SECOND FIVE-YEAR REVIEW REPORT FOR
COSDEN CHEMICAL COATINGS SUPERFUND SITE
BURLINGTON COUNTY, NEW JERSEY

Prepared by

U.S. Environmental Protection Agency
Region 2
New York, New York

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Date

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LIST OF ABBREVIATIONS & ACRONYMS

ARAR	Applicable or Relevant and Appropriate Requirement
bgs	Below Ground Surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COCs	Contaminants of Concern
EPA	United States Environmental Protection Agency
ERT	Environmental Response Team
ESD	Explanation of Significant Differences
FS	Feasibility Study
ft^2	Square-foot
FYR	Five-Year Review
GWQS	Groundwater Quality Standards
ICs	Institutional Controls
IEUBK	Integrated Exposure Uptake and Biokinetic
LTRA	Long Term Response Action
MCL	Maximum Contaminant Level
MiHPT	Membrane Interface Probe with Hydraulic Profiling Tool
µg/L	Micrograms per Liter
mg/kg	milligrams per kilogram
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NJDEP	New Jersey Department of Environmental Protection
NJDWQI	New Jersey Drinking Water Quality Institute
NJPDES	New Jersey Pollutant Discharge Elimination System
NPL	National Priorities List
O&M	Operation and Maintenance
OU	Operable Unit
PCBs	Polychlorinated Biphenyls
PRM	Potomac-Raritan-Magothy
RA	Remedial Action
RAO	Remedial Action Objectives
RDCSCC	Residential Direct Contact Soil Cleanup Criteria
RI	Remedial Investigation
ROD	Record of Decision
SVE	Soil Vapor Extraction
TBC	To be considered
TCE	Trichloroethylene
TRW	Technical Review Workgroup
TT	Treatment Technique
USACE	United States Army Corps of Engineers
UST	Underground Storage Tank
UU/UE	Unrestricted Use/Unlimited Exposure
VOC	Volatile Organic Compounds
XRF	X-Ray Fluorescence

I. INTRODUCTION

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

The U.S. Environmental Protection Agency (EPA) is preparing this FYR review pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121, consistent with the National Contingency Plan (NCP)(40 CFR Section 300.430(f)(4)(ii)), and considering EPA policy.

This is the second FYR for the Cosden Chemical Coatings Superfund site, (Site). The triggering action for this policy review is the completion date of the previous FYR. The remedy will not result in hazardous substances, pollutants, or contaminants remaining on-site above levels that allow for unrestricted use and unrestricted exposure (UU/UE); however, it is EPA policy to conduct five-year reviews when remedial activities will take longer than five years to meet UU/UE.

The Site consists of one operable unit (OU) which is reviewed in this FYR. OU1 addresses three distinct phases or components, namely: decontamination and demolition of the building on the Site with disposal of the building debris at an appropriate off-site facility, excavation with off-site treatment and disposal of soil contaminated with inorganic compounds and polychlorinated biphenyl (PCBs), and, extraction of contaminated groundwater with on-site treatment and recharge to the underlying aquifer.

The Site FYR was led by the EPA Remedial Project Manager, Thomas Dobinson. Additional EPA participants included Michael Scorca (Hydrogeologist) and Nicholas Mazziotta (Risk Assessor).

Site Background

The Site is located in the southeastern comer of the City of Beverly in Burlington County, New Jersey. The Site is at the intersection of Manor Road and Cherry Street within a residential area of Beverly. It is bounded on the north and east by residential streets, on the south by Conrail tracks and farmland, and on the west by undeveloped land. The nearest residence is approximately 300 feet to the north of the Site. The Beverly Elementary School is located 0.2 miles to the northeast. The neighboring area is suburban with some light industry. The Delaware River is approximately 4,000 feet to the north, and Rancocas Creek approximately 1.5 miles to the southwest of the Site. Population within a one-mile radius of the Site is approximately 800 people. The local water utility provides drinking water and the Delaware River is the source of the potable water supply.

Cosden Chemical Coatings Corporation was a paint formulation and manufacturing facility which produced coatings for industrial applications. In the manufacturing process, pigments were mixed with resins and solvents in both ball and sand mills. The material was then placed into a mixing tank where other ingredients were added to produce the final coating products. Mixing tanks were then washed out with solvents, and the rinsate was transferred to drums. Organic solvents used in the manufacturing process were recycled until 1974. After 1974, drums containing spent solvents were stored on-site; some of these drums leaked onto the ground causing soil and groundwater contamination. Fresh solvents were stored in underground tanks, which may have leaked.

The Site was placed on the National Priorities List (NPL) in July 1987. The plant owner ceased operations in May 1989, and subsequently did not agree to finance or undertake the remedial investigation or feasibility study (RI/FS) or remediation of the Site.

Site Geology and Hydrology

The Site is located in the Atlantic Coastal Plain physiographic province of southern New Jersey. Unconsolidated sediments in the shallow subsurface soil at the Site are alluvial deposits consisting mainly of sand and gravel with minor amounts of silt and clay. The Potomac-Raritan-Magothy (PRM) aquifer is the primary aquifer in the area of the Site and a significant source of municipal water for the region. This regional aquifer system is composed of three sandy aquifers (designated Lower, Middle, and Upper) which are separated by intervening confining units composed of silt and clay. The Upper PRM aquifer is not present at the Site. The contaminated aquifer at the Site is the Middle PRM aquifer.

Regional groundwater flow north of the Site flows northward towards the Delaware River. The Delaware River is the major surface water feature located approximately 4,000 feet north of the Site and is classified as a Class IIa aquifer (a potential drinking water supply). The projected 100-year flood of the Delaware River is expected to extend no closer than 3,000 feet north of the Site. The closest distance that the 500-year flood is expected to occur is approximately 1,900 feet to the north.

Current water-level data during non-pumping conditions indicate a groundwater divide at the northern limit of the Site. Groundwater on-site has a west-southward flow direction, possibly influenced by the nearby Bogg's Ditch and its unnamed tributary. EPA will install wells in the summer of 2017 to clarify shallow on-site groundwater flow directions.

Static groundwater levels collected in December 2016 during the quarterly groundwater elevation data collection event indicated the water table was located approximately 17 feet below the ground surface (bgs) on the Site property. An EPA well survey conducted in May 1991 found no private wells used for drinking water in the vicinity of the Site. Two public supply wells owned and operated by New Jersey-American Water Company (Wells No. 15 and 16) are located approximately 3,200 feet north of the Site but are no longer in use.

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site Name: Cosden Chemical Coatings Corporation		
EPA ID: NJD000565531		
Region: 2	**State:** NJ	**City/County:** Beverly/Burlington

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

REVIEW STATUS
Lead agency: EPA ***[If "Other Federal Agency", enter Agency name]*:**
Author name (Federal or State Project Manager): Thomas Dobinson
Author affiliation: U.S. EPA, Region 2
Review period: 1/9/2017 - 5/31/2017
Date of site inspection: 3/3/2017
Type of review: Policy
Review number: 2
Triggering action date: 8/15/2012
Due date *(five years after triggering action date)*: 8/15/2017

II. RESPONSE ACTION SUMMARY

Basis for Taking Action

As a result of the risk assessment, conducted as a part of the remedial investigation, ingestion of contaminated groundwater in a future use scenario indicated that an elevated risk to human health existed since the hazard indices were estimated to be 1.6 for children, and 1.1 for adults exceeding EPA's noncancer hazard threshold (HI of 1). In addition, the concentrations of the following contaminants were found in groundwater above promulgated federal and/or state Maximum Contaminant Levels (MCLs): toluene, ethylbenzene, xylene, trichloroethene, chromium, and lead. Both lead and PCBs were present in Site soils at unacceptable concentrations.

The environmental evaluation provides a qualitative assessment of the actual or potential impacts associated with the Site on plants and animals (other than people or domesticated species). The primary objectives of this assessment are to identify the ecosystems, habitats, and populations likely to be found at the Site and to characterize the contaminants, exposure routes and potential impacts on the identified environmental components. There were no endangered species, sensitive ecosystems, or sensitive habitats identified on the Site. The environmental assessment concluded that adverse impacts to on-site plants and animals from on-site contamination are not likely.

Response Actions

A grass fire that occurred at the Site on April 22, 1980 prompted the Burlington County Department of Public Safety to report the Site conditions to the New Jersey Department of Environmental Protection (NJDEP). Subsequent visits by the NJDEP revealed the presence of surface spills, and several hundred unsecured drums. Various court actions and negotiations undertaken by NJDEP against Cosden Chemical Coatings Corporation resulted in a judicial consent order on February 5, 1985 that ordered Cosden Chemical Coatings Corporation to clean up the facility. Cosden Chemical Coatings Corporation initiated the cleanup in February 1985, but abandoned cleanup efforts after 88 of 695 drums were removed. In January 1986, NJDEP then undertook an emergency removal of the drummed material, and cleanup of surface spills around the drum storage areas.

In June 1989, EPA initiated emergency cleanup activities at the Site by constructing a fence around areas of soil contamination; and began removing the remaining drums, paint cans, pigment bags, mixing tanks, and underground storage tank contents. On May 28, 1990, as the removal action was nearly completed, a fire occurred inside the process building which consumed a majority of the building. On May 31, 1990, the building was condemned by the Beverly City building inspector.

Based on the RI/FS, a Record of Decision (ROD) was prepared, opened to public comment, and signed on September 30, 1992. The remedial action objectives (RAOs) in the 1992 ROD are:

- Prevent exposure to contaminant sources that present a significant human health risk and;
- Restore contaminated groundwater to drinking water standards.

The major components of the selected remedy include:

- Decontamination and demolition of the building on the Site with disposal of the building debris at an appropriate off-site facility;
- In-situ stabilization of soil contaminated with inorganic compounds and PCBs;
- Extraction of contaminated groundwater with on-site treatment and recharge to the underlying aquifer.

The proposed contaminated soil remedy was reviewed during the design stage. A pre-design investigation related to this component uncovered conditions which led EPA to issue an Explanation of Significant Differences (ESD) in September 1998. This resulted in the 1992 ROD being modified as follows:

- In-situ treatment of contaminated soils was modified to excavation with off-site treatment (if necessary) and disposal;
- Construction of a soil vapor extraction (SVE) system to address the remaining contaminants present in soil above the water table (the vadose zone); and,
- The lead cleanup goal for soils was modified from 500 milligrams per kilogram (mg/kg) to 400 mg/kg.

The selected remedial actions included the following cleanup goals for soil and groundwater:

Table 1: Groundwater Contaminants of Concern and Remediation Goals (micrograms per liter) (µg/L)

Contaminant of Concern	Remediation Goal
Toluene	1,000
Ethylbenzene	700
Xylenes, Total	44*
Trichloroethene	1
Chromium, Total	100
Lead (at tap)	15 (TT)

TT - Treatment Technique

* The 2004 Groundwater Quality Standards Rule Recodification and Readoption (NJAC 7:9C), provided a revised standard of 1,000 µg/L. This was adopted by the state based on updated toxicological information recommended by the New Jersey Drinking Water Quality Institute (NJDWQI).

Table 2: Soil Contaminants of Concern and Remediation Goals (mg/kg)

Contaminant of Concern	Remediation Goal
PCBs	1
Lead	400

Status of Implementation

The first component of the design (decontamination, demolition, and disposal of the process building and equipment) was conducted between July 1995 and January 1996. This work included demolition of the former 15,000 square-foot (ft^2) process building. All structures were decontaminated and demolished. All demolition debris including asbestos was disposed of off-site.

The contaminated soils remediation was conducted by the EPA Region 2 Removal Action Branch with technical support provided by EPA's Environmental Response Team (ERT). ERT performed an extensive screening effort at the Site employing x-ray fluorescence (XRF) technology to identify the grid nodes, concentration and depth of inorganic contamination (principally lead and chromium). The data was used to define the areal extent and depth of the excavation.

The soil cleanup was conducted to meet the NJDEP Residential Direct Contact Soil Cleanup Criteria (RDCSCC), 400mg/kg. For PCBs, the soil cleanup objective was the federal residential cleanup criterion of 1 mg/kg. However, post-excavation sampling indicated that the soil removal ultimately met NJDEP's more stringent RDCSCC level of 0.49 mg/kg for PCBs. The excavated areas and maximum excavated depths are: the Eastern Wooded Area (two feet below grade), the Former Pad Area [after it had been removed under the soil remedy (two feet below grade)], the Deep Volatile Organic Compounds (VOC) Pit (16 feet below grade), the Former Stockpile Area (one foot below grade), the Hexavalent Chromium Pit (four feet below grade), the inorganic contamination grids (four feet below grade), the PCB grids (six feet below grade), the Buried Drum and Geophysical Survey Area (various test pit depths), and the Final VOC Excavation Area (11 feet below grade). The soil remediation was accomplished in phases from June 1999 to March 2002. All contaminated soils, underground storage tanks (USTs), and residual liquids were sent off-site for disposal, and/or treatment, if necessary. A remedial action report, dated September 2003,

was prepared to document in detail the cleanup undertaken for this component which generated and disposed of 13,000 tons of contaminated solid waste and debris, four USTs, plus 2,600 gallons of liquid waste.

EPA entered into an Interagency Agreement with the United States Army Corps of Engineers (USACE) Baltimore District to provide the remedial design (RD). The largest element of the RD was the groundwater treatment facility[1].

Based on a pilot study conducted during the design, there was a concern that the high water table might restrict the amount of treated groundwater that could be reinjected into the aquifer. However, after careful analysis, it was determined that the treated groundwater volume could be safely handled if the infiltration trenches were placed far enough apart.

In July 2006, construction began on treatment facility. In addition to the water treatment system, there are three banks of buried SVE wells and collection lines that allow contaminated vapors to be extracted from the vadose zone. A fence was installed around the treatment facilities to provide security and prevent trespassing. Construction complete for the remedy was achieved in July 2007.

Data collected to date indicate that the treatment system is efficiently removing contaminants from the groundwater prior to on-site reinjection. The primary contaminants of concern, as noted in the 1992 ROD and again in the September 2006 New Jersey Pollutant Discharge Elimination System (NJPDES) Permit Equivalent for Cosden, are ethylbenzene, toluene, xylene and trichloroethylene (TCE). The treatment system will reduce levels of any contaminants present to meet the New Jersey Groundwater Quality Standards (GWQS) Class IIa standards before the groundwater is reinjected back into the aquifer.

Institutional Control (IC) Summary Table

Table 3: Summary of Planned and/or Implemented ICs

Media, engineered controls, and areas that do not support Unrestricted Use/Unlimited Exposure (UU/UE) based on current conditions	ICs Needed	ICs Called for in the Decision Documents	Impacted Parcel(s)	IC Objective	Title of IC Instrument Implemented and Date (or planned)
Groundwater	No	No	Site	Restrict installation of groundwater wells and groundwater use. IC may be necessary if groundwater plume leaves Site boundaries.	N/A

[1] During the RI, considerable concern was placed on the off-site groundwater because there were two large public supply wells located downgradient on the bank of the Delaware River. Though the off-site groundwater contamination concentrations were moderate and there were no other private wells in area, the state and the EPA thought it prudent to carefully monitor the many on-site and off-site wells installed during the design. Data from these wells indicated that natural attenuation was taking place, and in conjunction with the source removal performed under the ROD and ESD, it was determined that, over time, the off-site plume would be remediated. Further, the downgradient receptors, the two wells owned by New Jersey American Water, were closed more than fifteen years ago when the company opened a larger potable water plant further down on the Delaware River. Despite the elimination of this primary risk, EPA continues to adhere to the extensive monitoring program noted in the state's September 2006 NJPDES Permit Equivalent.

Systems Operations/Operation & Maintenance

The operation and maintenance (O&M) requirements and activities are specified in the October 11, 2007 *Cosden Chemical Site, Operation and Maintenance Plan for the Groundwater Extraction and Treatment System and Soil Vapor Extraction System.*

The NJDEP permit equivalent requires semi-annual groundwater quality monitoring of monitoring wells MW-l, MW-3, MW-4, MW-9S, PZ-llS and EW-l and bi-monthly treatment system operation samples. Also, groundwater levels are measured quarterly at approximately 28 wells to determine the direction of groundwater flow. Under pumping conditions, on-site groundwater flows towards the recovery wells (RW-l and RW-2) while off-site groundwater flows northward towards the Delaware River.

In addition, since the inception of the groundwater extraction and treatment system in 2009, groundwater quality is sampled at seven on-site and seven off-site monitoring wells semi-annually or when deemed necessary to assess changes to the system (see Figures 1 and 2 for well locations). Groundwater samples are analyzed for VOCs by EPA Method 8260B plus chromium [total], and lead. The analytical data are evaluated and compared to monitoring results collected before system start-up, as well as to EPA's MCLs and GWQS.

The SVE system was shut down in June 2010 after soil vapor concentrations in the vadose zone dropped below levels requiring treatment. Due to the shutdown, no monitoring of SVE system data is being collected.

Potential Site impacts from climate change have been assessed, and the performance of the remedy is currently not at risk due to the expected effects of climate change in the region and near the Site.

III. PROGRESS SINCE THE LAST REVIEW

This section includes the protectiveness determinations and statements from the **last** FYR as well as the recommendations from the **last** FYR and the current status of those recommendations.

Table 4: Protectiveness Determinations/Statements from the 2012 FYR

OU #	Protectiveness Determination	Protectiveness Statement
Sitewide	Protective	The remedies at the Cosden Chemical Coating Site are expected to be protective of human health and the environment upon completion, and in the interim, exposure pathways that could result in unacceptable risks are being controlled.

There were no issues & recommendations in the last FYR.

A two-phased remedy-optimization pilot study investigation was conducted in April 2015 and January 2016 to further characterize the sources area at the Site. The investigation used direct-push equipment (Membrane Interface Probe with Hydraulic Profiling Tool, [MiHPT]) and soil and groundwater sample analysis. Based on the delineation of VOCs in soil with the MiHPT, an optimization treatability pilot study will be conducted in 2017 using injected chemical oxidant.

IV. FIVE-YEAR REVIEW PROCESS

Community Notification, Involvement & Site Interviews

On November 14, 2016, EPA Region 2 posted a notice on its website indicating that it would be reviewing Site cleanups and remedies at 38 Superfund sites in New York and New Jersey, including the Cosden Chemical Coatings Site. The announcement can be found at the following web address:

https://www.epa.gov/sites/production/files/2016-11/documents/five_year_reviews_fy2017_final.pdf.

In addition to this notification, a public notice was posted on the City of Beverly website (http://thecityofbeverly.com/ and http://thecityofbeverly.com/municipal-clerk) on June 14, 2017, stating that there was a FYR and inviting the public to submit any comments to the U.S. EPA. The results of the review and the report will be made available at the Site information repository located at both the Beverly Municipal Building and the Burlington County Library located at 446 Broad Street, Beverly, NJ 08010 and 5 Pioneer Blvd, Westampton, NJ 08060, respectively.

There is daily contact between the plant operators and USACE personnel in charge of oversight. Additionally, there is weekly contact between the EPA and USACE oversight personnel in New Jersey. There are meetings, phone calls and correspondence with the state, particularly in regard to meeting the terms of the permit equivalents specified in the state-issued NJPDES.

Data Review

Soil Vapor Extraction System

The SVE system, in conjunction with the groundwater treatment system, began operation in 2009. The SVE system is currently not operating since soil vapor concentrations in the vadose zone dropped below levels requiring treatment and as such there is no data to evaluated in this FYR.

Groundwater Quality

The two Cosden extraction wells, RW-l and RW-2, pump an average of 77 gallons per minute (gpm). Groundwater samples are collected at the two extraction wells on a monthly basis and analyzed for VOCs by EPA-Method 8260B plus calcium, iron, manganese, and magnesium. Groundwater quality is also sampled at seven on-site and seven off-site monitoring wells semi-annually or when deemed necessary to assess changes to the extraction system (see Figures 1 and 2 for well locations). Samples are analyzed for VOCs by EPA-Method 8260B plus chromium [total], and lead. The analytical data are evaluated and compared to monitoring results before system start-up, as well as to EPA's MCLs and NJDEP GWQS. Groundwater contaminants of concern (COCs) addressed in the ROD (and their remediation goals) are toluene (1,000 µg/L), TCE (1 µg/L), ethylbenzene (700 µg/L), total xylenes (44 µg/L), chromium (100 µg/L), and lead (15 µg/L). As indicated in Table 2, the 2004 Groundwater Quality Standards Rule Recodification and Readoption (NJAC 7:9C), revised the total xylene standard to 1,000 µg/L.

Extraction Well Data

Extraction well RW-1 is located in the western half of the Site and screened from 15 to 45 feet below ground surface (bgs). VOC concentrations have exhibited consistent decreases since 2010 with the exceptions of a notable spike during a period in 2011 and a smaller spike in 2013[2] (see Figure 3). The

[2]*Footnote: The term spike refers here to a short-term increase in concentration to levels substantially above the trend observed in most other preceding and subsequent samples. The spikes in VOC concentrations commonly could be attributed to*

highest concentrations of ethylbenzene, toluene, TCE, and xylenes in 2012 were 700 µg/L, 43 µg/L, 3.3 µg/L, and 5,500 µg/L, respectively, and concentrations in September 2016 decreased to 330 µg/L, 5.7 µg/L, non-detect, and 1,700 µg/L, respectively.

Extraction well RW-2 is located in the central portion of the Site and is screened from 15 to 45 feet bgs. Following a pronounced spike in VOC concentrations in 2011, concentrations of ethylbenzene, toluene, and xylene have demonstrated fairly steady declines since 2012 (see Figure 4). Ethylbenzene, toluene, TCE, and xylenes concentrations decreased to 420 µg/L, 7.3 µg/L, non-detect, and 2,200 µg/L, respectively, in September 2016.

Monitoring Well Data

Nearby monitoring well MW-1 is about 25 feet east of RW-1 and screened approximately 25 to 40 feet bgs. VOC concentrations at MW-1 have dropped substantially since the start-up of the extraction system. Xylenes concentrations had been as high as 34,100 µg/L in 2010 and dropped to less than 0.5 µg/L in 2014 and 2015. Similarly, ethylbenzene, toluene, and TCE were typically less than 0.5 µg/L since 2012. A small spike in VOC concentrations was observed in 2015 (see Figure 5).

Monitoring well MW-10-I is about 120 feet northwest of RW-1 and 62.6 feet deep. Historically, ethylbenzene, toluene, TCE, and xylenes concentrations at MW-10-I were 15,000 µg/L, 6,500 µg/L, non-detect, and 63,000 µg/L, respectively in 2001. Since system startup, VOC concentrations have declined significantly and are currently less than 1 µg/L (see Figure 6).

Monitoring well MW-9S is about 20 feet west of RW-2 and is screened from 14 to 30 feet bgs. Concentrations of xylenes at MW-9S had been as high as 115,000 µg/L in 2008, but ethylbenzene, toluene, and xylenes have been less than 1 µg/L since 2014. TCE was detected at 1.4 µg/L in 2016 (see Figure 7).

Well MW-OS-7D is 75 feet deep and located about 260 feet north of the Site and is the closest off-property well. This well has had the historically highest VOC concentrations in the area to the north of the property. After VOC concentrations peaked in 2001 (ethylbenzene 1,700 µg/L; xylenes 7,900 µg/L), concentrations have declined significantly and no VOCs have been observed at greater than 1 µg/L from 2012 to 2016 (see Figure 8). VOC concentrations from the six other off-property monitoring wells (see Figure 2) were below 1 µg/L for all VOC analytes of concern from 2012 to 2016. The significant declines in VOC concentrations to very low levels in the off-property monitoring wells following implementation of the remedy supports the expectation that source control would result remediation of the off-property VOC plume over time.

Since 2012 concentrations of the two inorganic contaminants of concern (chromium and lead) have been below their remediation goals at all on- and off-site monitoring wells, with the exception of MW-9S, which had 110 µg/L of chromium in 2016.

Summary

Based on the results described above, the overall effectiveness of the extraction system is demonstrated by: 1) VOC concentrations detected in the extraction wells (RW-1, RW-2) have remained consistently elevated, but with a declining trend, since the system went on-line, which supports the premise that the treatment system is capturing contaminated groundwater in the source area, 2) generally steady declining

intercepting the uneven distribution of contaminants in the subsurface, the results of fluctuations in pumping rates, or other factors.

trends in groundwater VOC concentrations in monitoring wells since system start-up, 3) the recent very low to non-detections of VOCs in monitoring wells close to the two extraction wells, which indicates that the extraction wells are intercepting the contamination that had been present in the monitoring wells before system start-up, 4) the recent absence of VOC detections at nearby off-site monitoring well MW-OS-7D suggests capture and shrinking of the plume, and 5) the groundwater levels measured during pumping indicate capture zones around the extraction wells.

Because some residual VOC source remains at the property, as indicated by groundwater VOC concentrations that remain elevated above remediation goals, a two-phased remedy-optimization pilot study investigation was conducted in April 2015 and January 2016. The investigation used direct-push equipment (MiHPT) and soil and groundwater sample analyses. Based on the results of the delineation of VOCs in soil with the MiHPT, an optimization treatability pilot study will be conducted in 2017 using injected chemical oxidant.

Site Inspection

The inspection of the Site was conducted on 3/3/2017. In attendance were Thomas Dobinson, EPA Remedial Project Manager, Michael Scorca, EPA Hydrogeologist, Nicholas Mazziotta, EPA Risk Assessor, Francisco Barba, USACE Project Manager, Brian Duffy, USACE Contracting Officer Representative, Travis Barbier, USACE Engineer, and Daniel Sirkis, USACE Hydrogeologist.

The plant operators are present on the Site about five days a week to make sure everything is functioning smoothly and all required testing and sampling is being carried out on schedule. Similarly, the USACE is on the Site as needed during the long-term response action (LTRA) to arrange the change out of carbon, dispose of waste sludge, handle all visitors, as well as conduct field activities such as sampling and investigations.

Based on the observations from the site inspection as well as the continual evaluation of the remedy by EPA and USACE, no issues were identified.

V. TECHNICAL ASSESSMENT

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

Remedial Action Performance

As indicated in the 1992 ROD and clarified in the 1998 ESD, the goal of the soils excavation remedy and the SVE system were to prevent exposure to inorganic and PCB contaminant sources that present a significant human health risk and to address VOC contaminant sources contributing to groundwater contamination. Soil excavation activities have been completed and met soil cleanup numbers identified in the remedy decision documents for lead, chromium, and PCBs. Residual VOC contaminated soils in the vadose zone were treated using soil vapor extraction system. The system was shut down in June 2010 due to declining soil contaminant concentrations. As part of an optimization activity, a focused site characterization was conducted to evaluate residual soil contamination and an in-situ chemical oxidation pilot study design is underway.

The groundwater treatment system began operation in 2009 and continues to extract and treat contaminated groundwater.

System Operations/Operations &Maintenance

As indicated in the 1992 ROD, the goal of the groundwater remediation is to restore groundwater to levels that would allow for unlimited use without restriction. Based on a review of available groundwater analytical results, the system is working effectively to capture the source area contamination through recovery wells RW-l and RW-2. The system effluent meets all NJPDES permitting requirements for subsurface reinjection.

Based on the data collected during the past five years, VOC concentrations detected in the extraction wells (RW-1, RW-2) have remained consistently elevated, but with a declining trend since the system started operation, which supports the premise that the treatment system is capturing contaminated groundwater in the source area. There are generally steady declining trends in groundwater VOC concentrations in monitoring wells since system start-up and recent very low to non-detect concentrations of VOCs in monitoring wells close to the two extraction wells indicates that the extraction wells are intercepting the contamination that had been present in the monitoring wells before system start-up. Additionally, the recent absence of VOC detections at nearby off-property monitoring well MW-OS-7D suggests capture and shrinking of the plume.

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

Question B Summary:

The exposure assumptions, pathways, and receptors that were used to estimate the potential risks and hazards to human health followed the standard risk assessment paradigm in use at the time. Ingestion, dermal contact, and inhalation exposures to groundwater, surface soil and subsurface soil were evaluated for trespassers, future Site residents, and future Site workers. The exposure assumptions, pathways, and receptors are still valid.

Changes in Toxicity and Other Contaminant Characteristics

The toxicity values used to calculate the risks and hazards were reported in Table 4 of the 1992 ROD. Some of the toxicity values that were used in the 1992 ROD have changed; however, the changes would not impact the remedial decision that was made for the Site. The cleanup goal for lead in soil documented in the 1992 ROD was 500 mg/kg, based on future residential use. As documented in the 1998 ESD, which modified in-situ soil treatment to excavation and off-site disposal, the soil lead cleanup goal was changed from 500 to 400 mg/kg to reflect EPA Lead Technical Review Workgroup (TRW) recommendations and NJDEP RDCSCC. The Agency is currently assessing lead cleanup goals on a site-specific basis through the TRW. As stated in OLEM Directive 9200.2-167 (December 2016), it is recommended that residential lead cleanup values be evaluated using the Integrated Exposure Uptake and Biokinetic (IEUBK) model in conjunction with site-specific model inputs, such as soil ingestion rates and lead bioavailability. In addition, the current scientific literature on lead toxicity and epidemiology provides evidence that adverse health effects are associated with blood lead levels less than 10 micrograms per deciliter (µg/dL), which is presently used as the model default. Use of site-specific parameters and updated toxicity information in the model may result in residential lead cleanup goals less than 400 mg/kg. Nevertheless, the remedial actions conducted on-site, including soil excavations ranging from 1 to 16 feet below ground surface combined with Site perimeter fence installation, are interrupting potential direct contact exposures. The Site is also not currently used for residential purposes and in the event that site redevelopment occurs, EPA will evaluate exposure scenarios and evaluate the soil remedial actions and residual soil lead concentrations.

Changes to Standards and To Be Considereds (TBCs)
The cleanup values used for the contaminants of concern are presented in Table 7 of the 1992 ROD. The revised cleanup goal for lead is documented in the 1998 ESD. The applicable or relevant and appropriate requirement (ARAR) provided for xylenes in groundwater is 44 µg/L, referenced from the New Jersey Safe Drinking Water Act (NJAC 7:10-16). As reported in the 2004 Groundwater Quality Standards Rule Recodification and Readoption (NJAC 7:9C), a revised drinking water standard of 1,000 µg/L was adopted by the state based on updated toxicological information recommended by the NJDWQI. Implementation of this revision would result in a higher cleanup goal for xylenes which would, therefore, not impact the remedial decision made for groundwater at the Site. In addition, the soil cleanup objective for PCBs was the federal residential cleanup criterion of 1 mg/kg at the time of the ROD. However, post-excavation sampling indicated that the soil removal ultimately met NJDEP's more stringent RDCSCC level of 0.49 mg/kg for PCBs at the time of soil removal. Although the most current NJDEP RDCSCC value for PCBs is 0.2 mg/kg, the previous standard is within one order of magnitude which is acceptable in accordance with NJDEP Order of Magnitude Guidance (2009). The remaining ARARs and TBCs presented in the 1992 ROD and 1998 ESD remain valid.

The remedial action objectives (RAOs) presented in the 1992 ROD were (1) prevent exposure to contaminant sources that present a significant human health risk, and (2) restore contaminated groundwater to drinking water standards. Despite the changes to the cleanup goals and ARARs described above, these RAOs remain valid. In addition, application of the updated state ARAR for xylenes would likely decrease the time needed for the groundwater remedy to meet the RAOs.

Vapor Intrusion
Since the primary contaminants of concern at the Site are VOCs, vapor intrusion was evaluated in March 2004 via vapor intrusion sampling. There were no VOCs detected above EPA's screening criteria and it was determined that the vapor intrusion pathway was not complete. The results of this evaluation remain valid since the concentrations of VOCs in groundwater have continued to decline since this time.

Ecological Risk
The ecological risk assessment indicated that there were no endangered species, sensitive ecosystems, or sensitive habitats identified on the Site. The assessment concluded that adverse impacts to on-site plants and animals from on-site contamination are not likely. The assumptions used in the assessment are still valid. Soils have been remediated and the groundwater does not impact any surface water bodies. Therefore, no ecological receptors are impacted.

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

No.

VI. ISSUES/RECOMMENDATIONS

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

Although no issues and recommendations were identified that impact protectiveness, the results of the MIPHpT and in-situ chemical oxidation study should continue to be implemented and evaluated to expedite groundwater restoration.

VII. PROTECTIVNESS STATEMENT

Protectiveness Statement(s)		
Operable Unit: 1	*Protectiveness Determination:* Protective	*Planned Addendum Completion Date:* Click here to enter a date
Protectiveness Statement: The OU1 remedy is protective of human health and the environment.		

Sitewide Protectiveness Statement	
Protectiveness Determination: Protective	Click here to enter a date
Protectiveness Statement: The Site remedy is protective of human health and the environment.	

VIII. NEXT REVIEW

The next FYR report for the Cosden Chemical Coatings Superfund Site is required five years from the completion date of this review.

APPENDIX A – REFERENCE LIST

Interim Remedial Investigation Report, Ebasco Services, October 1989

Phase I Remedial Investigation Report, Ebasco Services, 1990

Phase II Remedial Investigation Results Report, Ebasco Services, June 1992

Contaminant Fate & Transport Study / Risk Assessment, Ebasco Services, June 1992

Final Feasibility Report, Ebasco Services, July 1992

Continuous Groundwater Monitoring Report, USACE Baltimore, September 1997

Site Investigation! Remedial Design Report, Roy F. Weston! REAC, April 1998

Remedial Action Report (Soil), REAC, September 2003

35% Groundwater Remedial Design Report, URS Group Inc., May 2004

100% Groundwater Remedial Design Report, URS Group Inc., Sept. 2005

Five Year Review Report – Cosden Chemical Coatings Corporation Superfund Site, EPA Region 2, August 2012

Semi-Annual groundwater sampling was taken and analyzed between the fall of 2011 and the fall of 2016 by the contractor, and reviewed by USACE and the EPA.

Similarly, the treatment plant influent and effluent were monitored during that same period to confirm that the remedy was operating effectively in accordance with the design and the O&M manual

APPENDIX B – CHRONOLOGY OF SITE EVENTS

Event	Date(s)
Cosden facility operations closed	May '87
USEPA initiates emergency cleanup activities	June '87
Cosden site placed on NPL	July '87
Remedial Investigation work plan	Sept '88
Phase II Remedial Investigation field operations plan	Sept '90
Record of Decision signed	Sept '92
Cosden facility demolition & removal initiated	July '95
Explanation of Significant Differences for OU-2	Sept '98
Contaminated soil removal initiated	June'99
Phase III Pre-Design investigation of natural attenuation	Mar '02
Pre-Design / Design groundwater investigations	Fall '02-'04
Groundwater 100% Design submitted	Sept '05
USACE awards the construction contract for the groundwater/SVE facility	Mar '06
USACE awards O&M contract for the startup year of the new facility	May '08
LTRA through USACE O&M Contracts	June '09 - Present
First five-year review	August '12
MiHPT Investigation	June '16

APPENDIX C – FIGURES

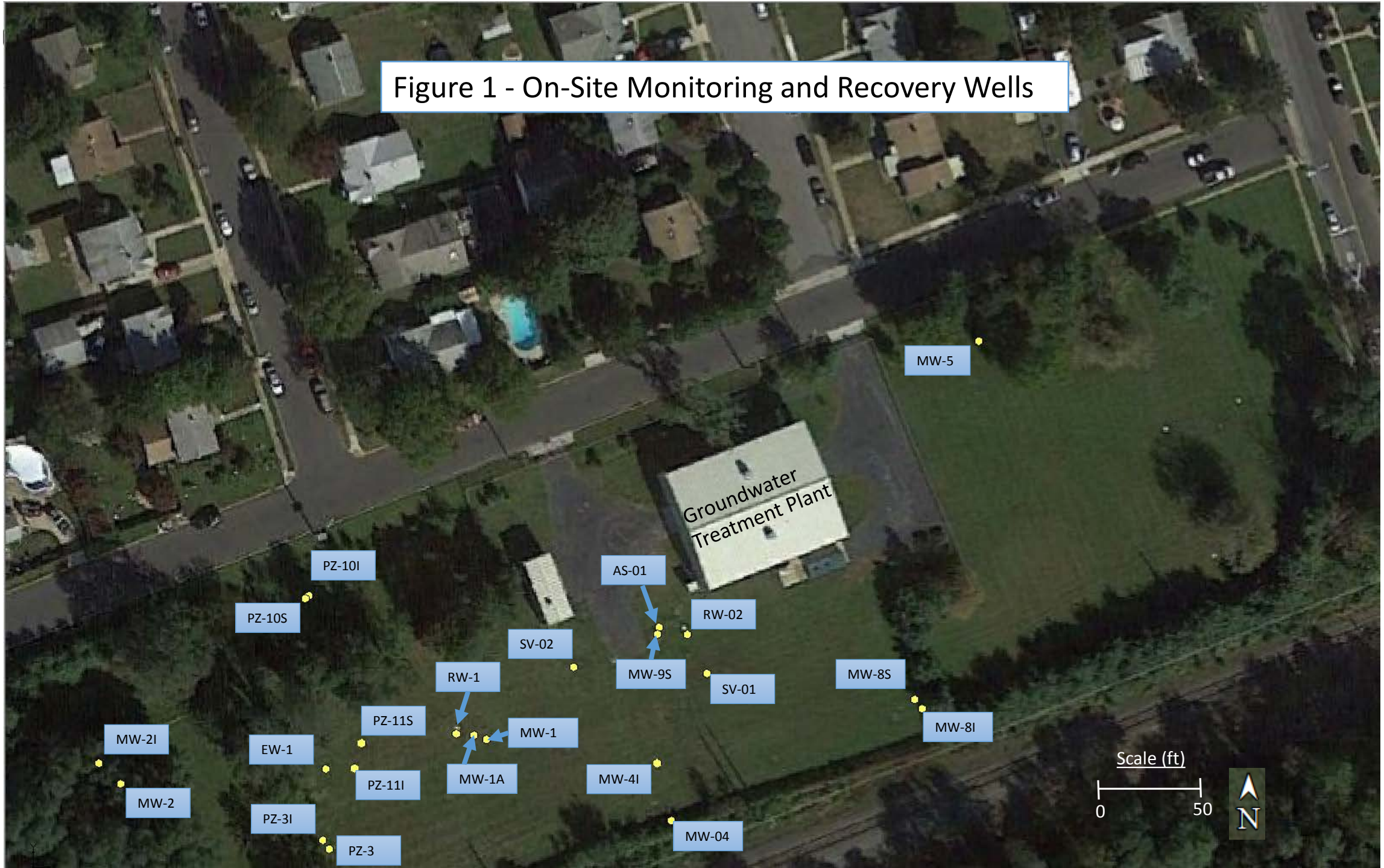
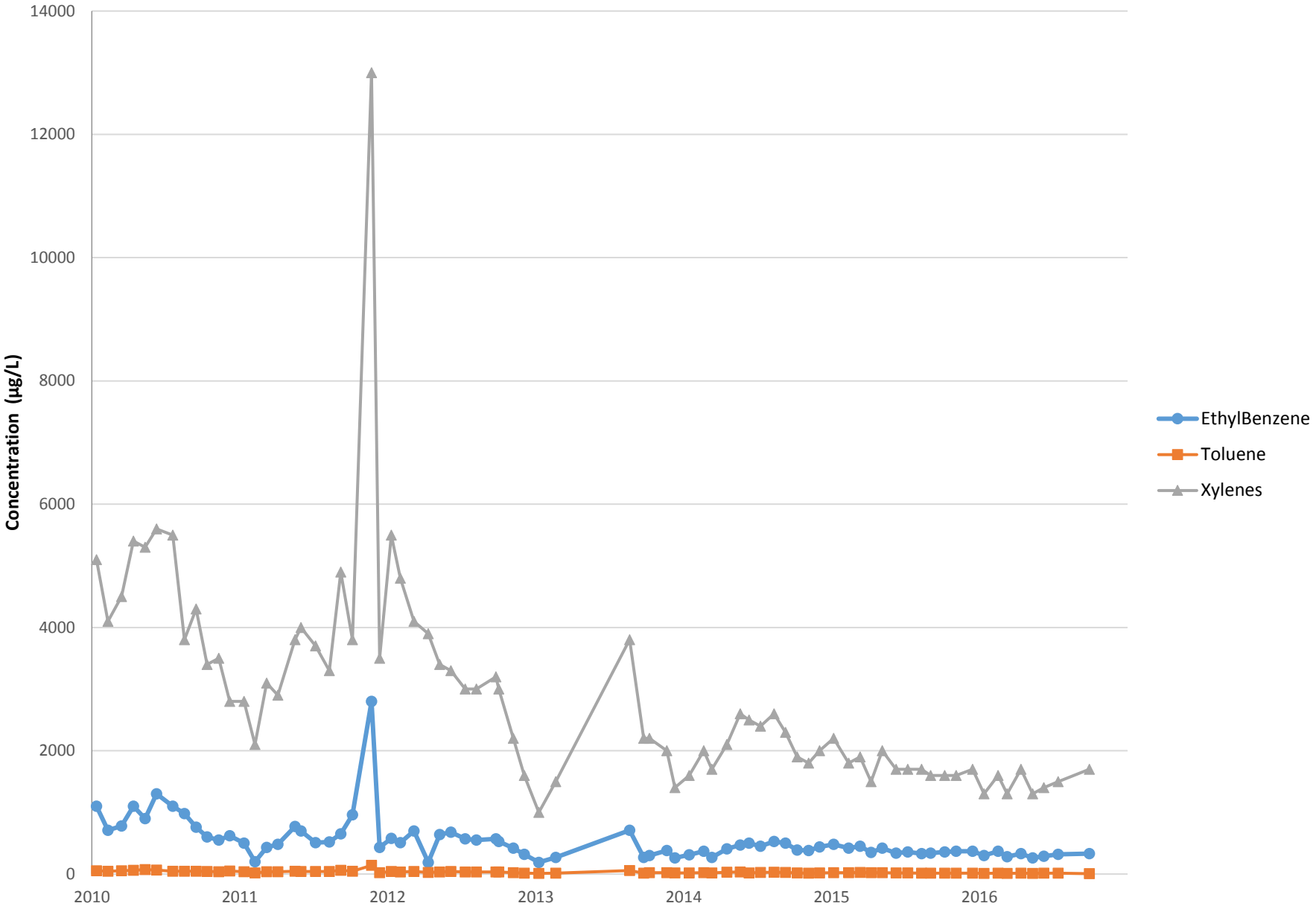


Figure 1 - On-Site Monitoring and Recovery Wells
MW-5
Groundwater Treatment Plant
PZ-10I
PZ-10S
AS-01
RW-02
SV-02
RW-1
MW-9S
SV-01
MW-8S
MW-8I
PZ-11S
MW-1
MW-2I
EW-1
MW-1A
MW-4I
PZ-11I
MW-2
PZ-3I
MW-04
PZ-3
Scale (ft)
0
50
N


Figure 2 - Off-Site Wells
Delaware River
MW-OS4
MW-OS5
MW-OS2
MW-OS1
MW-OS3
MW-OS7
MW-OS7D
Injection Gallery
Injection Gallery
Treatment Plant
Edgewater Park
Beverly
N
Not to Scale

Figure 3 - Recovery Well-1



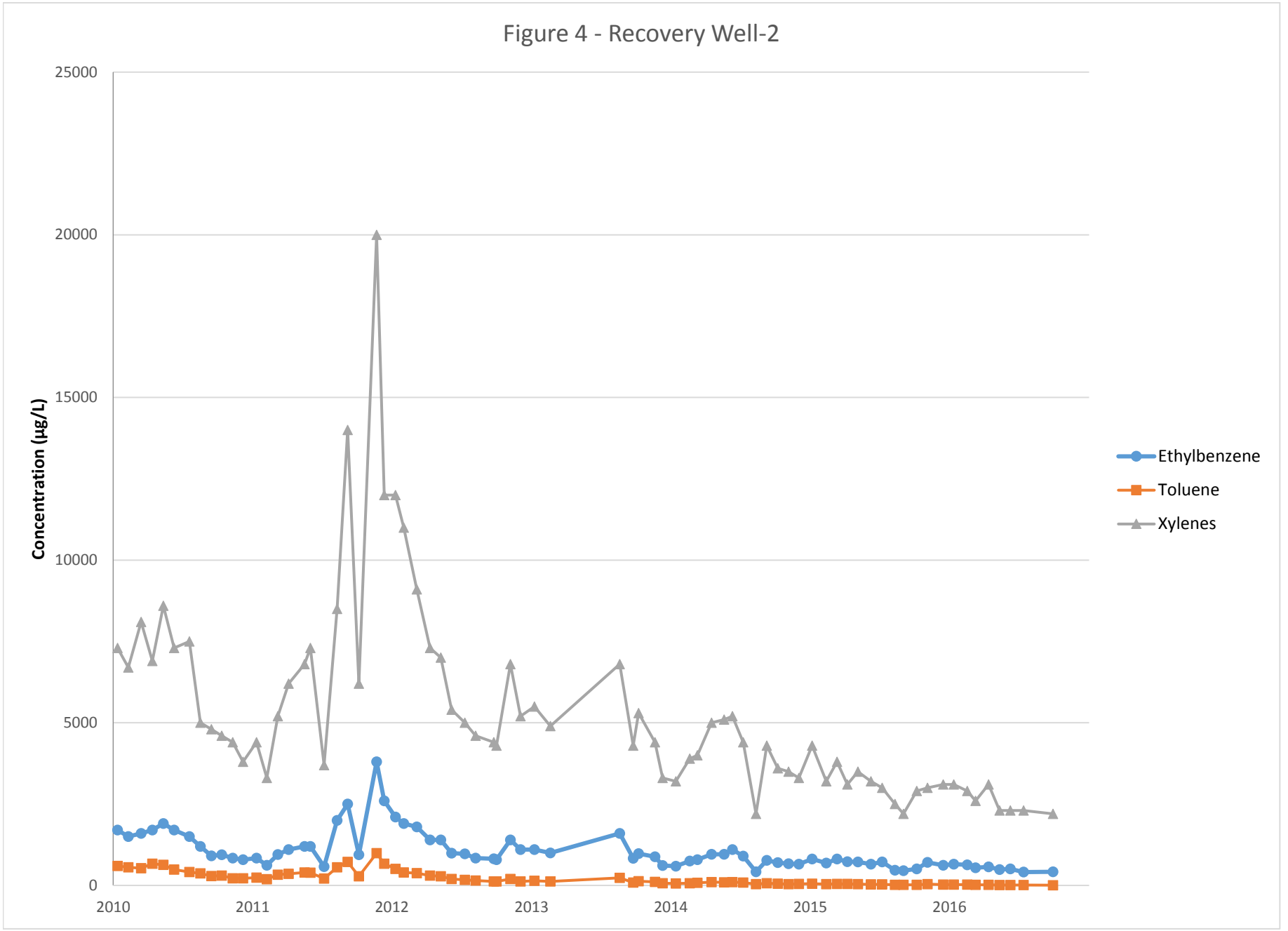
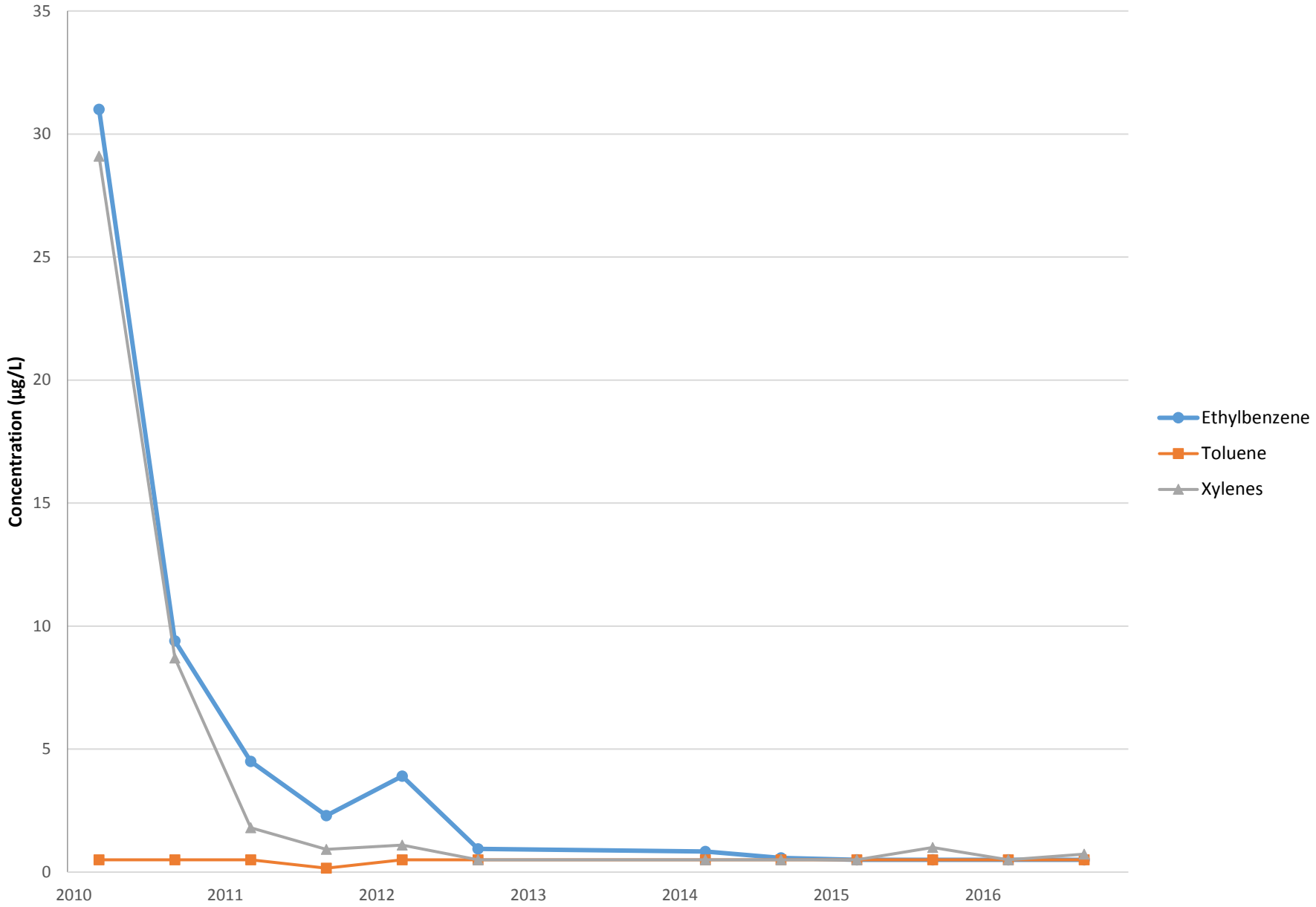


Figure 4 - Recovery Well-2
Concentration (µg/L)
25000
20000
15000
10000
5000
0
2010
2011
2012
2013
2014
2015
2016
Ethylbenzene
Toluene
Xylenes


Figure 5 - Monitoring Well-1
Concentration (µg/L)
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
2010
2011
2012
2013
2014
2015
2016
Ethylbenzene
Toluene
Xylenes

Figure 6 - Monitoring Well-10I



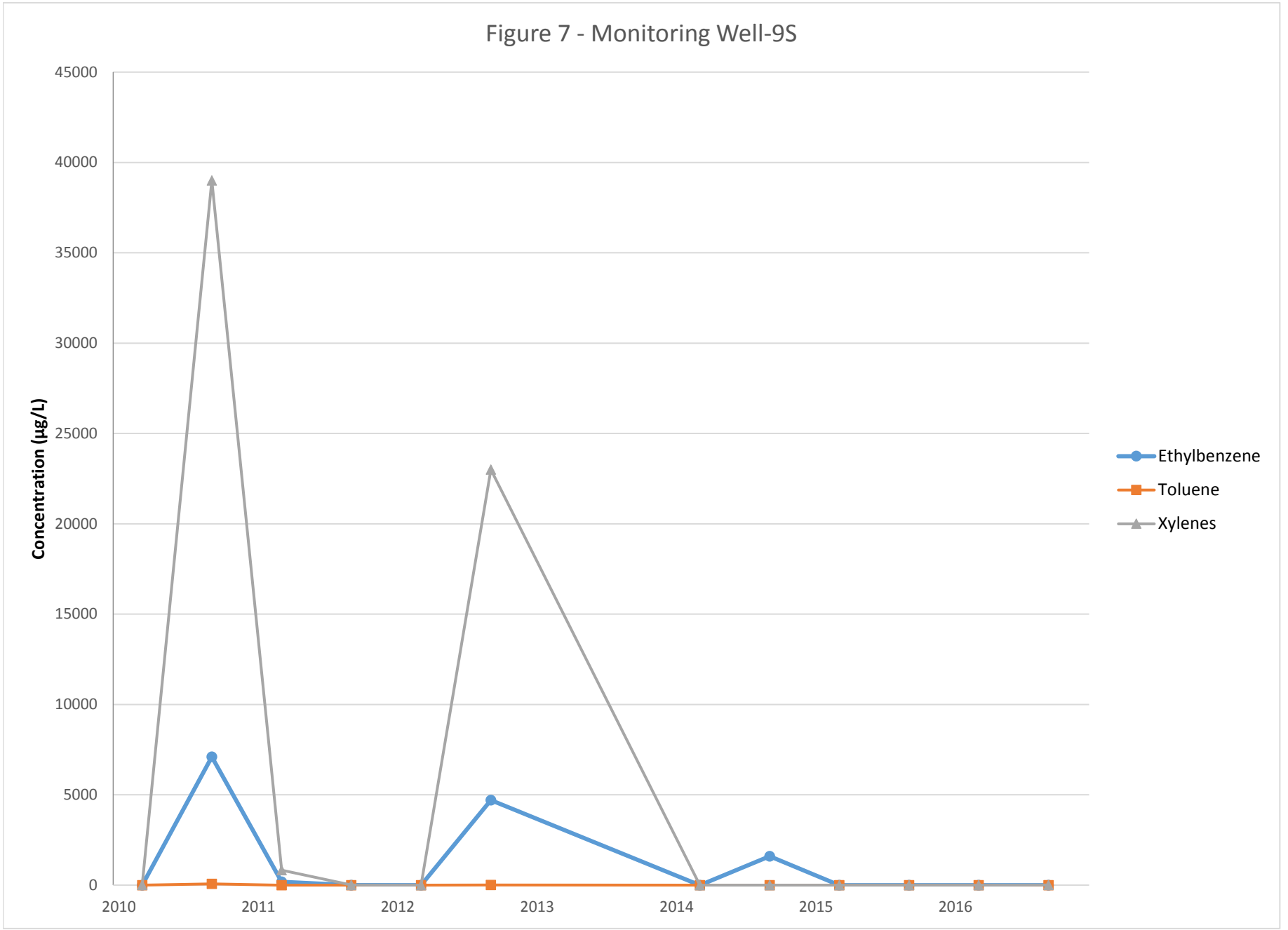


Figure 7 - Monitoring Well-9S
Concentration (µg/L)
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
2010
2011
2012
2013
2014
2015
2016
Ethylbenzene
Toluene
Xylenes

Figure 8 - Monitoring Well-OS-7D