4 (Former CW-29D) Historic PCP Concentrations
(2005-2014)
Pentachlorophenol (ug/L)
Sample Date
CW-29 converted to IW-4 July 2011
3900
2700
6500
4100
4.9
3.7
2200
7000
6100
8600
4200
430
73
0
450
250
2.9
112
11
CW-29D/IW-4
Linear (CW-29D/IW-4)


IW-5 (Former CW-30D) Historic PCP Concentrations
(2005-2014)
Pentachlorophenol (ug/L)
Sample Date
CW-30D converted to IW-5 October 2011
7200
6100
1100
620
1300
4700
660
8700
4200
6600
4000
3600
3300
2400
2800
0
46
380
250
0
3.5
33
CW-30D / IW-5
Linear (CW-30D / IW-5)

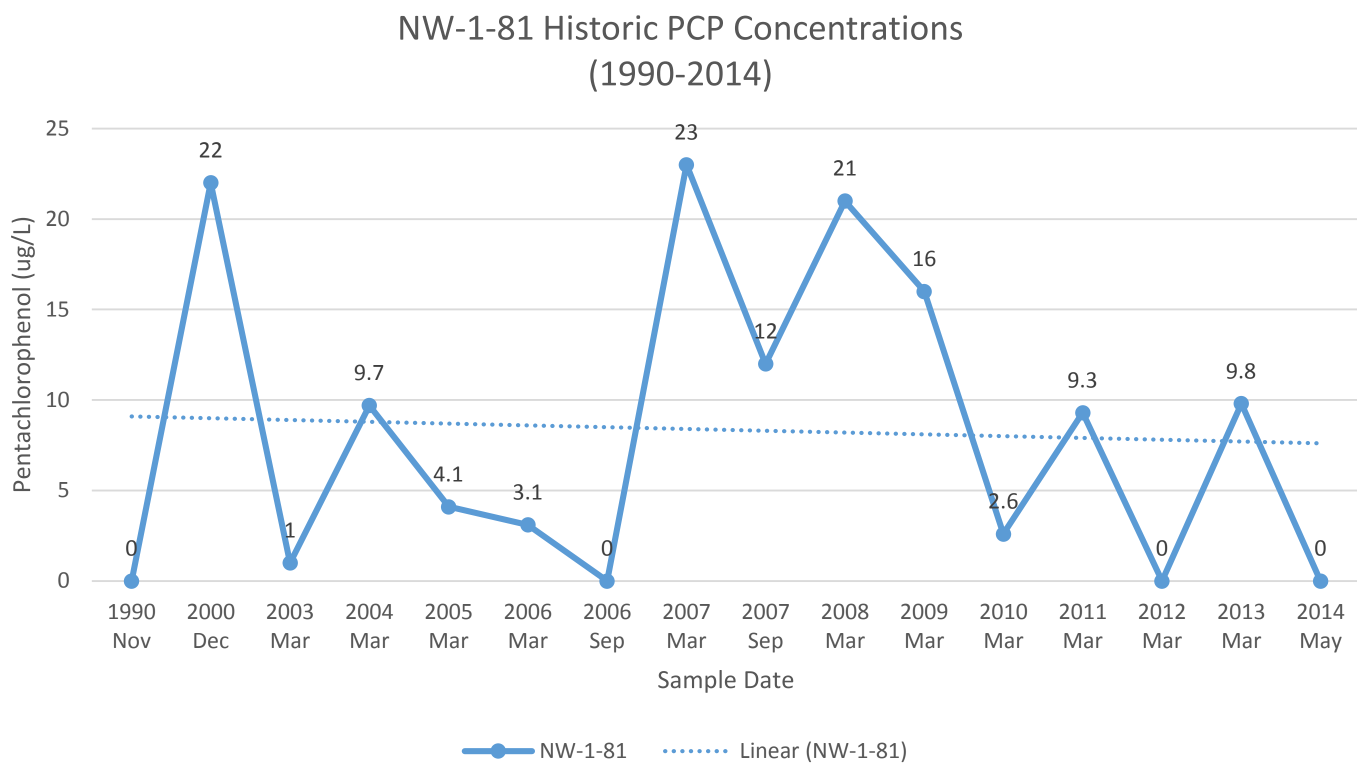


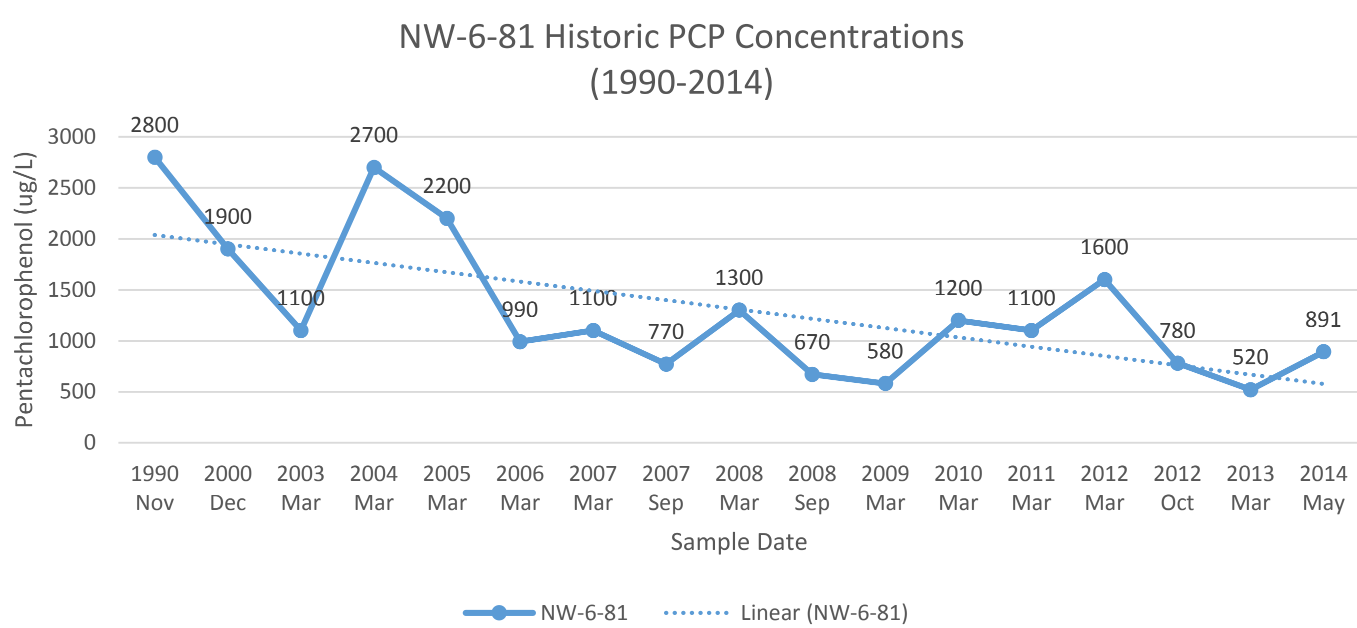
MW-1 Historic PCP Concentrations
(2003-2014)
Pentachlorophenol (ug/L)
Sample Date
RW-6 online April
MW-1
Linear (MW-1)

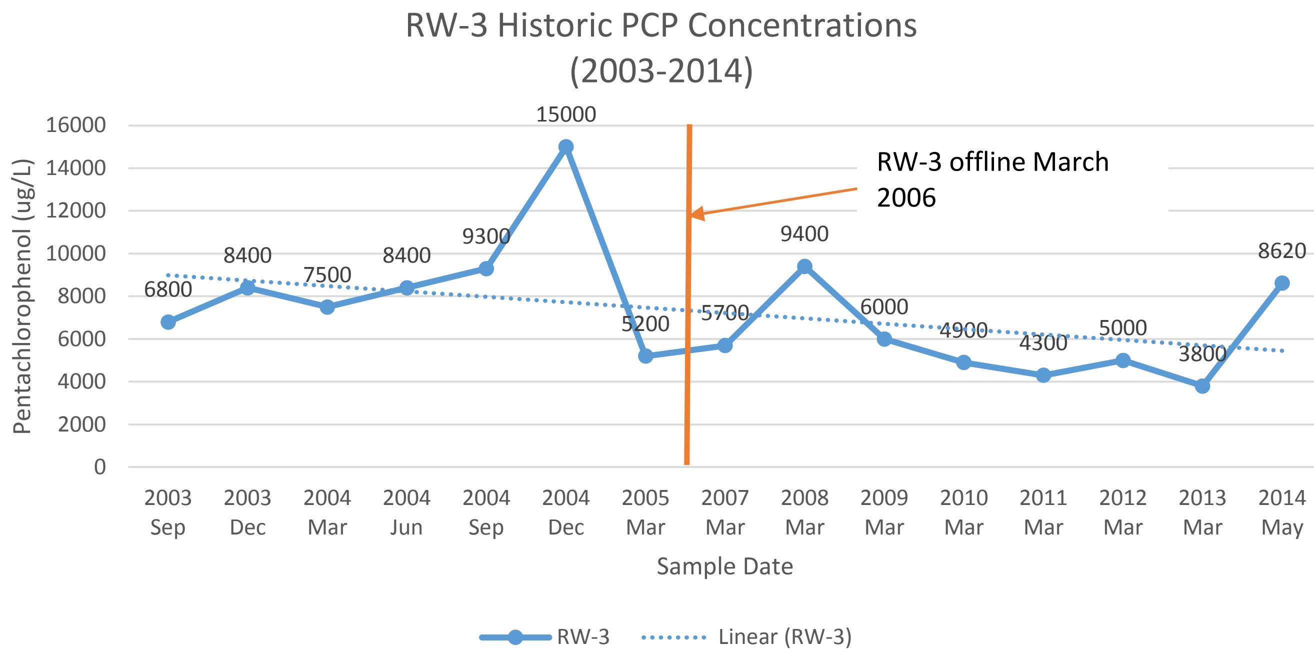

MW-2 Historic PCP Concentrations
(2000-2014)
Treatment Plant shutdown
Nov 2008-Feb 2009 for
Pentachlorophenol (ug/L)
Sample Date
MW-2
Linear (MW-2)



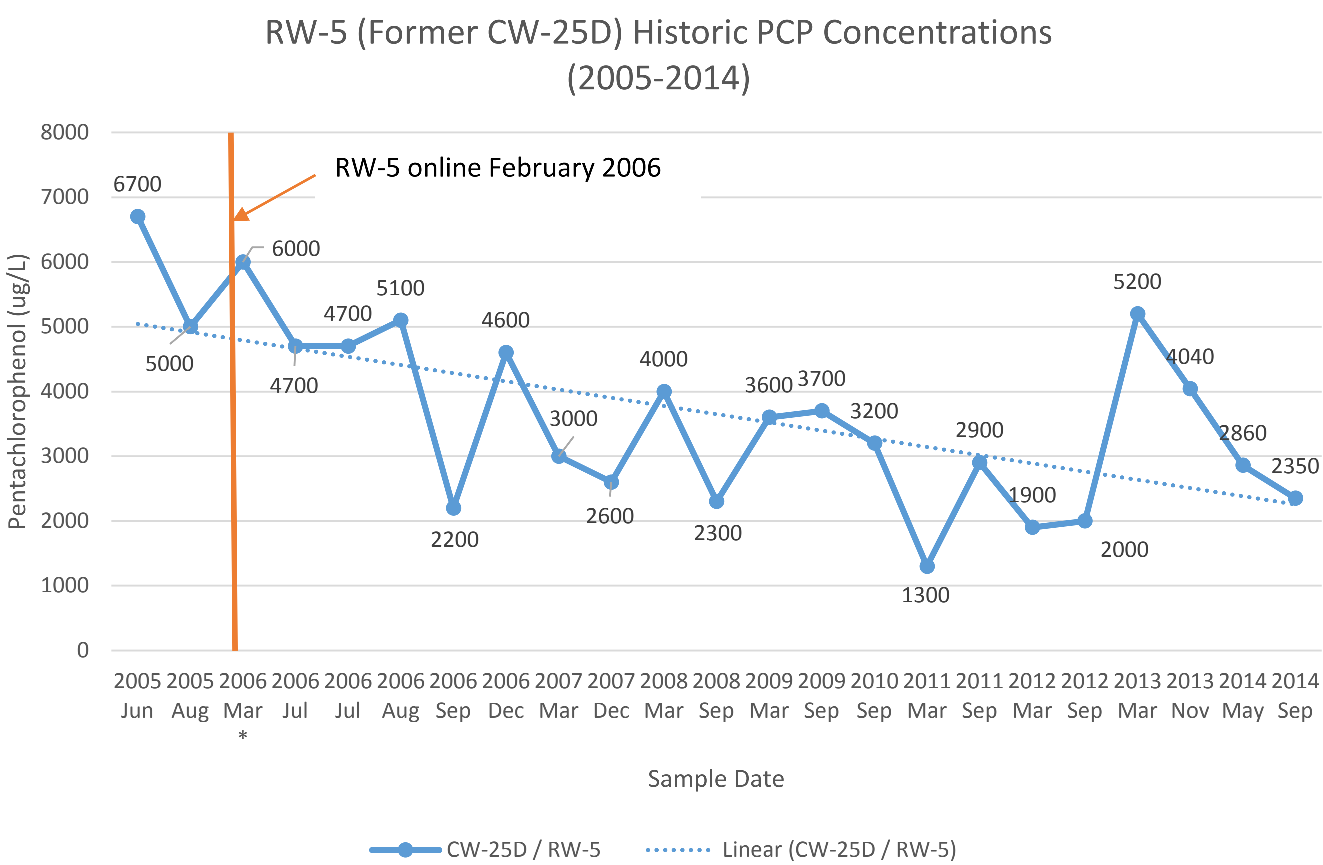
MW-3 (Former EW-2) Historic PCP Concentrations
(2002-2014)
EW-2 open borehole converted to MW-3 May 2005
Pentachlorophenol (ug/L)
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
4700
5300
8400
4400
5300
4000
5100
2900
3600
2500
3400
1500
900
920
1040
2002 Oct
2003 Sep
2004 Mar
2004 Sep
2005 Jun *
2005 Aug
2006 Mar
2007 Mar
2008 Mar
2009 Mar
2010 Mar
2011 Mar
2012 Mar
2013 Mar
2014 May
Sample Date
EW-2 / MW-3
Linear (EW-2 / MW-3)


NW-1-81 Historic PCP Concentrations
(1990-2014)
Pentachlorophenol (ug/L)
25
20
15
10
5
0
22
23
21
16
12
9.7
9.3
9.8
4.1
3.1
2.6
1
0
1990 Nov
2000 Dec
2003 Mar
2004 Mar
2005 Mar
2006 Mar
2006 Sep
2007 Mar
2007 Sep
2008 Mar
2009 Mar
2010 Mar
2011 Mar
2012 Mar
2013 Mar
2014 May
Sample Date
NW-1-81
Linear (NW-1-81)

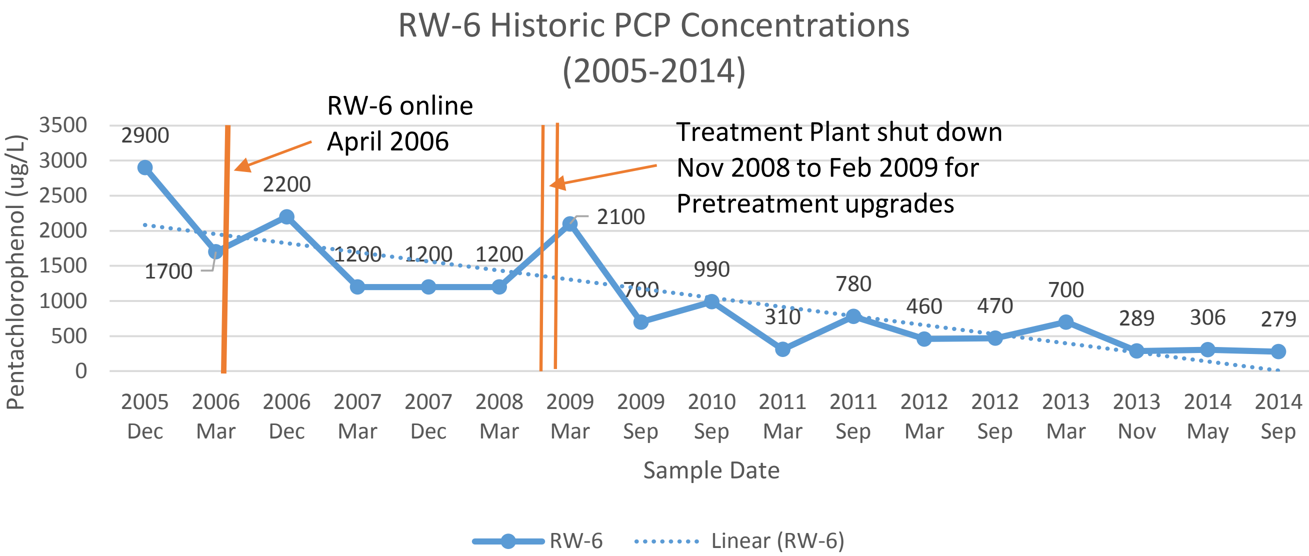

NW-6-81 Historic PCP Concentrations
(1990-2014)
Pentachlorophenol (ug/L)
3000
2500
2000
1500
1000
500
0
2800
1900
1100
2700
2200
990
1100
770
1300
670
580
1200
1100
1600
780
520
891
1990 Nov
2000 Dec
2003 Mar
2004 Mar
2005 Mar
2006 Mar
2007 Mar
2007 Sep
2008 Mar
2008 Sep
2009 Mar
2010 Mar
2011 Mar
2012 Mar
2012 Oct
2013 Mar
2014 May
Sample Date
NW-6-81
Linear (NW-6-81)



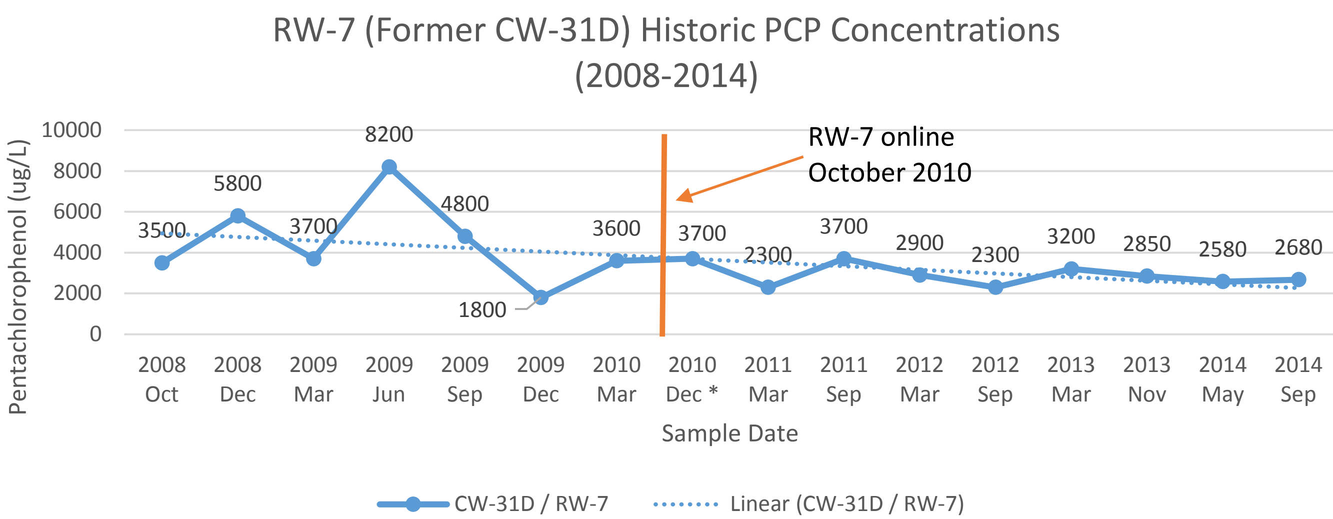
RW-3 Historic PCP Concentrations
(2003-2014)
Pentachlorophenol (ug/L)
16000
14000
12000
10000
8000
6000
4000
2000
0
15000
RW-3 offline March 2006
9400
8400
8400
9300
8620
6800
7500
5700
6000
5200
4900
4300
5000
3800
2003 Sep
2003 Dec
2004 Mar
2004 Jun
2004 Sep
2004 Dec
2005 Mar
2007 Mar
2008 Mar
2009 Mar
2010 Mar
2011 Mar
2012 Mar
2013 Mar
2014 May
Sample Date
RW-3
Linear (RW-3)



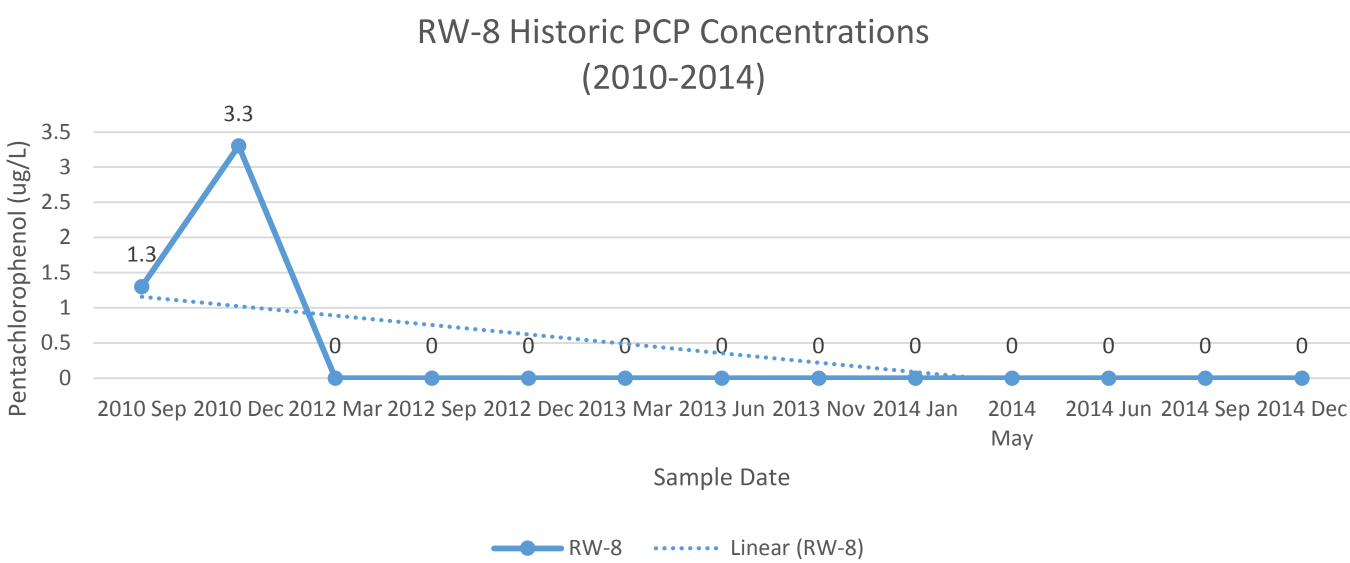
RW-5 (Former CW-25D) Historic PCP Concentrations
(2005-2014)
Pentachlorophenol (ug/L)
8000
7000
6000
5000
4000
3000
2000
1000
0
RW-5 online February 2006
6700
6000
5000
4700
4700
5100
4600
2200
3000
2600
4000
2300
3600
3700
3200
1300
2900
1900
2000
5200
4040
2860
2350
2005 Jun
2005 Aug
2006 Mar *
2006 Jul
2006 Jul
2006 Aug
2006 Sep
2006 Dec
2007 Mar
2007 Dec
2008 Mar
2008 Sep
2009 Mar
2009 Sep
2010 Sep
2011 Mar
2011 Sep
2012 Mar
2012 Sep
2013 Mar
2013 Nov
2014 May
2014 Sep
Sample Date
CW-25D / RW-5
Linear (CW-25D / RW-5)



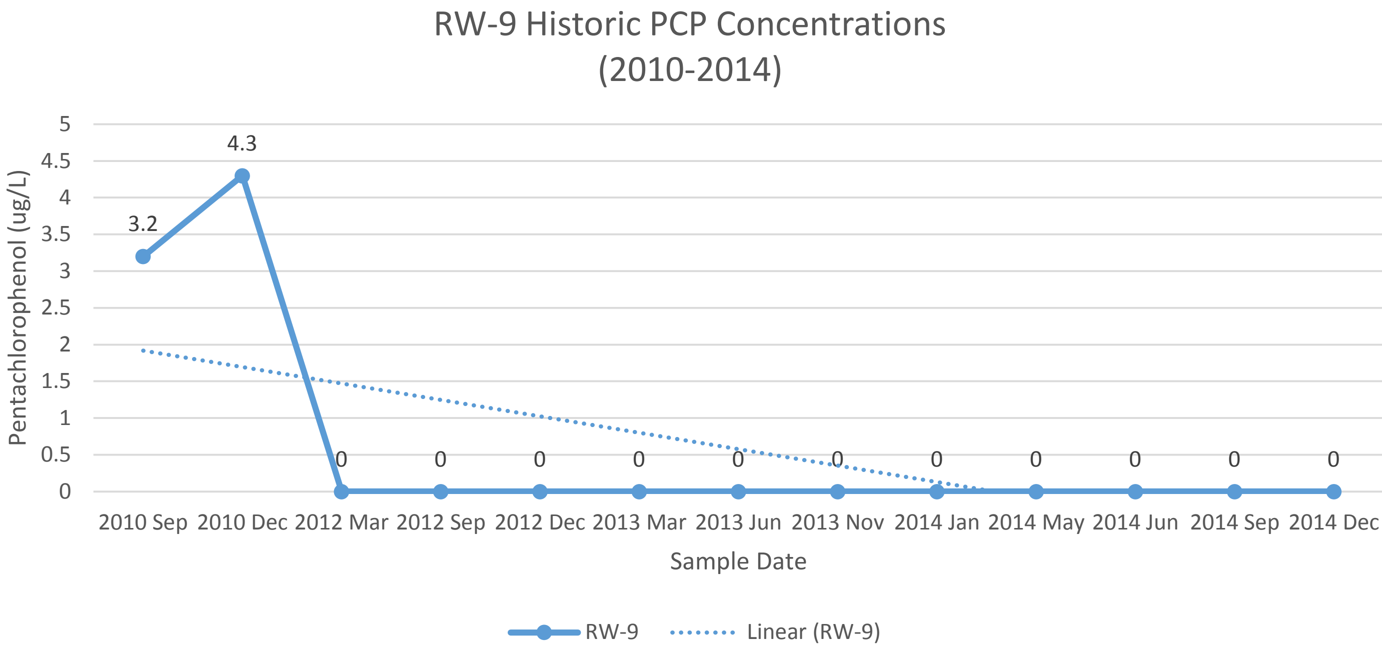
RW-6 Historic PCP Concentrations
(2005-2014)
RW-6 online
April 2006
Treatment Plant shut down
Nov 2008 to Feb 2009 for
Pretreatment upgrades
Pentachlorophenol (ug/L)
3500
3000
2500
2000
1500
1000
500
0
2900
1700
2200
1200
1200
1200
2100
700
990
310
780
460
470
700
289
306
279
2005 Dec
2006 Mar
2006 Dec
2007 Mar
2007 Dec
2008 Mar
2009 Mar
2009 Sep
2010 Sep
2011 Mar
2011 Sep
2012 Mar
2012 Sep
2013 Mar
2013 Nov
2014 May
2014 Sep
Sample Date
RW-6
Linear (RW-6)

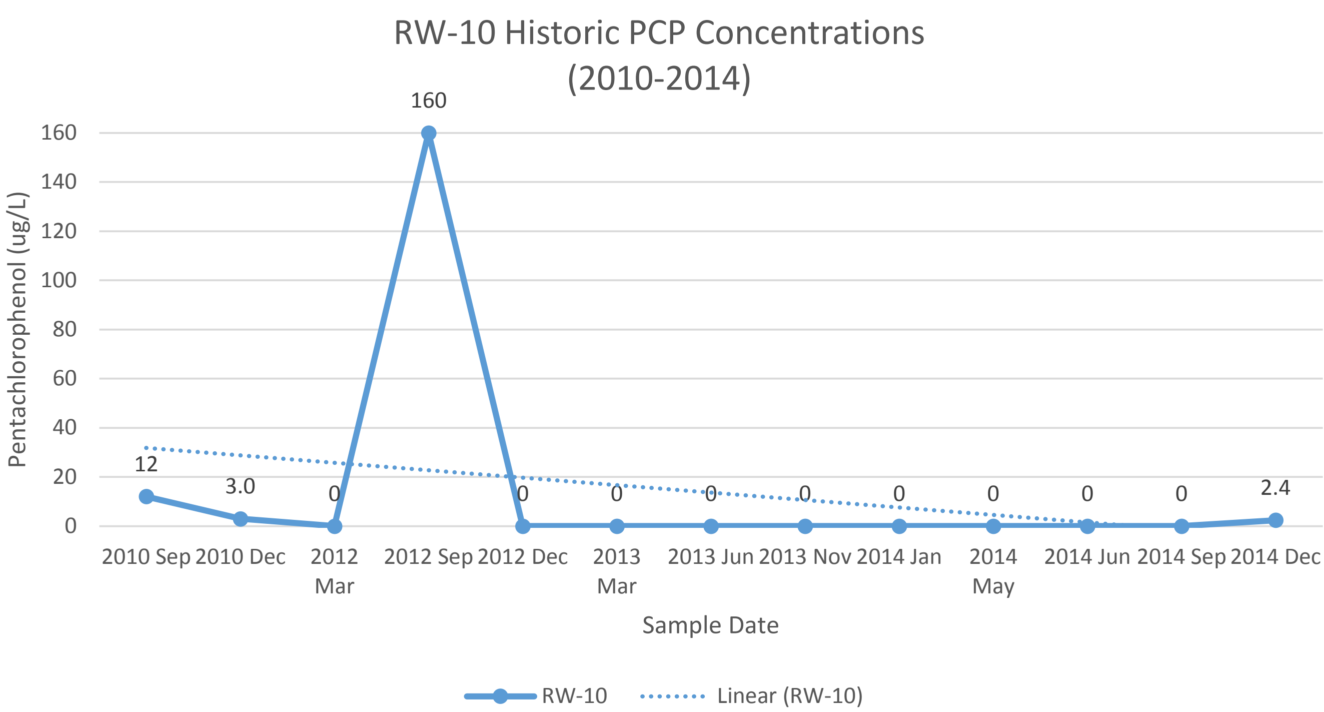


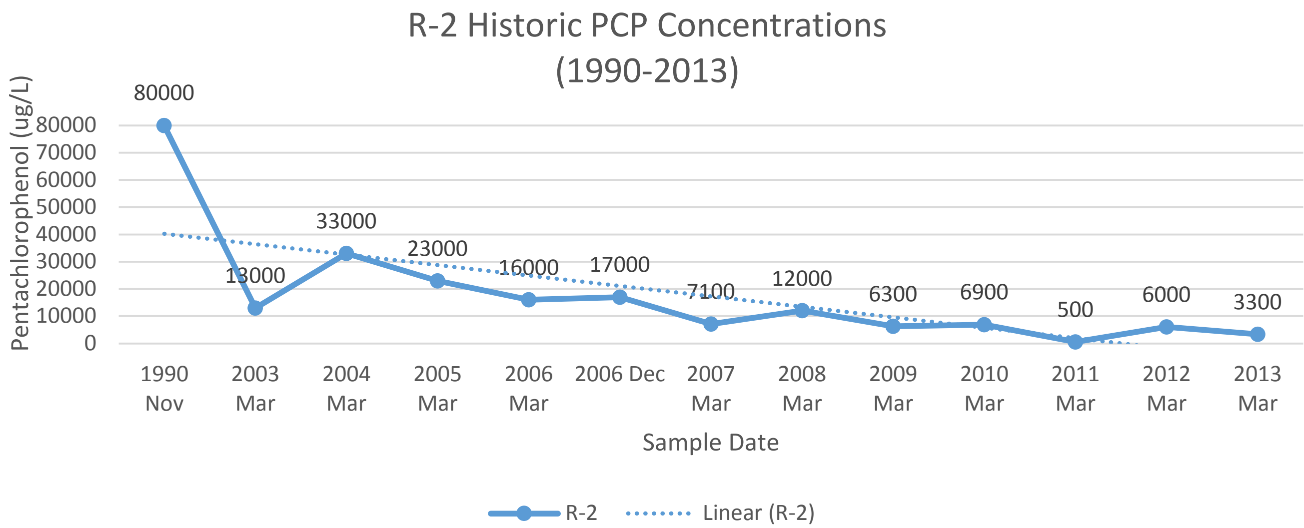
RW-7 (Former CW-31D) Historic PCP Concentrations
(2008-2014)
RW-7 online
October 2010
Pentachlorophenol (ug/L)
10000
8000
6000
4000
2000
0
3500
5800
3700
8200
4800
1800
3600
3700
2300
3700
2900
2300
3200
2850
2580
2680
2008 Oct
2008 Dec
2009 Mar
2009 Jun
2009 Sep
2009 Dec
2010 Mar
2010 Dec *
2011 Mar
2011 Sep
2012 Mar
2012 Sep
2013 Mar
2013 Nov
2014 May
2014 Sep
Sample Date
CW-31D / RW-7
Linear (CW-31D / RW-7)



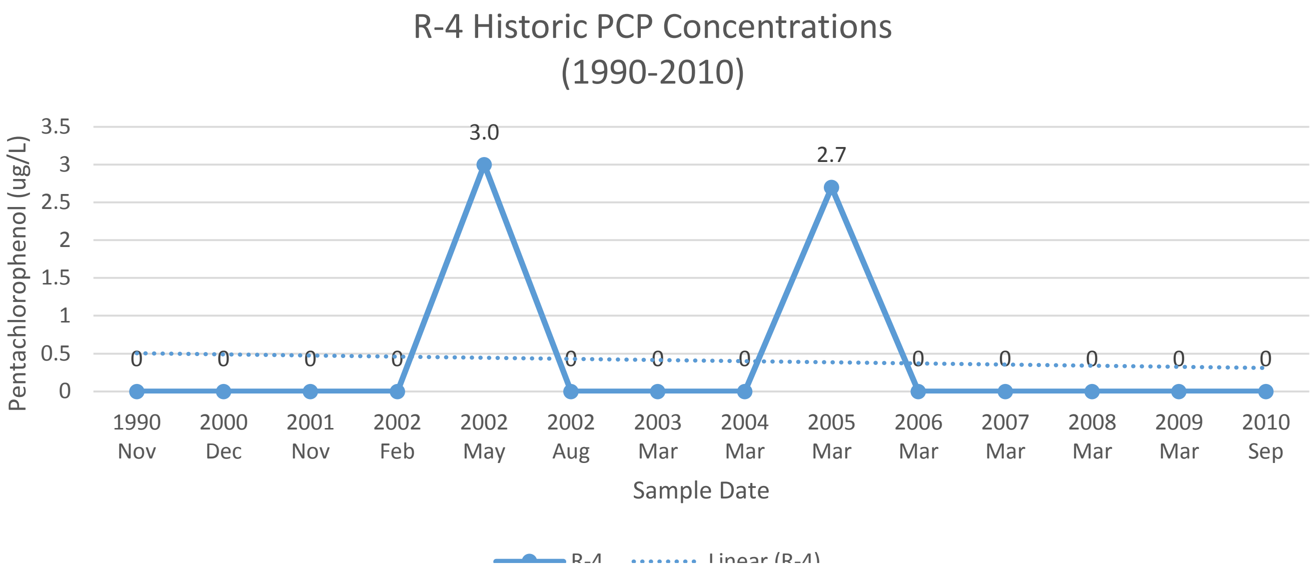
RW-8 Historic PCP Concentrations
(2010-2014)
Pentachlorophenol (ug/L)
3.5
3
2.5
2
1.5
1
0.5
0
1.3
3.3
0
2010 Sep
2010 Dec
2012 Mar
2012 Sep
2012 Dec
2013 Mar
2013 Jun
2013 Nov
2014 Jan
2014 May
2014 Jun
2014 Sep
2014 Dec
Sample Date
RW-8
Linear (RW-8)


RW-9 Historic PCP Concentrations
(2010-2014)
Pentachlorophenol (ug/L)
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
3.2
4.3
0
0
0
0
0
0
0
0
0
0
0
2010 Sep
2010 Dec
2012 Mar
2012 Sep
2012 Dec
2013 Mar
2013 Jun
2013 Nov
2014 Jan
2014 May
2014 Jun
2014 Sep
2014 Dec
Sample Date
RW-9
Linear (RW-9)

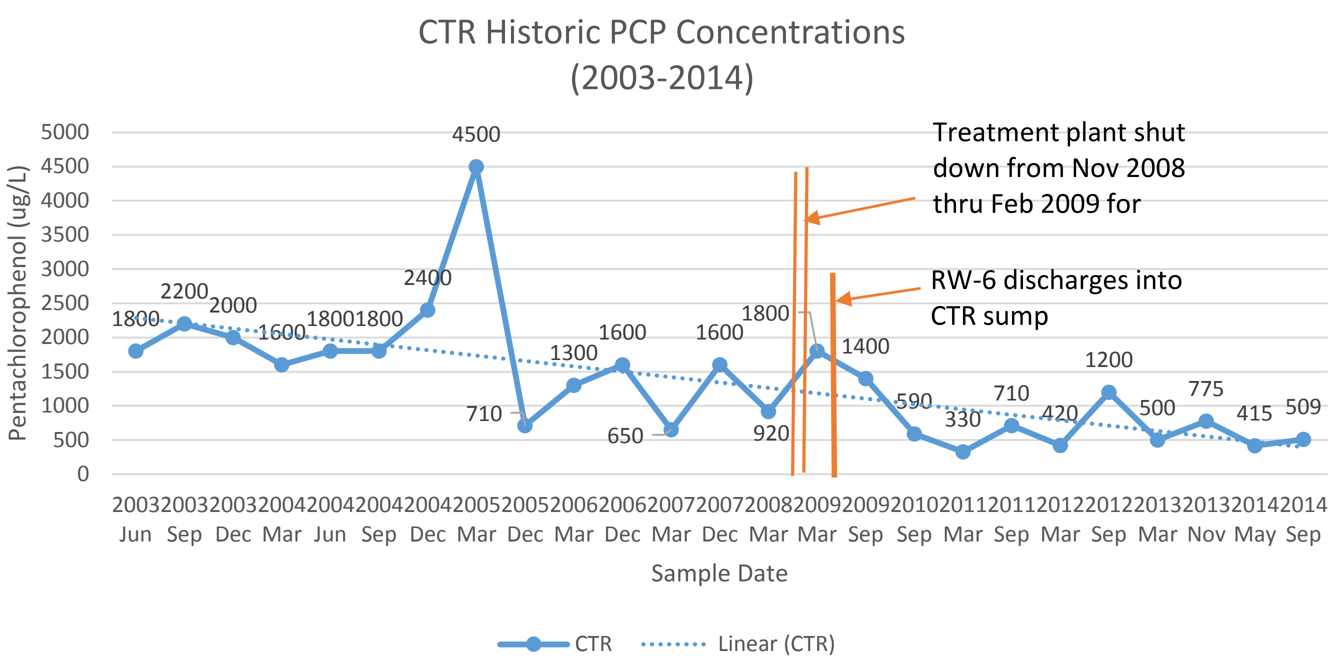

RW-10 Historic PCP Concentrations
(2010-2014)
Pentachlorophenol (ug/L)
160
140
120
100
80
60
40
20
0
12
3.0
0
160
0
0
0
0
0
0
0
0
2.4
2010 Sep
2010 Dec
2012 Mar
2012 Sep
2012 Dec
2013 Mar
2013 Jun
2013 Nov
2014 Jan
2014 May
2014 Jun
2014 Sep
2014 Dec
Sample Date
RW-10
Linear (RW-10)



R-2 Historic PCP Concentrations
(1990-2013)
Pentachlorophenol (ug/L)
Sample Date
R-2
Linear (R-2)



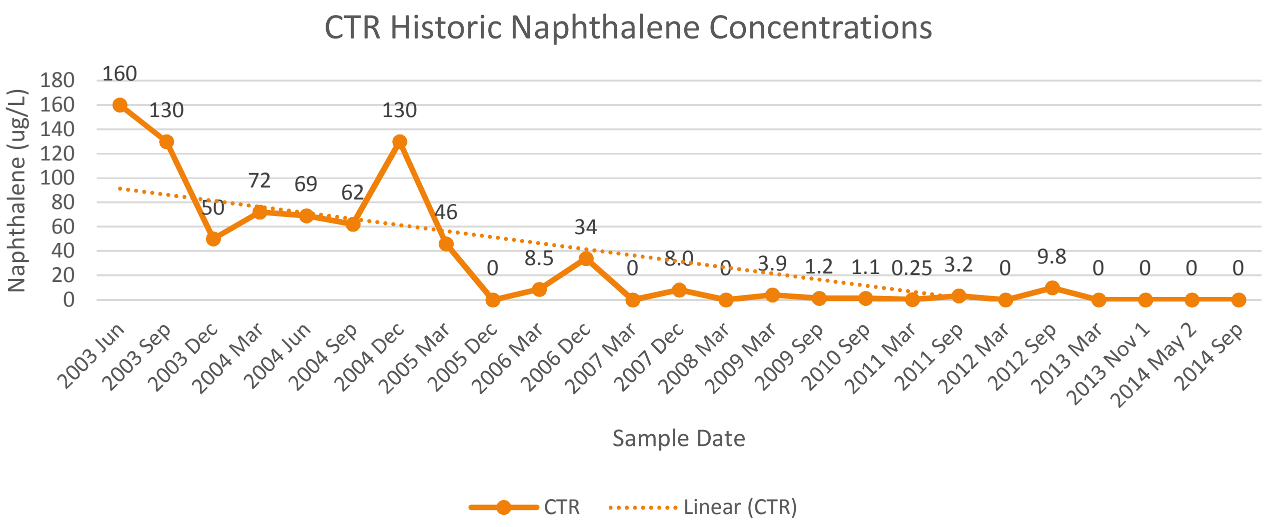
R-4 Historic PCP Concentrations
(1990-2010)
Pentachlorophenol (ug/L)
Sample Date



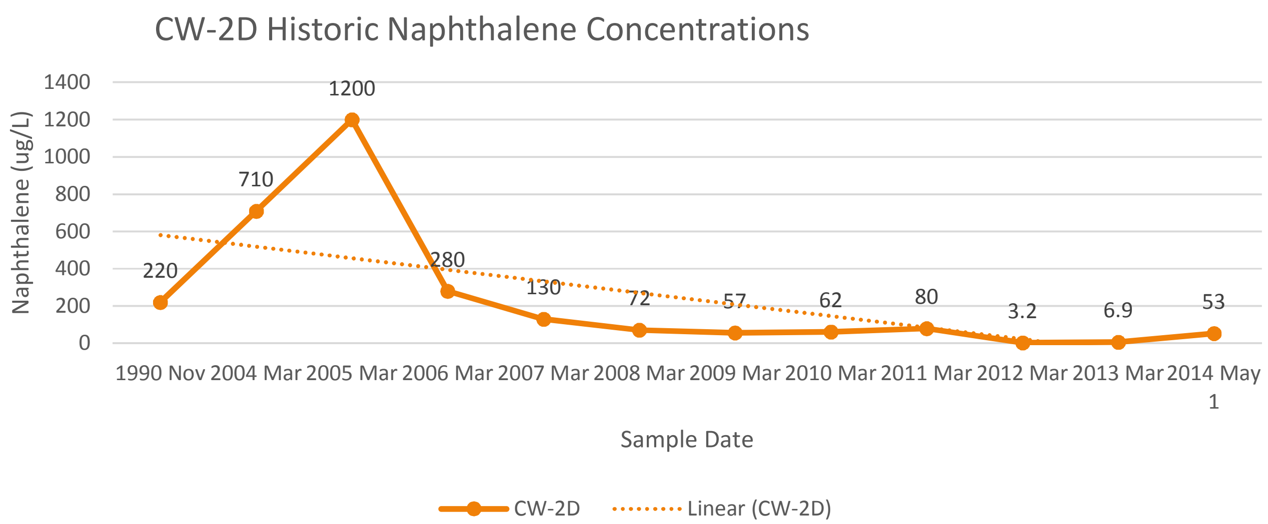
CTR Historic PCP Concentrations
(2003-2014)
Treatment plant shut down from Nov 2008 thru Feb 2009 for
RW-6 discharges into CTR sump
Pentachlorophenol (ug/L)
Sample Date
CTR
Linear (CTR)

APPENDIX B

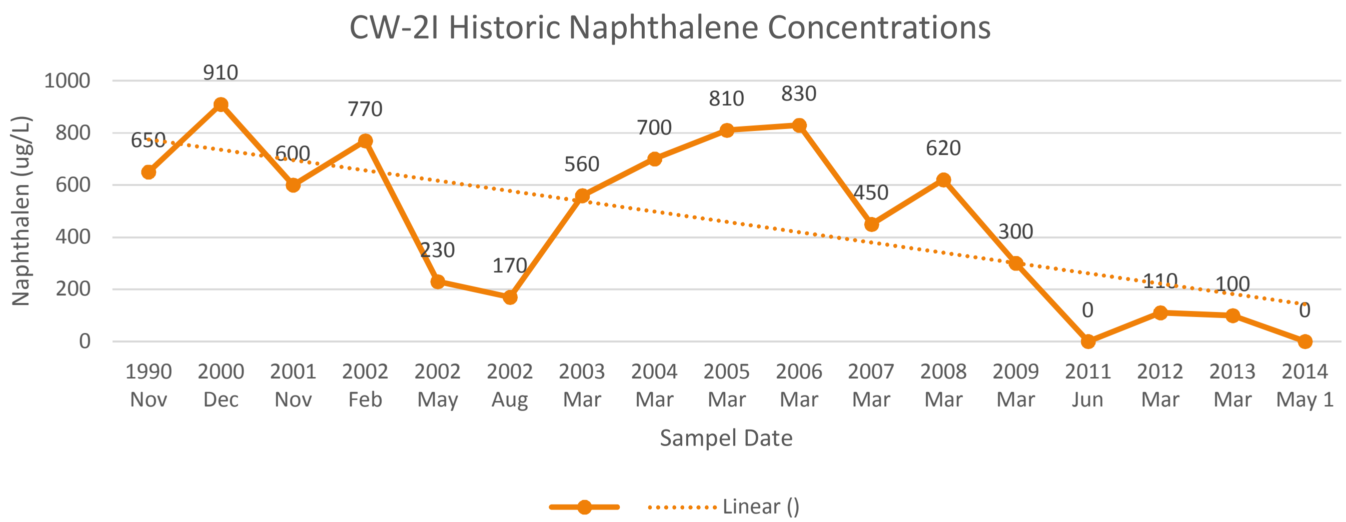
Historical Naphthalene Trend In Site wide Wells



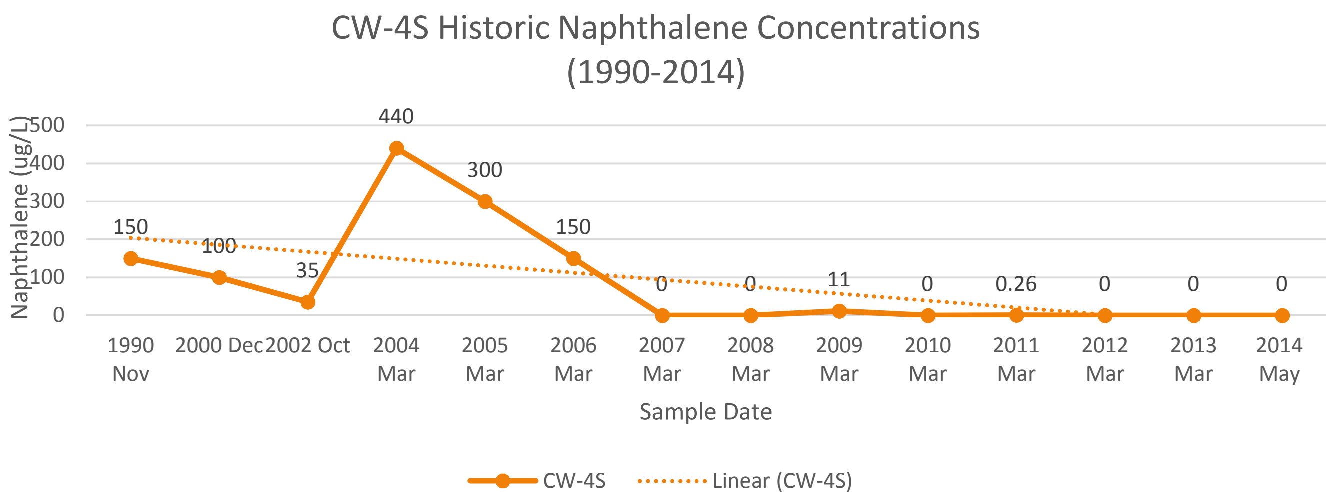
CTR Historic Naphthalene Concentrations
Naphthalene (ug/L)
180
160
140
120
100
80
60
40
20
0
160
130
50
72
69
62
130
46
0
8.5
34
0
8.0
0
3.9
1.2
1.1
0.25
3.2
0
9.8
0
0
0
0
2003 Jun
2003 Sep
2003 Dec
2004 Mar
2004 Jun
2004 Sep
2004 Dec
2005 Mar
2005 Dec
2006 Mar
2006 Dec
2007 Mar
2007 Dec
2008 Mar
2009 Mar
2009 Sep
2010 Sep
2011 Mar
2011 Sep
2012 Mar
2012 Sep
2013 Mar
2013 Nov 1
2014 May 2
2014 Sep
Sample Date
CTR
Linear (CTR)

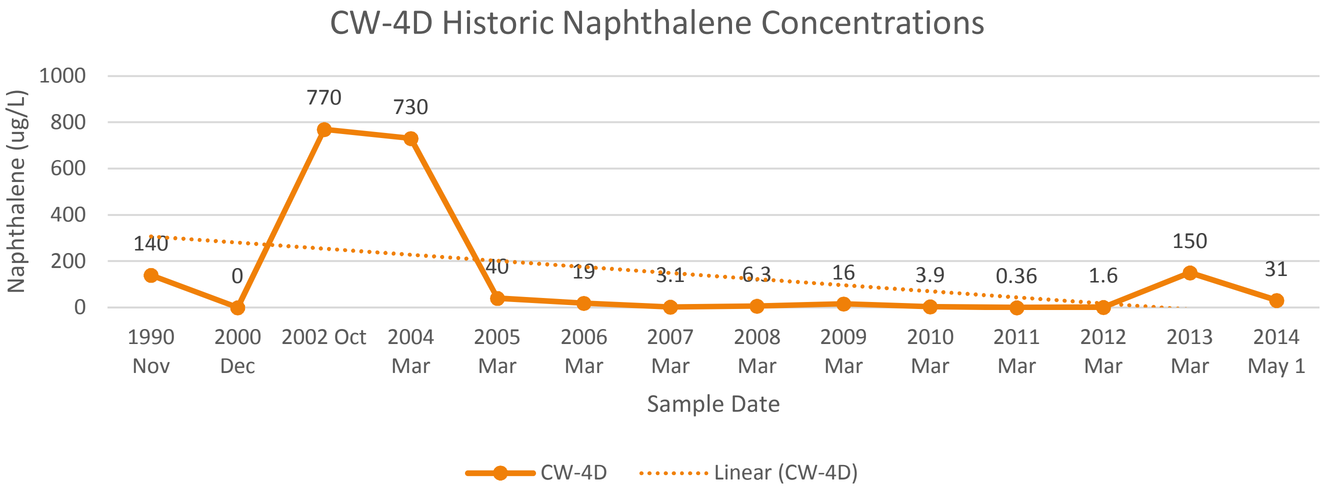


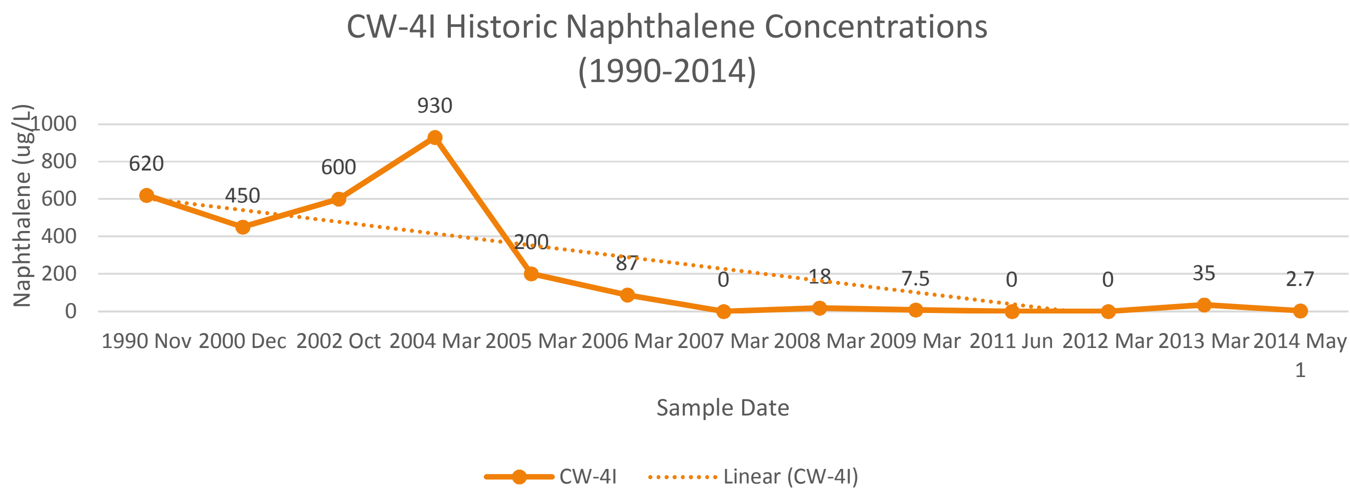
CW-2D Historic Naphthalene Concentrations
Naphthalene (ug/L)
1400
1200
1000
800
600
400
200
0
220
710
1200
280
130
72
57
62
80
3.2
6.9
53
1990 Nov
2004 Mar
2005 Mar
2006 Mar
2007 Mar
2008 Mar
2009 Mar
2010 Mar
2011 Mar
2012 Mar
2013 Mar
2014 May 1
Sample Date
CW-2D
Linear (CW-2D)

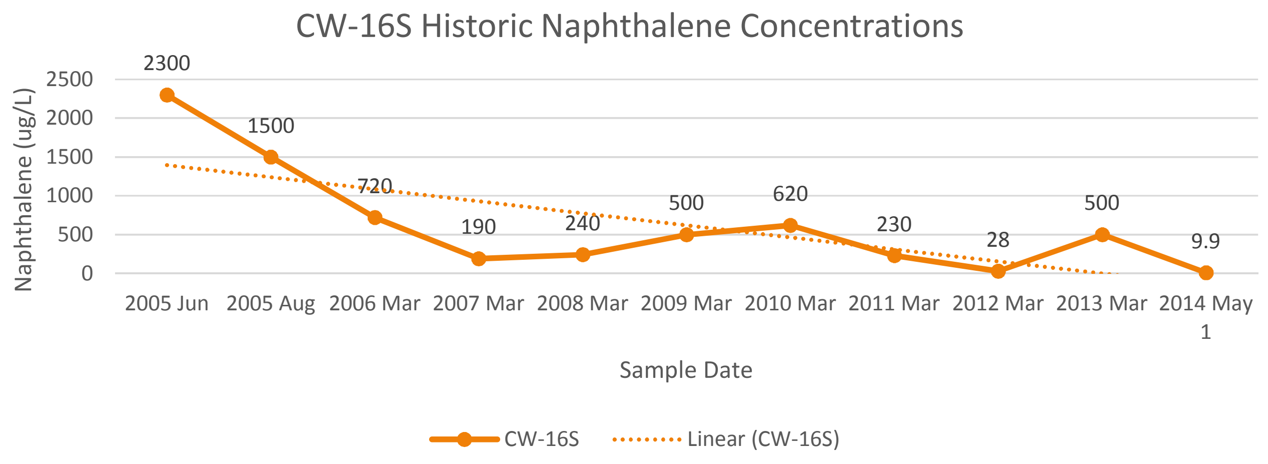


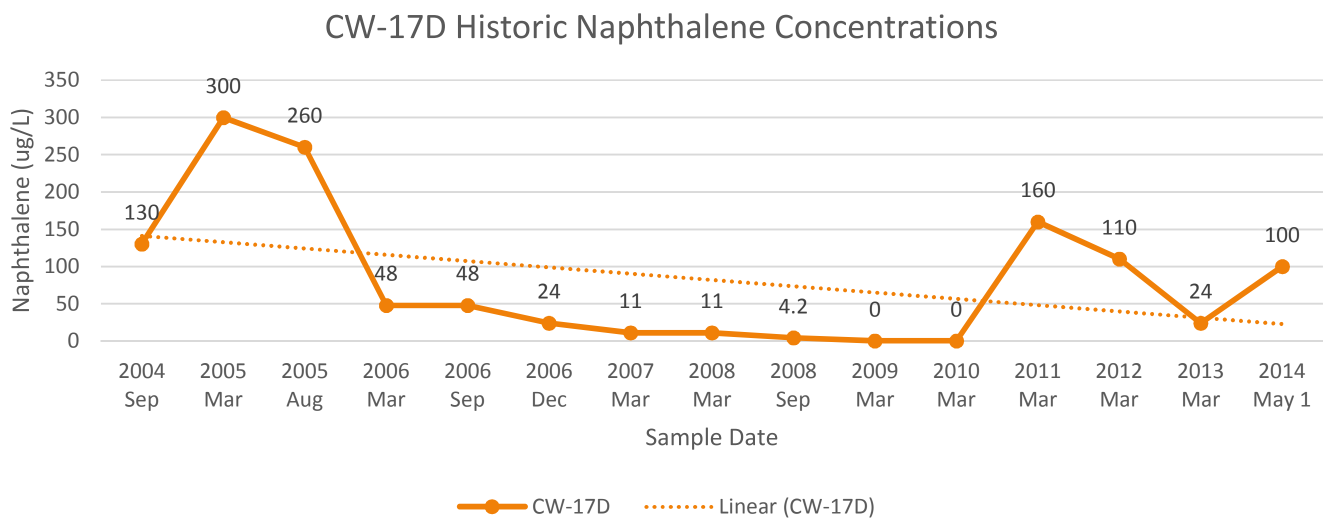
CW-2I Historic Naphthalene Concentrations
Naphthalen (ug/L)
1000
800
600
400
200
0
650
910
600
770
230
170
560
700
810
830
450
620
300
0
110
100
0
1990 Nov
2000 Dec
2001 Nov
2002 Feb
2002 May
2002 Aug
2003 Mar
2004 Mar
2005 Mar
2006 Mar
2007 Mar
2008 Mar
2009 Mar
2011 Jun
2012 Mar
2013 Mar
2014 May 1
Sampel Date
Linear ()

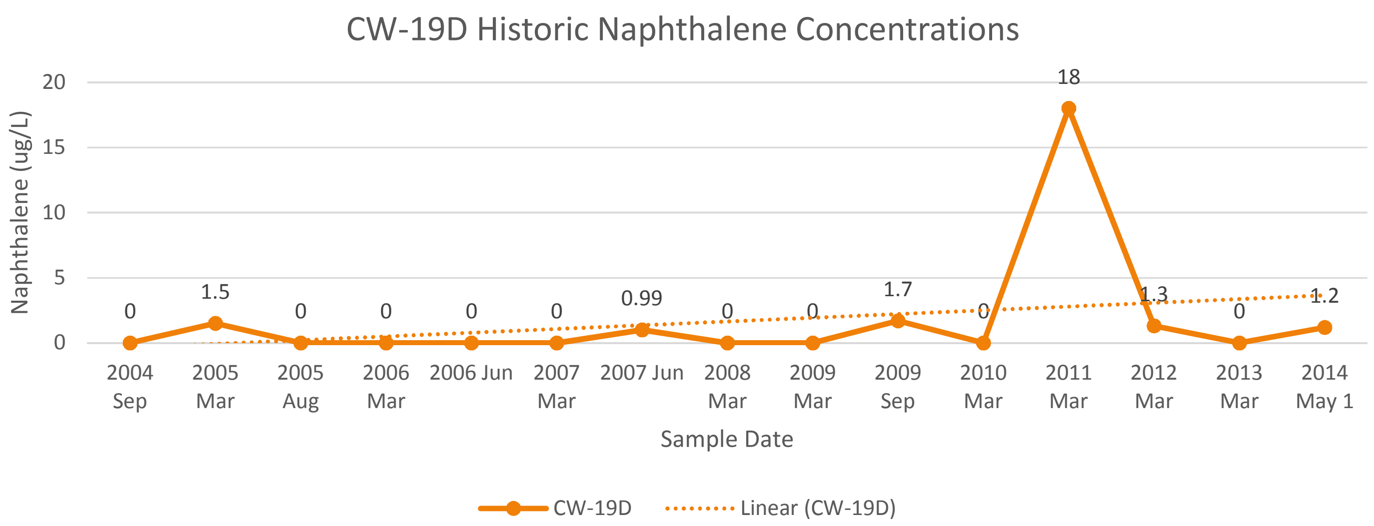

CW-4S Historic Naphthalene Concentrations
(1990-2014)
Naphthalene (ug/L)
500
400
300
200
100
0
150
100
35
440
300
150
0
0
11
0
0.26
0
0
0
1990 Nov
2000 Dec
2002 Oct
2004 Mar
2005 Mar
2006 Mar
2007 Mar
2008 Mar
2009 Mar
2010 Mar
2011 Mar
2012 Mar
2013 Mar
2014 May
Sample Date
CW-4S
Linear (CW-4S)

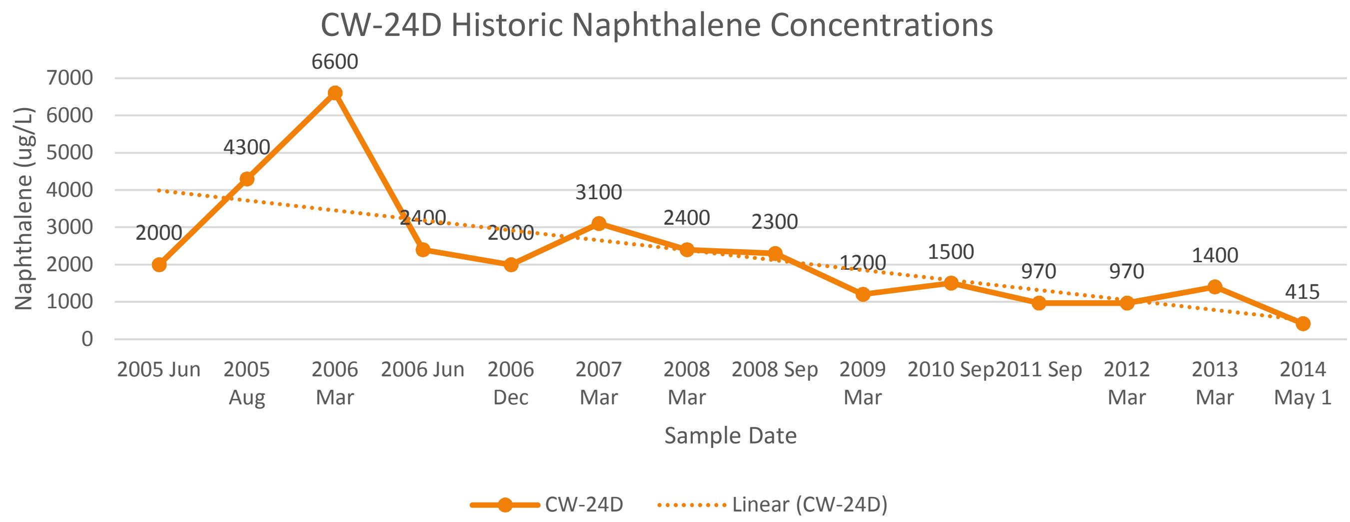

CW-4D Historic Naphthalene Concentrations
Naphthalene (ug/L)
1000
800
600
400
200
0
140
0
770
730
40
19
3.1
6.3
16
3.9
0.36
1.6
150
31
1990 Nov
2000 Dec
2002 Oct
2004 Mar
2005 Mar
2006 Mar
2007 Mar
2008 Mar
2009 Mar
2010 Mar
2011 Mar
2012 Mar
2013 Mar
2014 May 1
Sample Date
CW-4D
Linear (CW-4D)

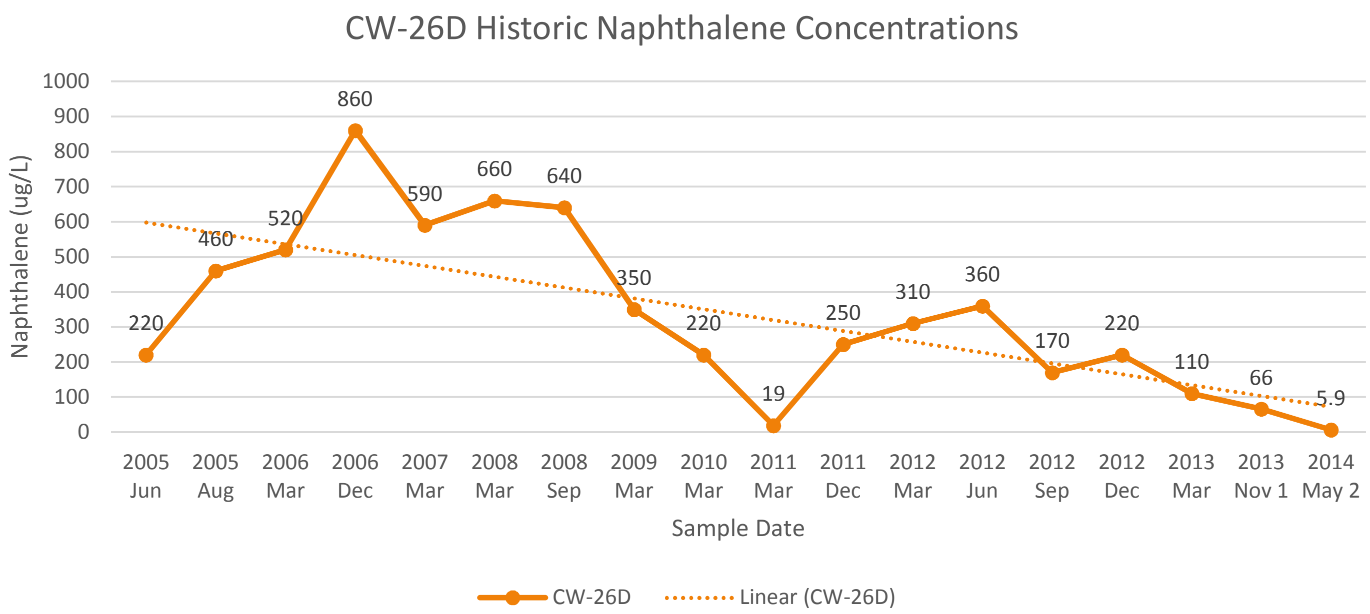

CW-4I Historic Naphthalene Concentrations
(1990-2014)
Naphthalene (ug/L)
1000
800
600
400
200
0
620
450
600
930
200
87
0
18
7.5
0
0
35
2.7
1990 Nov
2000 Dec
2002 Oct
2004 Mar
2005 Mar
2006 Mar
2007 Mar
2008 Mar
2009 Mar
2011 Jun
2012 Mar
2013 Mar
2014 May 1
Sample Date
CW-4I
Linear (CW-4I)

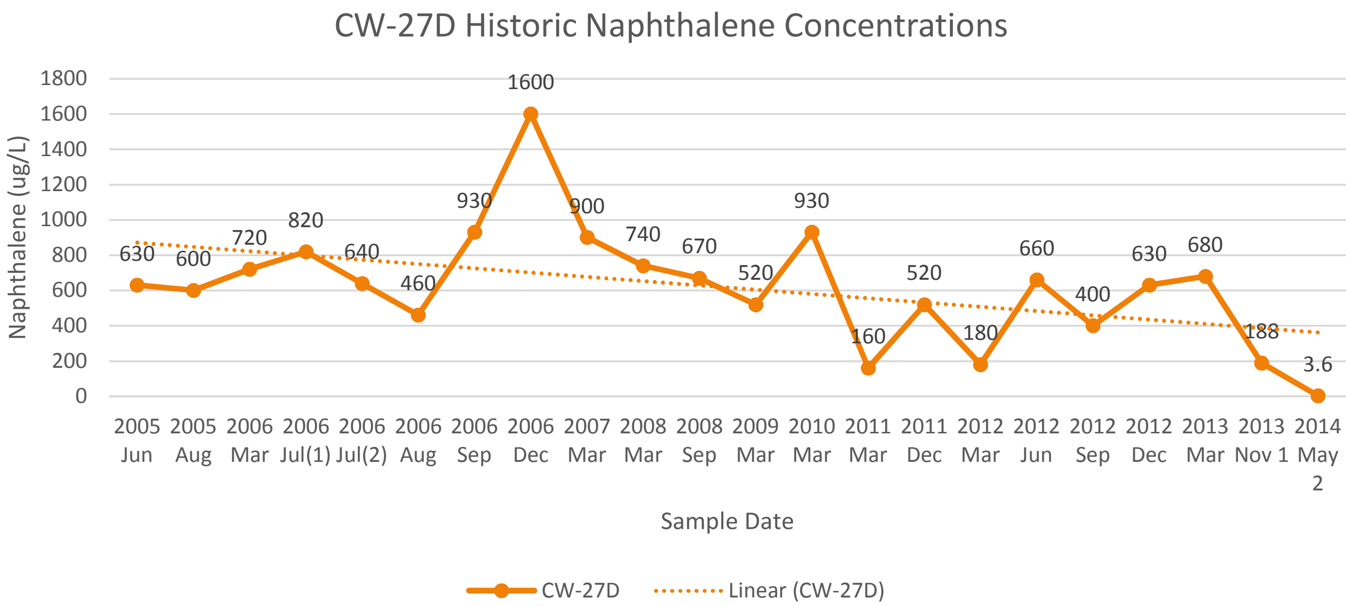

CW-16S Historic Naphthalene Concentrations
Naphthalene (ug/L)
2500
2000
1500
1000
500
0
2300
1500
720
190
240
500
620
230
28
500
9.9
2005 Jun
2005 Aug
2006 Mar
2007 Mar
2008 Mar
2009 Mar
2010 Mar
2011 Mar
2012 Mar
2013 Mar
2014 May 1
Sample Date
CW-16S
Linear (CW-16S)

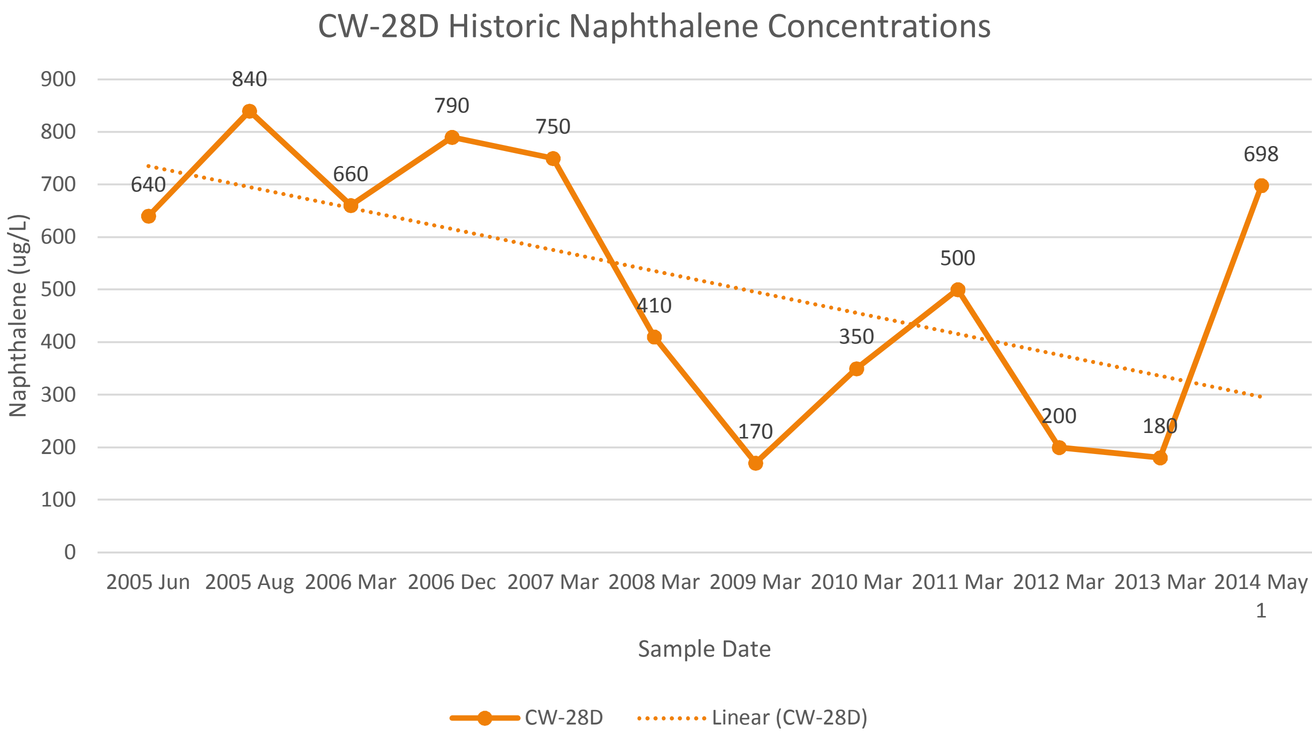

CW-17D Historic Naphthalene Concentrations
Naphthalene (ug/L)
350
300
250
200
150
100
50
0
130
300
260
48
48
24
11
11
4.2
0
0
160
110
24
100
2004 Sep
2005 Mar
2005 Aug
2006 Mar
2006 Sep
2006 Dec
2007 Mar
2008 Mar
2008 Sep
2009 Mar
2010 Mar
2011 Mar
2012 Mar
2013 Mar
2014 May 1
Sample Date
CW-17D
Linear (CW-17D)

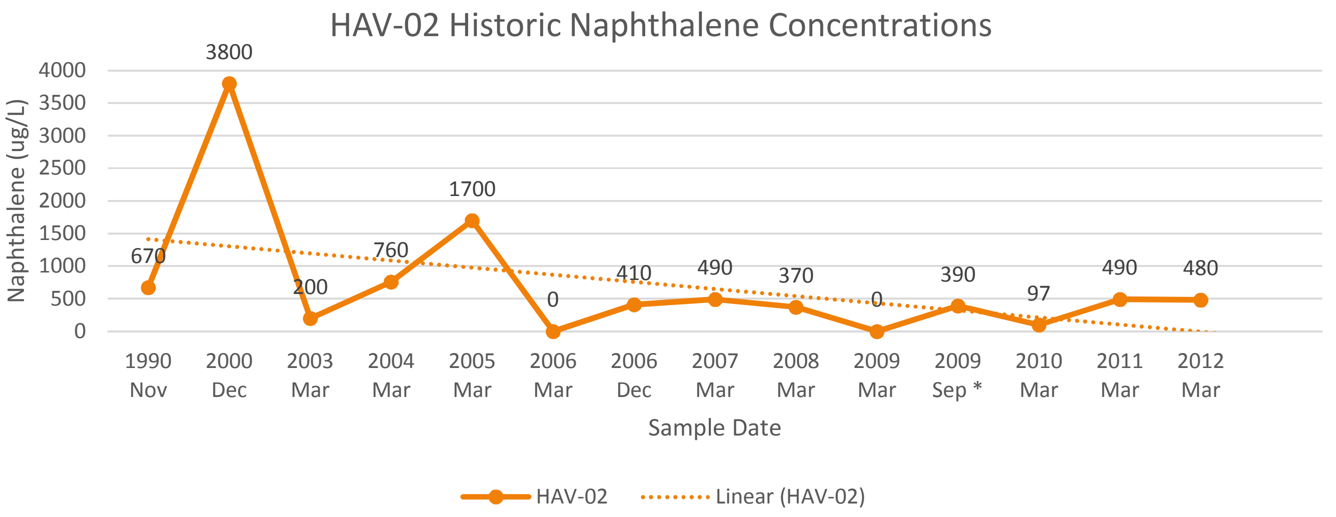

CW-19D Historic Naphthalene Concentrations
Naphthalene (ug/L)
20
15
10
5
0
0
1.5
0
0
0
0
0.99
0
0
1.7
0
18
1.3
0
1.2
2004 Sep
2005 Mar
2005 Aug
2006 Mar
2006 Jun
2007 Mar
2007 Jun
2008 Mar
2009 Mar
2009 Sep
2010 Mar
2011 Mar
2012 Mar
2013 Mar
2014 May 1
Sample Date
CW-19D
Linear (CW-19D)

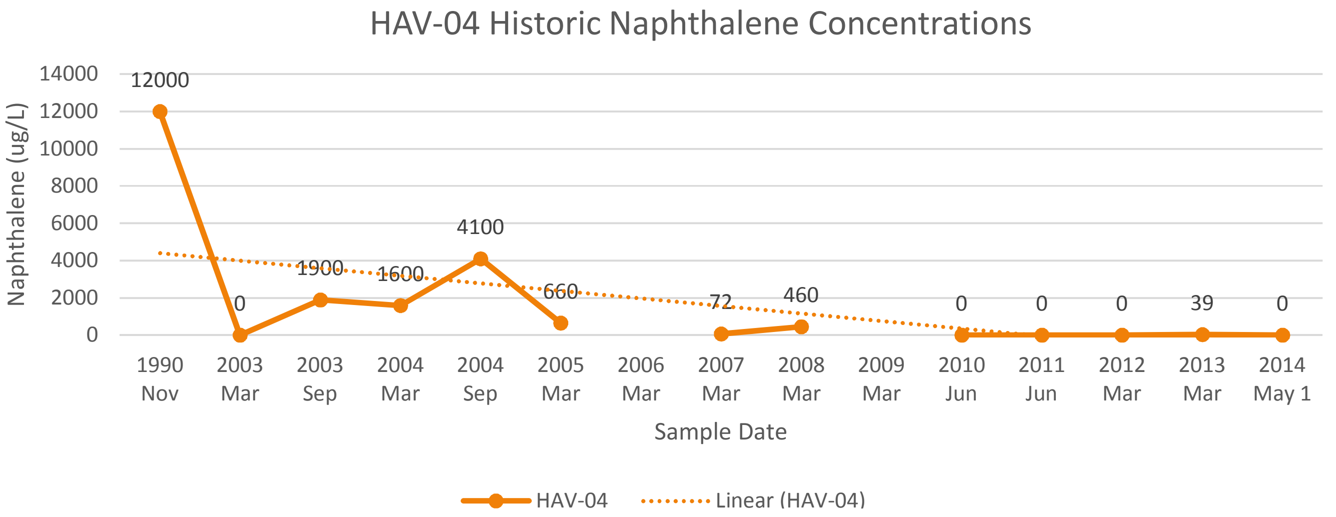

CW-24D Historic Naphthalene Concentrations
Naphthalene (ug/L)
7000
6000
5000
4000
3000
2000
1000
0
6600
4300
2000
2400
2000
3100
2400
2300
1200
1500
970
970
1400
415
2005 Jun
2005 Aug
2006 Mar
2006 Jun
2006 Dec
2007 Mar
2008 Mar
2008 Sep
2009 Mar
2010 Sep
2011 Sep
2012 Mar
2013 Mar
2014 May 1
Sample Date
CW-24D
Linear (CW-24D)

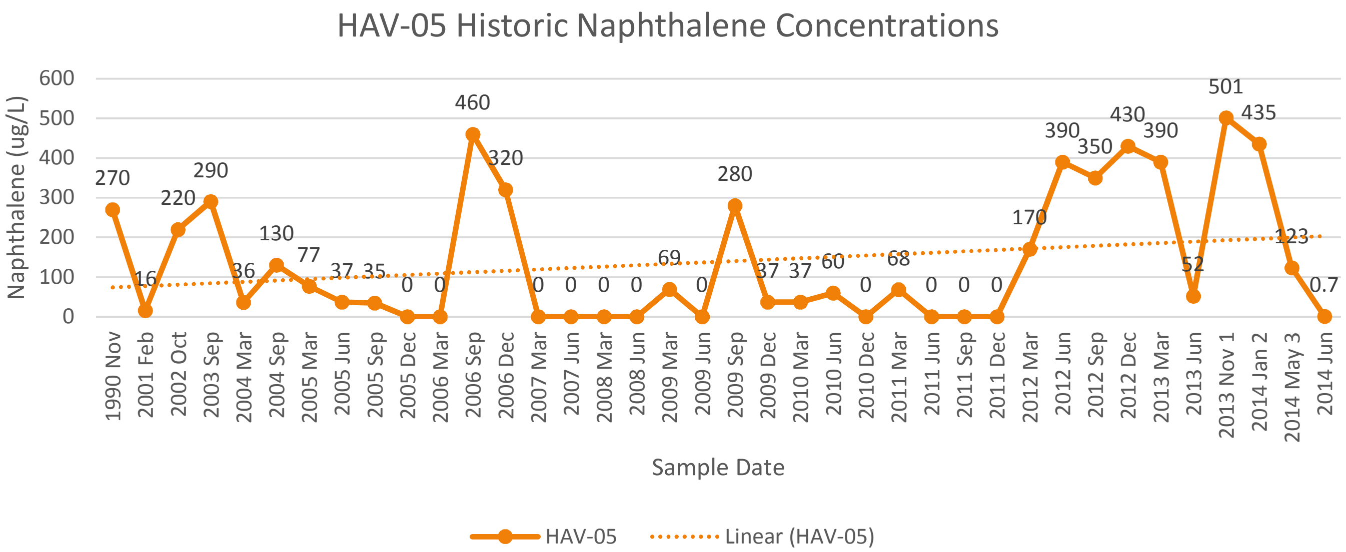

CW-26D Historic Naphthalene Concentrations
Naphthalene (ug/L)
1000
900
800
700
600
500
400
300
200
100
0
220
460
520
860
590
660
640
350
220
19
250
310
360
170
220
110
66
5.9
2005 Jun
2005 Aug
2006 Mar
2006 Dec
2007 Mar
2008 Mar
2008 Sep
2009 Mar
2010 Mar
2011 Mar
2011 Dec
2012 Mar
2012 Jun
2012 Sep
2012 Dec
2013 Mar
2013 Nov 1
2014 May 2
Sample Date
CW-26D
Linear (CW-26D)

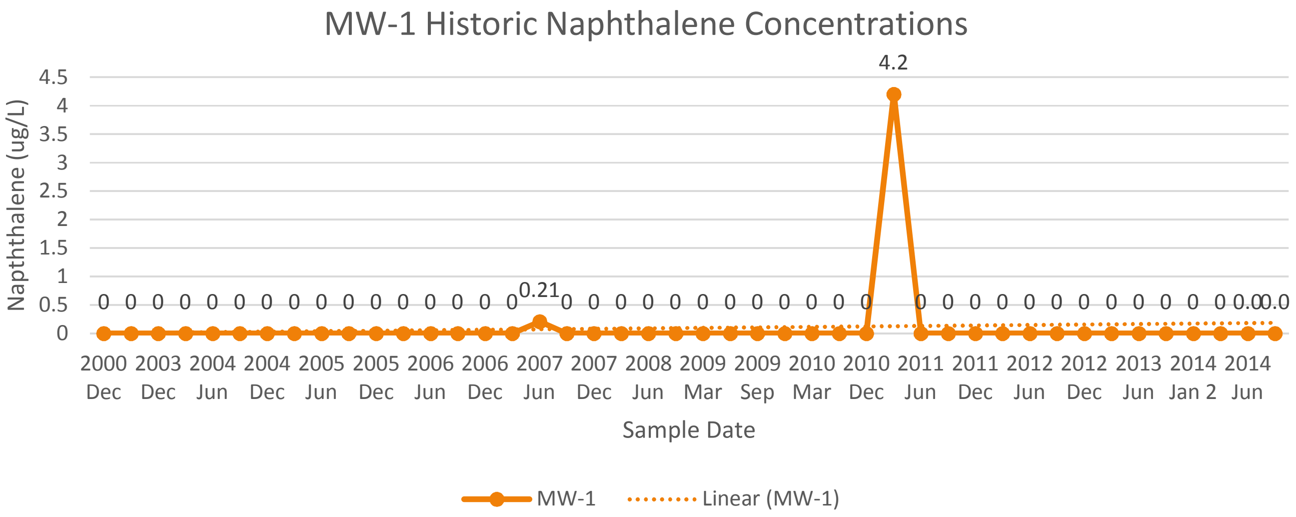

CW-27D Historic Naphthalene Concentrations
Naphthalene (ug/L)
1800
1600
1400
1200
1000
800
600
400
200
0
630
600
720
820
640
460
930
1600
900
740
670
520
930
160
520
180
660
400
630
680
188
3.6
2005 Jun
2005 Aug
2006 Mar
2006 Jul(1)
2006 Jul(2)
2006 Aug
2006 Sep
2006 Dec
2007 Mar
2008 Mar
2008 Sep
2009 Mar
2010 Mar
2011 Mar
2011 Dec
2012 Mar
2012 Jun
2012 Sep
2012 Dec
2013 Mar
2013 Nov 1
2014 May 2
Sample Date
CW-27D
Linear (CW-27D)

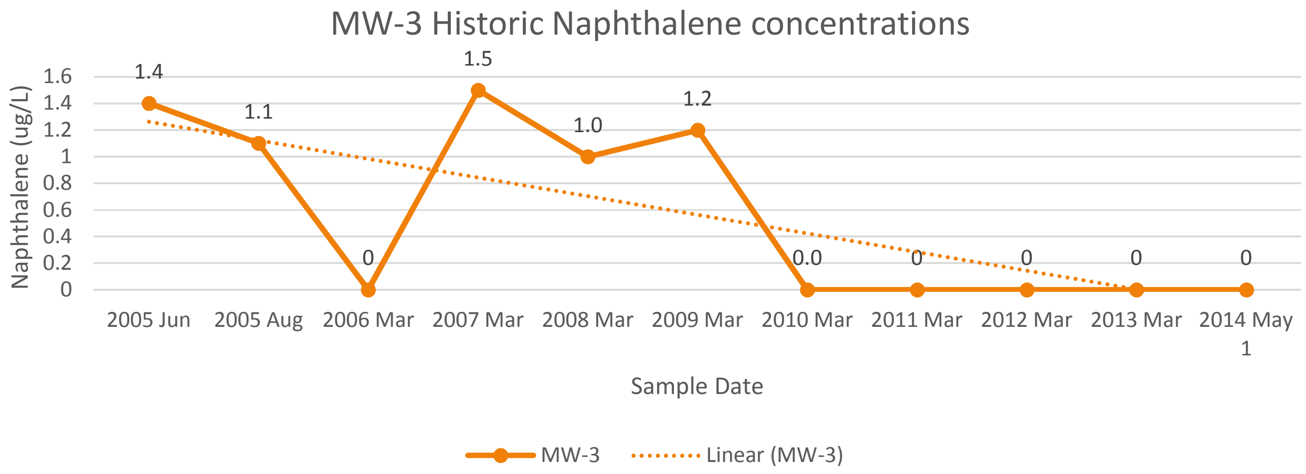

CW-28D Historic Naphthalene Concentrations
Naphthalene (ug/L)
900
800
700
600
500
400
300
200
100
0
640
840
660
790
750
410
170
350
500
200
180
698
2005 Jun
2005 Aug
2006 Mar
2006 Dec
2007 Mar
2008 Mar
2009 Mar
2010 Mar
2011 Mar
2012 Mar
2013 Mar
2014 May 1
Sample Date
CW-28D
Linear (CW-28D)

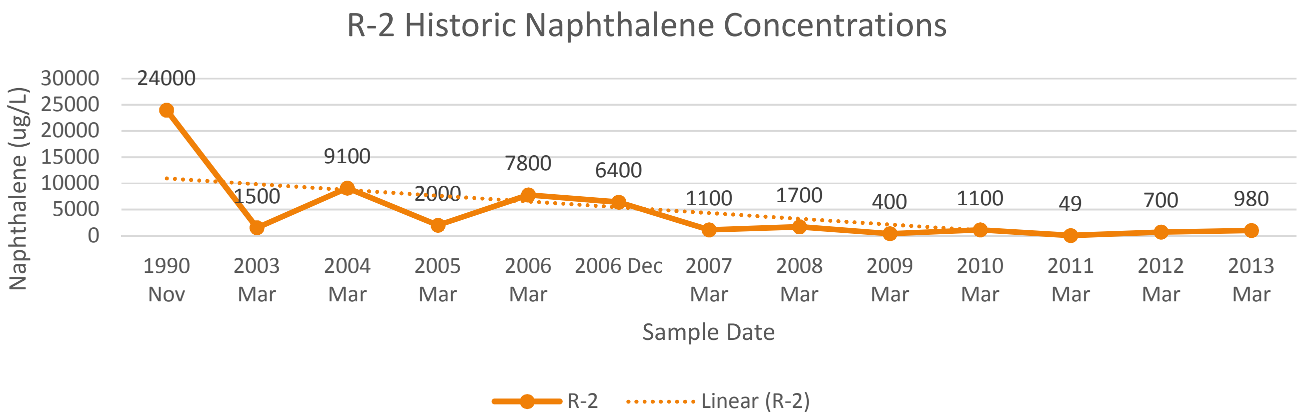

HAV-02 Historic Naphthalene Concentrations
Naphthalene (ug/L)
4000
3500
3000
2500
2000
1500
1000
500
0
670
3800
200
760
1700
0
410
490
370
0
390
97
490
480
1990 Nov
2000 Dec
2003 Mar
2004 Mar
2005 Mar
2006 Mar
2006 Dec
2007 Mar
2008 Mar
2009 Mar
2009 Sep *
2010 Mar
2011 Mar
2012 Mar
Sample Date
HAV-02
Linear (HAV-02)

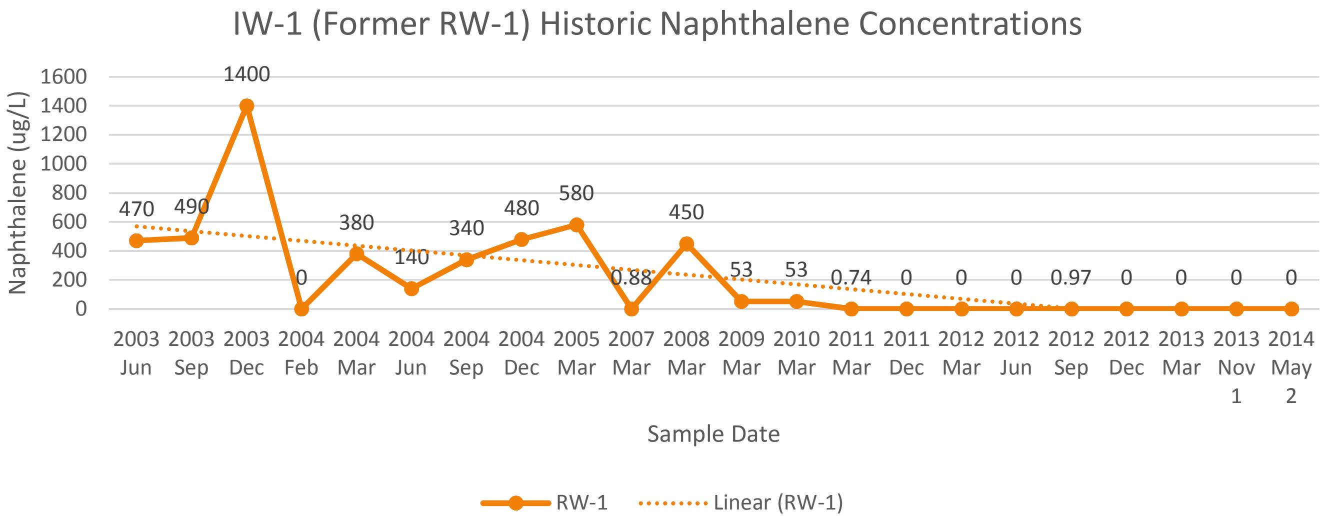

HAV-04 Historic Naphthalene Concentrations
Naphthalene (ug/L)
14000
12000
10000
8000
6000
4000
2000
0
12000
0
1900
1600
4100
660
72
460
0
0
0
39
0
1990 Nov
2003 Mar
2003 Sep
2004 Mar
2004 Sep
2005 Mar
2006 Mar
2007 Mar
2008 Mar
2009 Mar
2010 Jun
2011 Jun
2012 Mar
2013 Mar
2014 May 1
Sample Date
HAV-04
Linear (HAV-04)

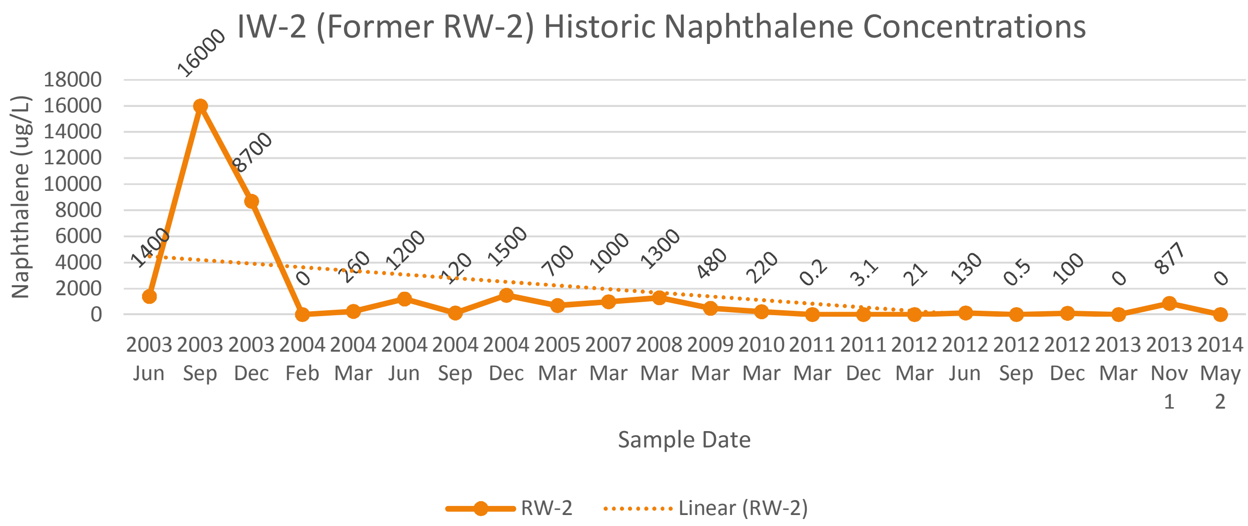

HAV-05 Historic Naphthalene Concentrations
Naphthalene (ug/L)
600
500
400
300
200
100
0
270
16
220
290
36
130
77
37
35
0
0
460
320
0
0
0
0
69
0
280
37
37
60
0
68
0
0
0
170
390
350
430
390
52
501
435
123
0.7
1990 Nov
2001 Feb
2002 Oct
2003 Sep
2004 Mar
2004 Sep
2005 Mar
2005 Jun
2005 Sep
2005 Dec
2006 Mar
2006 Sep
2006 Dec
2007 Mar
2007 Jun
2008 Mar
2008 Jun
2009 Mar
2009 Jun
2009 Sep
2009 Dec
2010 Mar
2010 Jun
2010 Dec
2011 Mar
2011 Jun
2011 Sep
2011 Dec
2012 Mar
2012 Jun
2012 Sep
2012 Dec
2013 Mar
2013 Jun
2013 Nov 1
2014 Jan 2
2014 May 3
2014 Jun
Sample Date
HAV-05
Linear (HAV-05)

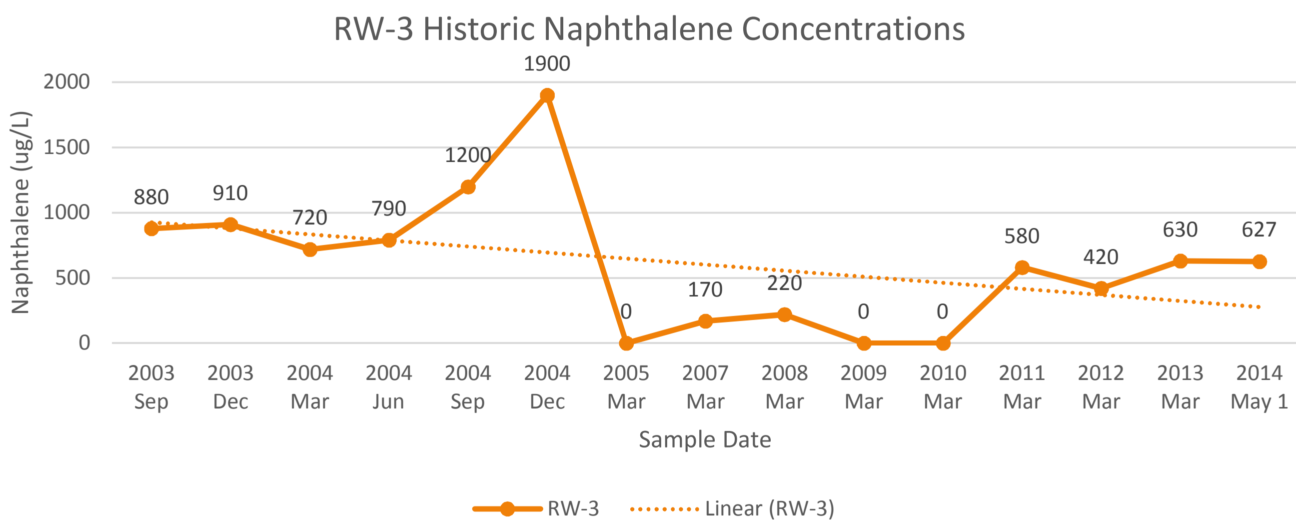

MW-1 Historic Naphthalene Concentrations
Napththalene (ug/L)
Sample Date
MW-1
Linear (MW-1)
4.2
0.21

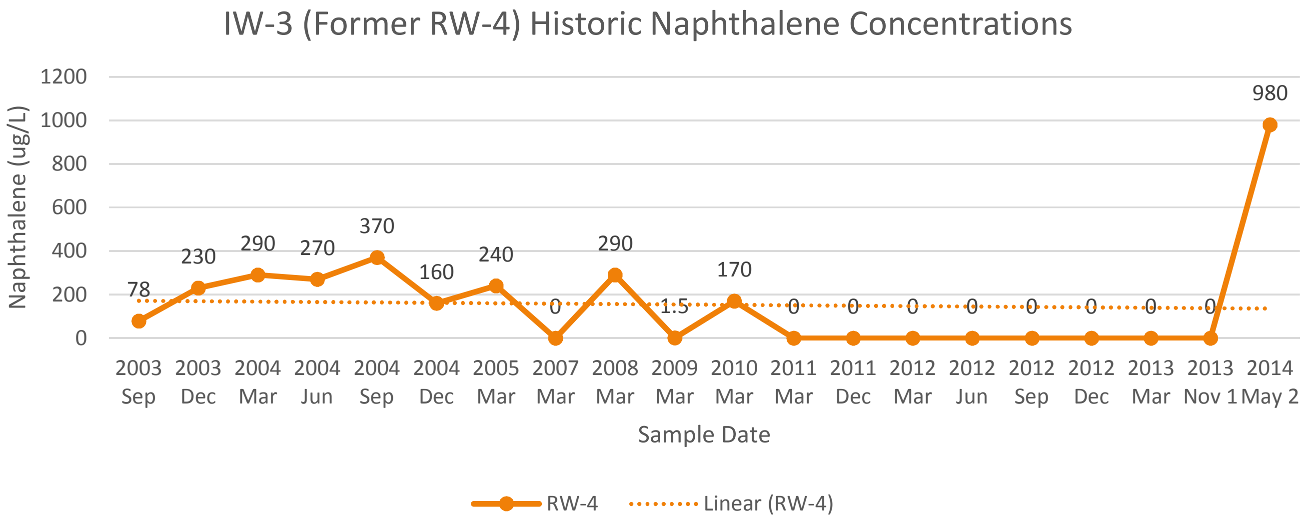

MW-3 Historic Naphthalene concentrations
Napthalene (ug/L)
Sample Date
MW-3
Linear (MW-3)
1.4
1.1
1.5
1.0
1.2

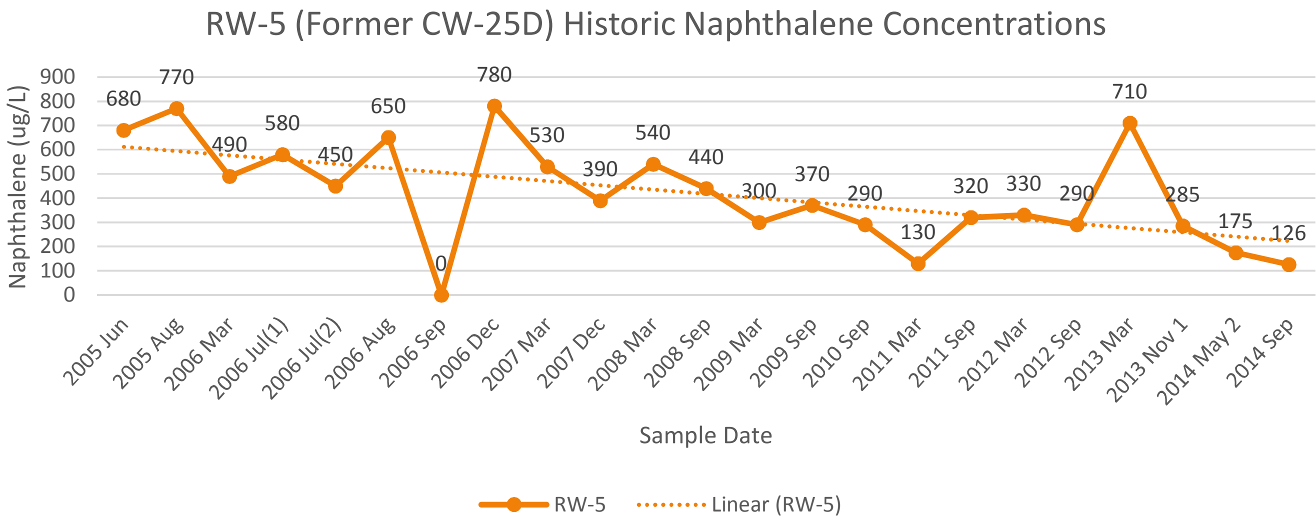

R-2 Historic Naphthalene Concentrations
Napthalene (ug/L)
Sample Date
R-2
Linear (R-2)
24000
1500
9100
2000
7800
6400
1100
1700
400
1100
49
700
980

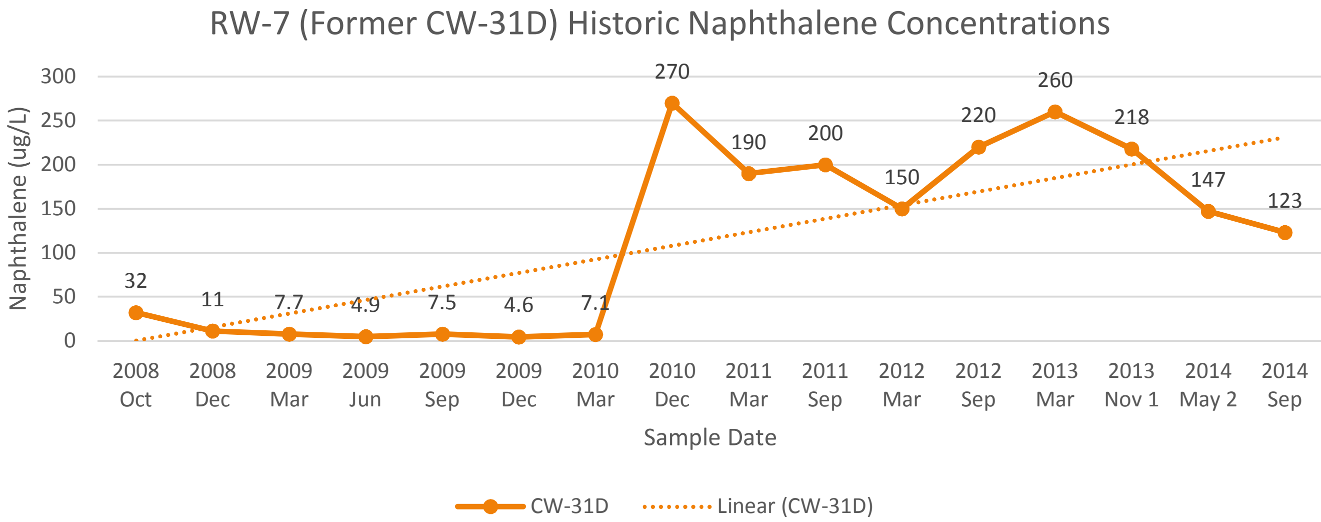

IW-1 (Former RW-1) Historic Naphthalene Concentrations
Naphthalene (ug/L)
1600
1400
1200
1000
800
600
400
200
0
470 490 1400 0 380 140 340 480 580 0.88 450 53 53 0.74 0 0 0 0.97 0 0 0 0
2003 Jun
2003 Sep
2003 Dec
2004 Feb
2004 Mar
2004 Jun
2004 Sep
2004 Dec
2005 Mar
2007 Mar
2008 Mar
2009 Mar
2010 Mar
2011 Mar
2011 Dec
2012 Mar
2012 Jun
2012 Sep
2012 Dec
2013 Mar
2013 Nov 1
2014 May 2
Sample Date
RW-1
Linear (RW-1)


IW-2 (Former RW-2) Historic Naphthalene Concentrations
Naphthalene (ug/L)
18000
16000
14000
12000
10000
8000
6000
4000
2000
0
1400 16000 8700 0 260 1200 120 1500 700 1000 1300 480 220 0.2 3.1 21 130 0.5 100 0 877 0
2003 Jun
2003 Sep
2003 Dec
2004 Feb
2004 Mar
2004 Jun
2004 Sep
2004 Dec
2005 Mar
2007 Mar
2008 Mar
2009 Mar
2010 Mar
2011 Mar
2011 Dec
2012 Mar
2012 Jun
2012 Sep
2012 Dec
2013 Mar
2013 Nov 1
2014 May 2
Sample Date
RW-2
Linear (RW-2)


RW-3 Historic Naphthalene Concentrations
Naphthalene (ug/L)
2000
1500
1000
500
0
880 910 720 790 1200 1900 0 170 220 0 0 580 420 630 627
2003 Sep
2003 Dec
2004 Mar
2004 Jun
2004 Sep
2004 Dec
2005 Mar
2007 Mar
2008 Mar
2009 Mar
2010 Mar
2011 Mar
2012 Mar
2013 Mar
2014 May 1
Sample Date
RW-3
Linear (RW-3)


IW-3 (Former RW-4) Historic Naphthalene Concentrations
Naphthalene (ug/L)
1200
1000
800
600
400
200
0
78
230
290
270
370
160
240
0
290
1.5
170
0
0
0
0
0
0
0
0
980
2003 Sep
2003 Dec
2004 Mar
2004 Jun
2004 Sep
2004 Dec
2005 Mar
2007 Mar
2008 Mar
2009 Mar
2010 Mar
2011 Mar
2011 Dec
2012 Mar
2012 Jun
2012 Sep
2012 Dec
2013 Mar
2013 Nov 1
2014 May 2
Sample Date
RW-4
Linear (RW-4)


RW-5 (Former CW-25D) Historic Naphthalene Concentrations
Naphthalene (ug/L)
900
800
700
600
500
400
300
200
100
0
680
770
490
580
450
650
0
780
530
390
540
440
300
370
290
130
320
330
290
710
285
175
126
2005 Jun
2005 Aug
2006 Mar
2006 Jul(1)
2006 Jul(2)
2006 Aug
2006 Sep
2006 Dec
2007 Mar
2007 Dec
2008 Mar
2008 Sep
2009 Mar
2009 Sep
2010 Sep
2011 Mar
2011 Sep
2012 Mar
2012 Sep
2013 Mar
2013 Nov 1
2014 May 2
2014 Sep
Sample Date
RW-5
Linear (RW-5)


RW-7 (Former CW-31D) Historic Naphthalene Concentrations
Naphthalene (ug/L)
300
250
200
150
100
50
0
32
11
7.7
4.9
7.5
4.6
7.1
270
190
200
150
220
260
218
147
123
2008 Oct
2008 Dec
2009 Mar
2009 Jun
2009 Sep
2009 Dec
2010 Mar
2010 Dec
2011 Mar
2011 Sep
2012 Mar
2012 Sep
2013 Mar
2013 Nov 1
2014 May 2
2014 Sep
Sample Date
CW-31D
Linear (CW-31D)