FIRST FIVE-YEAR REVIEW REPORT FOR EVOR PHILLIPS SUPERFUND SITE MIDDLESEX COUNTY, NEW JERSEY

Prepared by

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

John Prince, Acting Division Director

Date

451932

Table of Contents

LIST OF ABBREVIATIONS & ACRONYMS

ARAR	Applicable or Relevant and Appropriate Requirement
CEA/WRA	Classification Exception Area/Well Restriction Area
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
EPA	United States Environmental Protection Agency
FYR	Five-Year Review
ICs	Institutional Controls
ISCO	In-Situ Chemical Oxidation
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NJDEP	New Jersey Department of Environmental Protection
NPL	National Priorities List
O&M	Operation and Maintenance
PRP	Potentially Responsible Party
RAO	Remedial Action Objectives
ROD	Record of Decision
RPM	Remedial Project Manager
TCE	Trichloroethene
UU/UE	Unlimited Use and Unrestricted Exposure
1,1,2,2-Tetra	1,1,2,2-Tetrachloroethane
1,2-DCA	1,2 Dichloroethane

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 first FYR for the Evor Phillips Superfund Site. The triggering action for this statutory review is the on-site construction start date (May 2, 2012), of the Operable Unit 2 (OU2) remedial action. The FYR has been prepared due to the fact that hazardous substances, pollutants or contaminants remain at the site above levels that would allow for unlimited use and unrestricted exposure (UU/UE) .

The Site consists of three Operable Units (OUs). Only OU2 and OU3 will be addressed in this FYR, because OU1, the interim remedy for groundwater, was subsumed by the OU3 groundwater remedy. OU1 called for the removal of buried drums, and extraction and treatment of contaminated groundwater as an interim measure for groundwater. OU2 addressed contaminated onsite soils by excavation and disposal of hot spots and capping of a 1.5 acre area of the site. OU3 is the final remedy for groundwater at the site and is currently being implemented.

The Evor Phillips Superfund Site FYR was led by John Osolin, the EPA remedial project manager for the site. Participants included Urszula Filipowicz, human health risk assessor, Ed Modica, hydrogeologist, Wanda Ayala, community involvement coordinator, Mindy Pensak, Ecological Risk Assessor, and Lynn Vogel, New Jersey Department of Environmental Protection (NJDEP) case manager. The potentially responsible party (PRP) group was notified of the initiation of the FYR. The review began on 7/27/2016.

Site Background

The Evor Phillips Leasing (EPL) property covers six acres in Old Bridge Township. The property is commercially zoned, with the surrounding area being mostly industrial. In the early 1970s, the site was used for various waste treatment, hauling and disposal businesses. The site also contained nineteen horizontal furnaces which were used for the incineration of photographic film and printed circuit boards. Two former surface impoundments, used for the neutralization of caustic and acidic waste waters, were located in the northeast area of the site. The impoundments were unlined, enabling contaminants to migrate through the soil to groundwater, and surface water. In 1973, NJDEP filed a complaint against the operator of the waste treatment facility and its landlord for operating without a permit. In 1975, the waste treatment facility was shut down pursuant to a court issued consent judgment. A State investigation conducted in 1982 estimated that approximately 150 drums containing chemicals were buried at the site. All remaining operations at the site stopped in 1986 with the shutdown of the metal recovery furnaces. The Evor Phillips site was listed on the EPA's National Priorities List in 1983.

The Sayreville municipal wellfield is located approximately 1,000 feet southwest, and the City of Perth Amboy wellfield is located approximately 3,000 feet southwest of the site. All nearby residents have discontinued use of private wells and are now served by a municipal water supply. This site is being addressed through Federal, State, and PRP actions.

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site Name: The Evor Phillips Leasing Superfund Site		
EPA ID: NJD980654222		
Region: 2	**State:** NJ	**City/County:** Old Bridge / Middlesex County
SITE STATUS		
NPL Status: Final		
Multiple OUs? Yes	**Has the site achieved construction completion?** No	
REVIEW STATUS		
Lead agency: EPA		
Author name (Federal Project Manager): John Osolin		
Author affiliation: U.S. Environmental Protection Agency		
Review period: 7/27/2016 - 1/31/2017		
Date of site inspection: 11/3/2016		
Type of review: Statutory		
Review number: 1		
Triggering action date: 5/2/2012		
Due date *(five years after triggering action date)*: 5/2/2017		

II. RESPONSE ACTION SUMMARY

Basis for Taking Action

Groundwater is contaminated with carbon tetrachloride, chloroform, 1,2-dichloroethane, 1,1,2,2-tetrachloroethane, tetrachloroethene, and trichloroethane. These contaminants have the potential to impact future onsite residents, as well as downgradient receptors including the Sayreville and Perth Amboy municipal wellfields. The human health risk assessment indicated that contaminated groundwater beneath the site poses an unacceptable risk to human health due to the presence of volatile organic compounds (VOCs) in groundwater above maximum contaminant levels (MCLs) for drinking

water. In addition, a screening evalution indicated a potential for risk from conmmerical/industrial worker exposure to groundwater contaminants via the vapor intrusion pathway.

Onsite soils were contaminated with arsenic, benzo(a)anthracene, benzo(b)fluoranthene, benzo(a)pyrene, beryllium, bis(2-ethylhexyl)pthalate, copper, hexachlorobutadiene, lead, methylene chloride, PCBs, thallium, toluene, and zinc. These soils are a potential contact hazard to onsite workers and tresspassers, as well as a source of groundwater contamination. The human health risk assessment indicated that levels of arsenic and benzo(a)pyrene detected in site soil exceed the lower end of the acceptable carcinogenic risk range for trespassers and future industrial/commercial workers. The ecological risk assessment indicated that copper contamination in soil exceeded phytotoxicity screening levels (potential impact to the plant community).

Response Actions

In 1983, the NJDEP excavated 30 to 40 drums and removed them from the site. Excavations initiated in January 1996 by some of the PRPs unearthed over 1,000 buried waste containers in six areas of the Site through May 1997.

From February to April 1997, EPA conducted a removal action that required a temporary 10,000 square foot containment structure and resulted in the excavation of 34 drums and approximately 300 laboratory-sized containers. PRP excavation activities, on hold during EPA work, were completed in May 1997. Following completion of excavation, a total of twelve post-excavation samples were collected at depths of 7 feet and 11 feet and the results of the laboratory analyses on those samples showed no substantial contamination above background.

The first Record of Decision (ROD) (September 1992) was an interim remedy to address on-site groundwater. The Remedial Action Objectives (RAOs) for the OU1 ROD were:

- *Arrest the migration and initiate the restoration of contaminated on-site groundwater; and*
- *Remove on-site sources of contamination that substantially and continually degrade the on-site groundwater.*

The remedy components to address these RAOs were:

- Extraction of contaminated groundwater underlying the site with on-site treatment and recharge of treated water.
- Excavation of buried drums and debris in the drum disposal areas with off-site disposal at an appropriate facility; and
- Environmental monitoring to evaluate the effectiveness of the remedy.

An Explanation of Significant Differences (May 2002) modified the OU1 remedy to include the option to discharge pre-treated water to the Middlesex County Utilities Authority (MCUA) in accordance with their permit requirements.

The second ROD (September 2008) addressed on-site soils. The RAOs for the OU2 ROD were:

- *Prevent human and ecological (plant) contact with contaminated soil;*
- *Prevent migration of contaminated soil via surface water runoff and erosion; and*
- *Minimize or eliminate contaminant migration from soil to the groundwater.*

The remedy components to address these RAOs were:

- Excavation of two VOC and two VOC/semi-volatile organic compound (SVOC) contaminated hot spots located in the central portion of the site. Backfill of excavated areas with clean fill and the excavated surface soil from the discontinuous areas described below.
- Excavation of six discontinuous areas located near the eastern boundary of the site where contaminants in the surface soil exceed the direct contact cleanup objectives. Consolidation of excavated surface soil in the central portion of the site with similarly contaminated surface soil and backfill of excavated areas with clean fill.
- Characterization of excavated soil from four hot spots and hazardous debris. Transport of waste to an off-site RCRA-compliant facility for disposal. Treatment of soils determined to be RCRA hazardous waste, by chemical stabilization, prior to disposal to meet the RCRA LDRs.
- Disposal of nonhazardous soil and debris at a nonhazardous waste landfill.
- Consolidation of soil and placement of a surface cover, that is compliant with RCRA Subtitle D permeability requirements, over an estimated 1.5 acres in the center of the site to prevent exposure to contaminants that exceed the soil cleanup objectives.
- Placement of a readily-visible and permeable subsurface demarcation delineating the interface between the contaminated native soil and the cover.
- Grading and seeding of soil covered area.
- Institutional controls in the form of a deed notice to prohibit residential use of the property and to restrict any excavation below the cover.
- Maintenance of the cover.

The third ROD (September 2012) addressed on-site groundwater. The (RAOs) for the OU3 ROD were:

- *Prevent exposure to contaminated groundwater that presents an unacceptable risk to public health and the environment;*
- *Remediate groundwater to the extent practicable and minimize the potential for further migration of contaminants in groundwater;*
- *Restore groundwater to New Jersey Groundwater Quality Standards (NJGWQS) within a reasonable time frame; and*
- *Minimize or eliminate organic vapor migration from groundwater into potential future indoor environments that may be built on Site.*

The remedy components to address these RAOs were:

- Injection of an oxidizing agent to treat groundwater containing concentrations of volatile organic compounds greater than New Jersey Groundwater Quality Standards (NJGWQS);
- Post remediation sampling; and
- Institutional controls consisting of a Classification Exception Area/Well Restriction Area (CEA/WRA), which limit future use of the Site groundwater for potable purposes until remediation goals are met.

Table 1

Contaminant of Concern	Clean-up Objectives for Soil mg/kg	Clean-up Objectives for Groundwater ug/L*
Arsenic	23[b]	
Benzo(a)anthracene	2.1	
Benzo(b)fluoranthene	2.1	
Benzo(a)pyrene	0.21	
Beryllium	94[s]	
Bis(2-ethylhexyl)phthalate	120 (100)	
Carbon Tetrachloride		1
Chloroform		70
Copper	600	
1,2-Dichloroethane		2
Hexachlorobutadiene	21	
Lead	600	
Methylene Chloride	54 (1)	
PCBs	.74	
1,1,2,2-Tetrachloroethane		1
Tetrachloroethene		1
Thallium	2	
Toluene	1,000 (500)	
Trichloroethene		1
Zinc	1,500	

[b] - Based on background concentration.

[s] - Site specific alternative remediation Criterion

( ) – Numbers in parentheses indicate impact to groundwater criteria. Exceedence of these criteria in soils are considered hotspots for the soil remedy.

* - Based on NJGWQS

Status of Implementation

OU1 Remedy - Construction of the OU1 interim groundwater extraction system and removal of drums was completed in 1999. In 2002, pursuant to an ESD, treated water was discharged to the MCUA instead of being reinjected on-site. Two of the five wells installed (deep wells EW-2 and EW-4) were taken offline in 2002 as deeper groundwater achieved remediation goals. EW- 3 was taken offline in 2011 when remedial goals were achieved in that area. The last two wells (EW-1 and EW-5) were taken offline in 2014 when the OU3 groundwater remedy was initiated. Regular yearly monitoring of the groundwater continues consistent with the final OU3 groundwater remedy.

OU2 Remedy – Construction of the OU2 remedy was completed in 2012. This remedy included removal and offsite disposal of hotspot soils that could act as sources of groundwater contamination, and consolidation of six areas that exceeded the direct contact cleanup objectives, under a soil cap. The 1.5 acre cap consists of a demarcation layer that overlays the contaminated soil, covered by 18 inches of certified clean fill, and 6 inches of topsoil planted with grass to reduce erosion.

OU3 Remedy – Two rounds of in-situ chemical oxidation (ISCO) injections were completed in March 2014 and June 2015. The injections focused on two onsite areas where groundwater contamination remained elevated after 15 years of pumping pursuant the OU1 interim remedy. Following the first injections, four monitoring events were conducted to evaluate the performance of the remedy. The second injection event was conducted based on the results the groundwater monitoring that followed the first injection event. Four additional monitoring events followed the second ISCO injection. EPA has

recommended up to four additional monitoring events over the course of the next year to determine whether the remedy will require additional ISCO injections.

Institutional Controls

Soils – The OU2 remedy includes a deed notice prohibiting residential use, and places restrictions on excavation in the capped areas. A deed notice was placed on the the property in December 2004 (prior to the OU2 ROD) and is still in effect. That deed notice addresses all restrictions listed in the OU2 ROD.

Groundwater – The OU3 remedy references a CEA/WRA for groundwater which prohibits drilling of wells in the area. The CEA/WRA was put in place on February 24, 2003, and is still active. See figure 2, which is map of the CEA/WRA.

Table 2: IC Summary Table Summary of Planned and/or Implemented Institutional Controls (ICs)

Media, engineered controls, and areas that do not support 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)
Onsite Soil	Yes	Yes	Covers the entire site area	notice prohibits residential use and restricts excavation in the capped areas	Deed Notice 12/11/2004
Groundwater	Yes	Yes	See Figure 2	Restricts drilling of wells in the CEA/WRA area	CEA/WRA 2/24/2003

Systems Operations/Operation & Maintenance

The OU2 cap is inspected, and the grass is mowed regularly throughout the year to ensure the integrity of the remedy. The site groundwater remedy is ongoing and additional injections will be administered and groundwater will be monitored until the the groundwater goals are achieved and the CEA is removed.

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 is the first FYR, therefore this section is not applicable.

IV. FIVE-YEAR REVIEW PROCESS

Community Notification and Involvement

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 Evor Phillips 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

The results of the review and the report will be made available at the site information repository located at:

Old Bridge Central Library
One Old Bridge Plaza
Municipal Center
Old Bridge, NJ 08857
Phone: 732-721-5600, Ext. 5010
Phone: (212) 637-4308 (Call to make an appointment)

OR

EPA Region 2 Public Reading Room
Phone: (212) 637-4308 (Call to make an appointment)

Data Review

Data for Evor Philips consists largely of analyses of groundwater samples and groundwater level information collected from a network of shallow monitoring wells distributed in and adjacent to two treatment areas on the Evor-Philips property. In the implementation of the site's OU3 groundwater remedy two treatment areas of the site were subject to injection of sodium persulfate. A preliminary injection event was completed in March 2014, and a second injection event was later deemed necessary and completed in June 2015. This section will discuss groundwater monitoring results conducted to support the in-situ groundwater remedy. Specifically, a sampling event was performed in January 2014 to establish baseline conditions at the site. Following the first injection event, four rounds of performance monitoring were performed between May and September of 2014. In March 2015, a second sampling event was performed to establish an updated baseline at the site. Subsequently, following the second injection event, four rounds of performance monitoring were performed between July and November of 2015. The location of the two treatment areas may be seen in figure 3 of this report.

Groundwater Quality Results of Baseline Sampling Event, January/February 2014
A total of 30 monitoring wells were sampled using low-flow purge methods and in accordance with the approved Remedial Design Report (RDR) /Remedial Action Work Plan (RAWP) and the NJDEP Field Sampling Procedures Manual (FSPM). Wells were sampled for VOCs. Select wells were also sampled for dissolved iron/chromium and total chromium/sodium, total dissolved solids, and sulfate.

The monitoring wells are located within, or surrounding, two continuous "Treatment Areas" that, joined together, measure approximately 52 feet wide by 550 feet long and are aligned with the south boundary of the property. Treatment Area 1, which is located to the east, contains wells screened in a perched groundwater zone within the shallow aquifer. Treatment Area 2 is west of Treatment Area 1, and contains wells also screened in the shallow aquifer, but beneath the clay. Most of the wells are screened

in the shallow portion of the local aquifer (wells MW-6S, MW-10S, MW-14S, MW-19S, MW-23S, MW-24, MW-28, PZ-1S, IW1-BT-2, IW1-DR-1, IW-4S, WCC-1S, MW-51, MW-91, MW-111, MW-231, WCC-1M, WCC-3M, extraction well EW-3, ISCO-MW-1, ISCO-MW-5, and ISCO-MW-6). Six of the monitoring wells are screened in the localized perched groundwater zone (ISCO-MW-2, ISCO-MW-3, ISCO-MW-4, ISCO-MW-7, ISCO-MW-8, and ISCO-MW-9); these were also sampled/analyzed for VOCs. Two monitoring wells screened in the deep aquifer (MW-15D and MW-23D) were also sampled and analyzed for VOCs. Five of the monitoring wells are located downgradient of the property (south) and three of the wells are located up-gradient of the treatment areas.

In general, total VOCs in excess of standards (the tally of specific VOC constituents that are observed at concentrations above NJGWQS) were reported at concentrations of less than 110 ppb for most monitoring wells. A maximum total VOC concentration of 1,303 ppb was reported for ISCO-MW-2, a well located within Treatment Area 1. The most significant specific VOC constituents observed were 1,2 Dichloroethane (1,2-DCA) and Trichloroethene (TCE), with concentrations of 1,2-DCA reported up to a maximum of 1,270 ppb in ISCO-MW-2, and concentrations of TCE reported up to a maximum of 54.9 ppb in ISCO-MW-3. 1,1,2,2-Tetrachloroethane (1,1,2,2-Tetra) was also observed at a concentration of 22.5 ppb for well ISCO-MW-2 and (1,1,2,2-Tetra) was observed at a concentration 1.2 ppb in well ISCO-MW-8. The two wells screened in the deep aquifer reported baseline VOC concentrations below levels of concern.

Groundwater Quality Results of 1st Post-Injection Performance Monitoring, May to September 2014

Following the preliminary injection of ISCO into groundwater four rounds of performance monitoring were completed in May, June, August and September of 2014. Work was performed in accordance with the approved RDR/RAWP. Wells were sampled for VOCs. Thirteen wells were sampled during the first three sampling events and 17 wells were sampled during the last round of sampling.

Treatment Area 1 (easternmost area above silty clay)

For Treatment Area 1, groundwater performance monitoring results indicate that VOC concentrations remained relatively low, but above NJGWQS in all Treatment Area 1 wells. Sustained reductions in VOC concentrations were observed in some wells (e.g., 50-70% VOC reduction in ISCO-MW-2 and ISCO-MW-9). However, following initial post-injection decreases, VOC concentrations in wells ISCO-MW-2 and ISCO-MW-3 increased to higher levels by the September monitoring event (see figures 4 and 5).

An initial 90% decrease in VOCs was observed for ISCO-MW-2 (1,303 ppb total VOCs as identified in the January 2014 baseline groundwater monitoring, down to 150 ppb in the May groundwater sampling round), followed by an increase by the September round to 1,218 ppb (574 ppb of which comprised 1,2-DCA). However, the concentrations of TCE, PCE, and 1,1,2,2-TCA within the well appear to be neutral or slightly declining. Consistent with the baseline monitoring results, ISCO-MW-2 continued to show the highest total VOC (primarily 1,2-DCA) concentrations at the Site.

An initial decrease in total VOCs was observed in ISCO-MW-3 from the 56-ppb concentration reported above standard in 2014 baseline sampling event, down to 33 ppb in the May 2014 event, followed by an increase in the September 2014 round to 164 ppb. In wells ISCO-MW-7 and IW1-BT-2, slight upward trends in total VOCs were exhibited, from baseline concentrations of 1-2 ppb to 13-20 ppb in the September round. In wells ISCO-MW-8 and ISCO-MW-9, a downward trend in total VOCs was observed (baseline concentrations were 44 ppb in both and decreased to 1-16 ppb in the September round).

Treatment Area 2 (westernmost area below the silty clay unit)
The highest total VOC concentrations above NJGWQS within Treatment Area 2, at wells ISCO-MW-1 and ISCO-MW-5 (44.5 ppb and 72.2 ppb, respectively) were reduced to low-level VOC concentrations (to 4 ppb and 4.8 ppb, respectively) in the September 2014 sampling event. The low levels observed were similar to those initially present in ISCO-MW-6 and PZ-1S during the baseline sampling event. Wells PZ-15 and ISCO-MW-6 continued to show low-level VOC concentrations (baseline concentrations were 2 ppb in both, whereas concentrations during the September event were 7-8 ppb) The differences in these totals are due primarily to small increases in a few compounds to just above NJGWQS values.

Other Water Quality Results
Groundwater at the site flows to the south-west. Downgradient wells (MW-10S, ISCO-MW-4, and MW-14S) continue to show low-level VOC concentrations below NJGWQS at ISC0-MW-4 and MW-14S which are down gradient of Treatment Area 1. MW-l0S, which is downgradient of Treatment Area 2, is marginally above NJGWQS for VOCs.

Following initial increases in dissolved chromium concentration, trends appear to be downward or neutral (e.g., ISCO-MW-9 and PZ-1S). No chromium detections have been identified in the downgradient wells, which supports the contention that the chromium increases appear to be localized to the treatment areas. Based on findings from other case studies, chromium concentrations are expected to continue to decrease over time.

Increased acetone concentrations appear in a number of wells, although not at concentrations that would be of concern relative to its groundwater quality standards (i.e., 6,000 ppb). The minor acetone concentrations detected are a typical by-product of the ISCO process and are expected to be transient.

Groundwater Quality Results of Baseline Sampling Event, March 2015
In March 2015, 30 monitoring wells were sampled consistent with the 2014 annual monitoring event and in accordance with the approved RAWP. Wells were sampled for VOCs whereas select wells were sampled for dissolved iron/chromium and total chromium/sodium, total dissolved solids (TDS), and sulfate. Water-level measurements were also collected from the sampled wells. The network of monitoring wells is described above (see Groundwater Quality Results of Baseline Sampling January/February 2014).

Consistent with prior sampling results, VOCs with concentrations above NJGWQS are primarily 1,2-DCA and TCE. The highest total VOCs above NJGWQS were detected in three monitoring wells screened within the ISCO treatment areas, ISCO-MW-2, ISCO-MW-3, and ISCO-MW-5, which exhibited total VOCs of 884 ppb, 79 ppb, and 206 ppb, respectively, see figures 4 - 6. The highest 1,2-DCA concentration (834 ppb) was detected at ISCO-MW-2. The highest TCE concentration (77 ppb) was detected at ISCO-MW-3. Total VOCs detected in the remaining on-site monitoring wells, and wells immediately downgradient from the site were generally less than 13 ppb. Concentrations of 1,2-DCA and TCE were relatively unchanged in off-site wells.

In Treatment Area 1, several wells (e.g., ISCO-MW-7, ISCO-MW-8, IW1-BT-2) exhibited total VOCs of 6 ppb or less, indicating that progress toward the remedial action objectives has been made. However, sampling results for other wells, ISCO-MW-2, ISCO-MW-3, and to a lesser degree ISCO-MW-9,

continued to show VOC concentrations above NJGWQS. In Treatment Area 2, PZ-1S, ISCO-MW-1, and ISCO-MW-6 showed total VOCs of less than 6 ppb.

Groundwater Quality Results of 2nd Post-Injection Performance Monitoring, July to November 2015
A second round of ISCO injections implemented to address persistent groundwater contamination in Treatment Areas 1 and 2 was completed in June 2015. Following the ISCO injection work, four rounds of performance monitoring were completed to evaluate groundwater quality in July, September, October and November of 2015. Work was performed in accordance with the approved RDR/RAWP. Also, the VOCs analysis method was updated from EPA Method 8260B to Method 8260C, in accordance with the latest SW-846 methods established by EPA. Ten wells were sampled during the first three post-injection sampling events and 16 wells were sampled during the November sampling event.

Treatment Area 1 (easternmost area above silty clay)
For several wells representing a major part of Treatment Area 1, total VOC concentrations continued at relatively low levels but tended to increase by the last performance sampling event in November 2015. For ISCO-MW-7, the total VOC concentration above NJGWQS (consisting principally of TCE and 1,2-DCA) was 2 ppb in January 2014 (baseline), 3.6 ppb in March 2015 (baseline) and 5.6 ppb for in November 2015. For well IW1-BT-2, total VOC concentration above NJGWQS was 1.6 ppb in January 2014, 2 ppb in March 2015, and 10.4 ppb in November 2015. However, based on prior monitoring results for IW1-BT-2, the 10.4 ppb result for the November 2015 monitoring event may be a transient effect from the nearby injection work, and is expected to decline over time (a similar concentration trend was noted following Injection Event #1).

In some wells, there were significant reductions in VOC concentration noted between baseline sampling events, but only slight further decreases by the final performance sampling event. For well ISCO-MW-8, total VOC concentration above NJGWQS was reported at 43.8 ppb in January 2014, 6 ppb in March 2015, and a slight decrease to 5.7 ppb in November 2015. This represents an approximate 87% reduction in 1,2-DCA and TCE concentrations from baseline conditions, achieved through the first injection event in February/March 2014 and sustained through November 2015. Similarly, for ISCO-MW-9, the total VOC concentration above NJGWQS was reported at 44 ppb in January 2014, 12.5 ppb in March 2015, and 12.6 ppb in November 2015. This represents an approximate 70% reduction in 1,2-DCA and TCE concentrations from baseline conditions, achieved through the first injection event in February/March 2014 and sustained through November 2015.

For well ISCO-MW-2, a total VOC concentration above NJGWQS of 1,303.8 ppb (predominantly 1,2-DCA) was reported in January 2014, 884.8 ppb in March 2015, and 262 ppb in November 2015. This represents an approximate 80% reduction in 1,2-DCA, TCE, and other VOCs from baseline conditions, achieved through the two injection events. Although there was a strong initial decrease in concentrations following each injection event, nominal increases in concentrations followed. For example, following Injection Event #2, ISCO-MW-2 demonstrated an initial 89% decrease in 1,2-DCA and TCE concentrations (from 840 ppb in March 2015 down to 94.7 ppb in July 2015). The concentrations subsequently increased, fluctuating between approximately 220 ppb and 315 ppb between August and November 2015.

In well ISCO-MW-3, 54.9 ppb of TCE was reported in January 2014, 77.1 ppb in March 2015 and 80.1 ppb in November 2015. Similar to ISCO MW 2, there was a decrease in TCE concentrations following the injection work with a subsequent return to baseline conditions. Cis-1,2-DCE was also detected in the later monitoring events at concentrations just above its respective NJGWQS (70 ppb).

Treatment Area 2 (westernmost area below the silty clay unit)
In the portions of the Treatment Area 2 where no further injection work was completed (e.g., vicinity of PZ-1S, ISCO-MW-1, and ISCO-MW-6), TCE and 1,2-DCA concentrations have remained low (in the range of 2-6 ppb). For well ISCO-MW-1, a total VOC concentration above the NJGWQS of 44.5 ppb was reported in January 2014, 3.6 ppb for March 2015, and 3.6 ppb in November 2015. This represents an approximate 92% reduction in TCE and 1,2-DCA concentrations achieved through the first injection event in February/March 2014 and sustained through November 2015. For PZ-1S, 2 ppb of total VOC was reported for January 2014, 4.4 ppb for March 2015, and 3.9 ppb for the November 2015 sampling event. For ISCO-MW-6, 2 ppb of total VOC was also reported for January 2014, 1.8 ppb for March 2015, and 1.9 ppb for the final November 2015 sampling event.

A second round of injections was completed in the vicinity of ISCO-MW-5. Groundwater monitoring results indicated an initial decrease in 1,2-DCA and TCE concentrations (from 198.3 ppb in March 2015, down to 128.6 ppb in July 2015) followed by a return to approximate pre injection concentrations of 219.6 ppb during the final post injection groundwater monitoring event in November 2015.

Other Water Quality Results
Increased acetone concentrations appear in a number of wells, although not at concentrations that would be of concern relative to its groundwater quality standard (i.e., 6,000 ppb). The minor acetone concentrations detected are a typical by-product of the ISCO process and are also expected to decrease over time. In addition, acetone was not detected in downgradient wells, which supports that the temporary acetone increases appear to be localized to the treatment areas.

While there were initial increases in dissolved chromium concentrations, the trend is downward/neutral (e.g., IW1-BT-2 and ISCO-MW-3). Low-level chromium detections have been identified sporadically in the downgradient wells (e.g., approximately 40 ppb in well MW-10S). However, these detections appear to be relatively close to the treatment area and not likely to migrate any significant distance downgradient. Based on groundwater baseline monitoring results, as well as the first and second rounds of performance sampling to date, chromium concentrations are expected to continue to decrease over time.

Wells located downgradient from the injection areas show no significant migration or mobilization of groundwater constituents from the ISCO treatment areas throughout the ISCO remediation program. ISCO-MW-4 and MW-14S have not shown 1,2-DCA or TCE concentrations above the NJGWQS. The November 2015 results for MW-10S exhibited small increase in 1,2-DCA concentrations (from 1.2 ppb to 14 ppb) most likely due to transient effects from upgradient injection work proximal to ISCO-MW-5.

<u>Groundwater Level and Flow Data</u>
As part of each groundwater sampling event, water-level measurements were collected from each monitoring well. The data collected were used to generate groundwater contour maps for the shallow, and perched aquifers. Groundwater flow direction in the perched aquifer is to the southeast. Groundwater flow direction in the shallow aquifer was consistently to the southwest throughout the post-injection monitoring period. This groundwater flow direction is consistent with previous findings.

Site Inspection

The inspection of the Site was conducted on 11/3/2016. In attendance were John Osolin (USEPA Project Manager), Urszula Filipowicz (USEPA Risk Assessor), Matt Grubb (de maximis), and Jeffrey Levesque (OBG). John Osolin and Lynn Vogel (NJDEP Project Manager) also visited the site on 11/7/2016. The purpose of the inspection was to assess the protectiveness of the remedy.

The inspection determined that the soil cap and grass cover were intact and properly maintained and site fences were in good condition. Observation wells were in good condition, although one required replacement of its lock. It was noted that two temporary vehicle gates would require replacement with fencing to make access more secure from tresspassers. One gate was missing a lock which was replaced during the visit. In addition the site signs were missing. EPA also asked that purgewater found in drums onsite be removed before the winter. Jeffrey Levesque of OBG, agreed that these items would be addressed as soon as possible.

V. TECHNICAL ASSESSMENT

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

A ROD addressing the final remedy for site soils (OU2) was signed in 2008. The OU2 ROD called for excavation and backfilling of four hotspot areas, along with excavation and onsite consolidation of six discontinuous soil areas where contaminants in surface soil were present above direct contact cleanup objectives. These six areas were consolidated and moved to the central portion of the site; a surface cover consisting of soil, and crushed stone was placed over the area in order to prevent direct contact exposures. Further, a geofabric demarcation was placed between the interface of the consolidated contaminated soil and the clean top surface soil. The entire site, with the exception of the asphalted areas and the crushed stone access ways were graded and seeded. ICs in the form of a deed notice were also called for in the ROD. A deed notice was placed on the entire site in December 2004 which restricts the use of the site to non-residential uses, and prohibits digging onsite without NJDEP consent. During the site visit the cap was found to be well maintained with no evidence of burrowing animals or large trees with roots that have the potential to breech the cap, indicating that the cap is functioning as designed.

The final remedy for groundwater was documented in the 2012 OU3 ROD. The selected remedy called for injection of an oxidizing agent to treat groundwater above NJGWQS, post-remediation sampling and an IC in the form of a CEA/WRA to limit future use of site groundwater for potable uses until remediation goals are met. The remedy is progressing toward its remedial goal of restoring the aquifer to beneficial use by reducing the level of VOC-contamination in the local aquifer. Currently, however, contamination levels remain above the NJGWQS in several parts of the aquifer and more time will be required to determine whether the remedy can effectively reduce groundwater contamination to below standards in a reasonable period of time. Additional monitoring is being conducted to determine if additional ISCO injections are warranted.

Additionally, institutional controls consisting of a CEA/WRA have already been established for the Site groundwater during the implementation of the interim groundwater remedy. These institutional controls limit future use of the Site groundwater for potable purposes until RAOs are achieved.

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?

There have been no physical changes to the site that would adversely affect the protectiveness of the remedy. The exposure assumptions and the toxicity values that were used to estimate the potential risks and hazards to human health and ecological receptors followed the general risk assessment practice at the time the risk assessment was performed. Although the risk assessment process has been updated and specific parameters and toxicity values may have changed, the risk assessment process that was used is still consistent with current practice and the need to implement a remedial action remains valid.

The following RAOs were established for on-site soils (OU2): prevent human and ecological (vegetative community) contact with contaminated soil; prevent migration of contaminated soils via surface water runoff and erosion; and minimize or eliminate contaminant migration from soil to the groundwater. The RAOs for onsite soils remain valid and protective of human health and ecological receptors. The current land zoning at the site remains industrial (Special Development [SD3]) which is consistent with the soil cleanup goals selected for the site. The site is currently unoccupied and unused.

Soil cleanup levels were chosen for the site by selecting the lower of NJ's Non-Residential direct contact soil cleanup criteria and EPA's soil Regional Screening Levels (RSLs) for commercial/industrial use. Numerical soil cleanup objectives, as shown in Appendix II Tables 1 and 2 of the 2008 ROD, were compared to current risk-based RSLs for commercial/industrial use. Results of this comparison indicate that the ROD selected cleanup goals remain protective of human health under current and future anticipated land use.

The following RAOs were established for the OU3 groundwater remedy: prevent exposure to contaminated groundwater that presents an unacceptable risk to public health and the environment; remediate groundwater to the extent practicable and minimize the potential for further migration of contaminants in groundwater; restore the groundwater to the NJGWQS within a reasonable timeframe; and minimize or eliminate organic vapor migration from groundwater into potential indoor environments that may be built on the Site. The groundwater RAOs remain valid and protective of human health.

Other than an unoccupied building which houses the interim pump and treat system (for OU1), there are no other buildings onsite. The area immediately downgradient of the site is highly industrialized (currently occupied by a trucking business) and does not contain any slab-on-grade buildings. Based on these considerations, currently the vapor intrusion pathway remains incomplete for the site as there are no occupied buildings onsite or in the immediate vicinity of the site. If in the future, buildings are to be constructed onsite, they will be required to be constructed with an appropriate subslab depressurization system or other vapor mitigation technology to prevent the potential of subsurface vapors from impacting indoor air. To ensure the vapor intrusion pathway remains incomplete in the future, this pathway will continue to be evaluated during each FYR.

The soil cap prevents direct exposure to ecological receptors (vegetative community) and no complete exposure pathways exist and risk has been appropriately addressed.

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:
OU2 -no issues

Issues and Recommendations Identified in the Five-Year Review:

OU(s): 3 Groundwater	**Issue Category:** Monitoring			
	Issue: While the OU3 RA is still ongoing, the current groundwater monitoring indicates groundwater remains above remediation goals in localized areas of the shallow aquifer.			
	Recommendation: Conduct additional monitoring events over the next year to determine if goals will be achieved or additional remediation will required.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA	6/30/2017

OTHER FINDINGS

In addition, the following are items that were identified during the FYR site visit which will improve site security, but do not affect current and/or future protectiveness:

- *One well cover required replacement of the lock;*
- *Missing site sign should be replaced;*
- *Two temporary vehicle gates would require replacement with fencing; and*
- *Purgewater found in drums onsite be removed.*

VII. PROTECTIVNESS STATEMENT

Protectiveness Statement(s)	
Operable Unit: OU2	***Protectiveness Determination:*** Protective
Protectiveness Statement: The Remedy at OU2 is protective of human health and the environment.	

Protectiveness Statement(s)	
Operable Unit: OU3	***Protectiveness Determination:*** Short-term Protective
Protectiveness Statement: The Remedy at OU3 currently protects human health and the environment because there are current receptors to the groundwater. Institutional and engineering controls prevent receptors from drinking or contacting contaminated water. However, in order for the remedy to be protective in the long term, EPA and the responsible parties need to determine what additional remediation activities are needed (e.g., ISCO injections) to achieve RAOs.	

VIII. NEXT REVIEW

The next FYR report for the Evor Phillips Superfund Site is required five years from the completion date of this review.

APPENDIX A – FIGURES

Figure 1 - Site Map

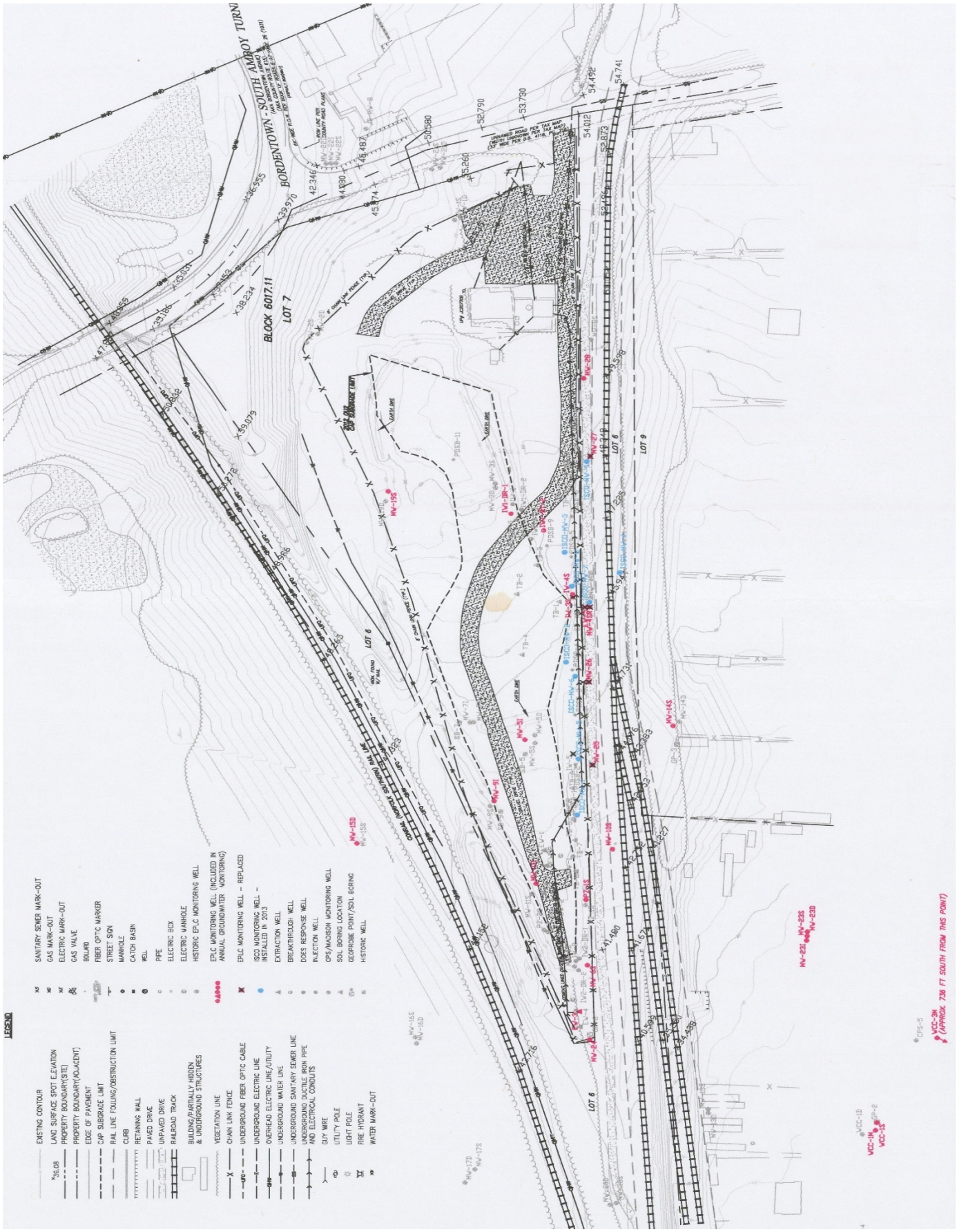


Figure 2 – CEA/WRA Map

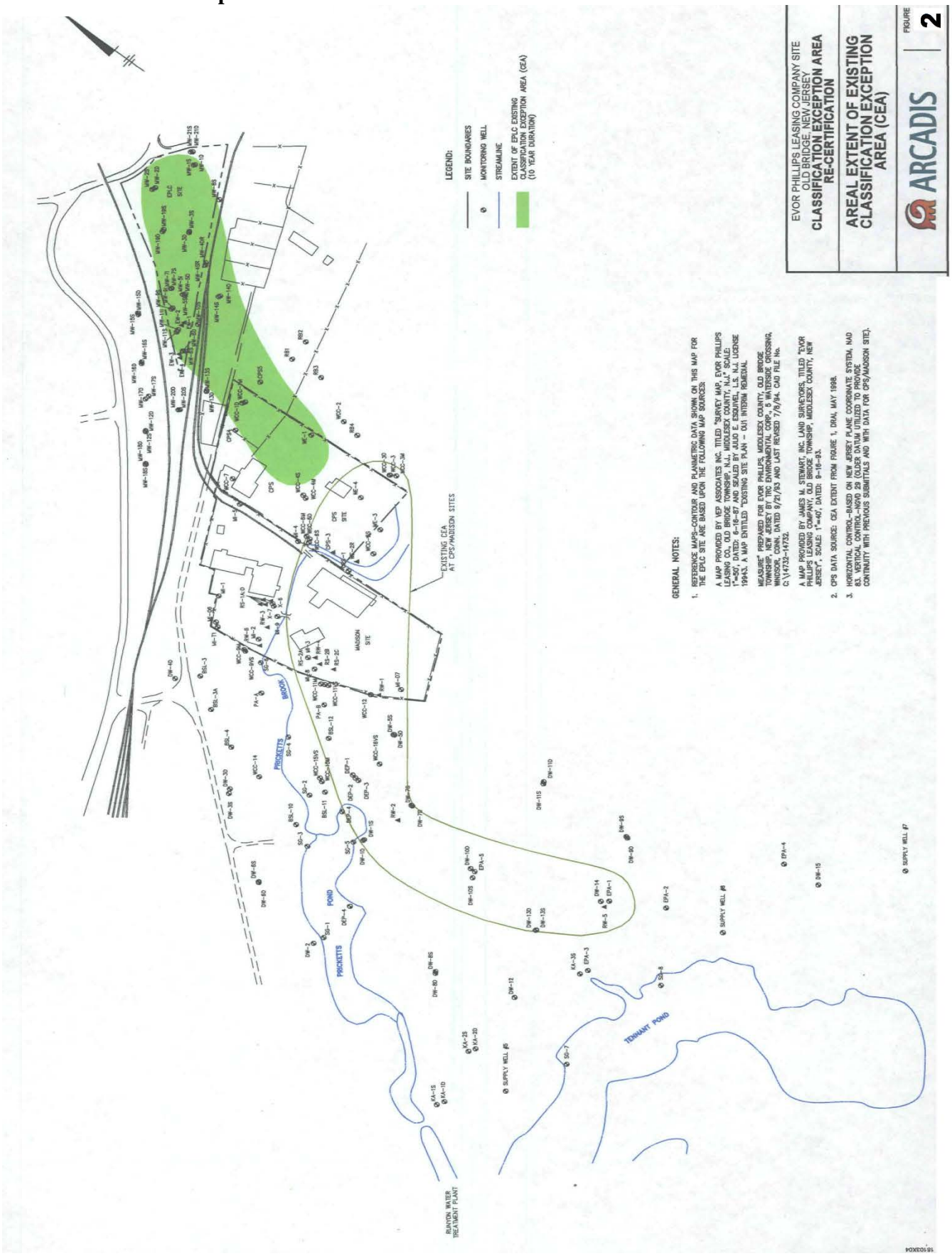
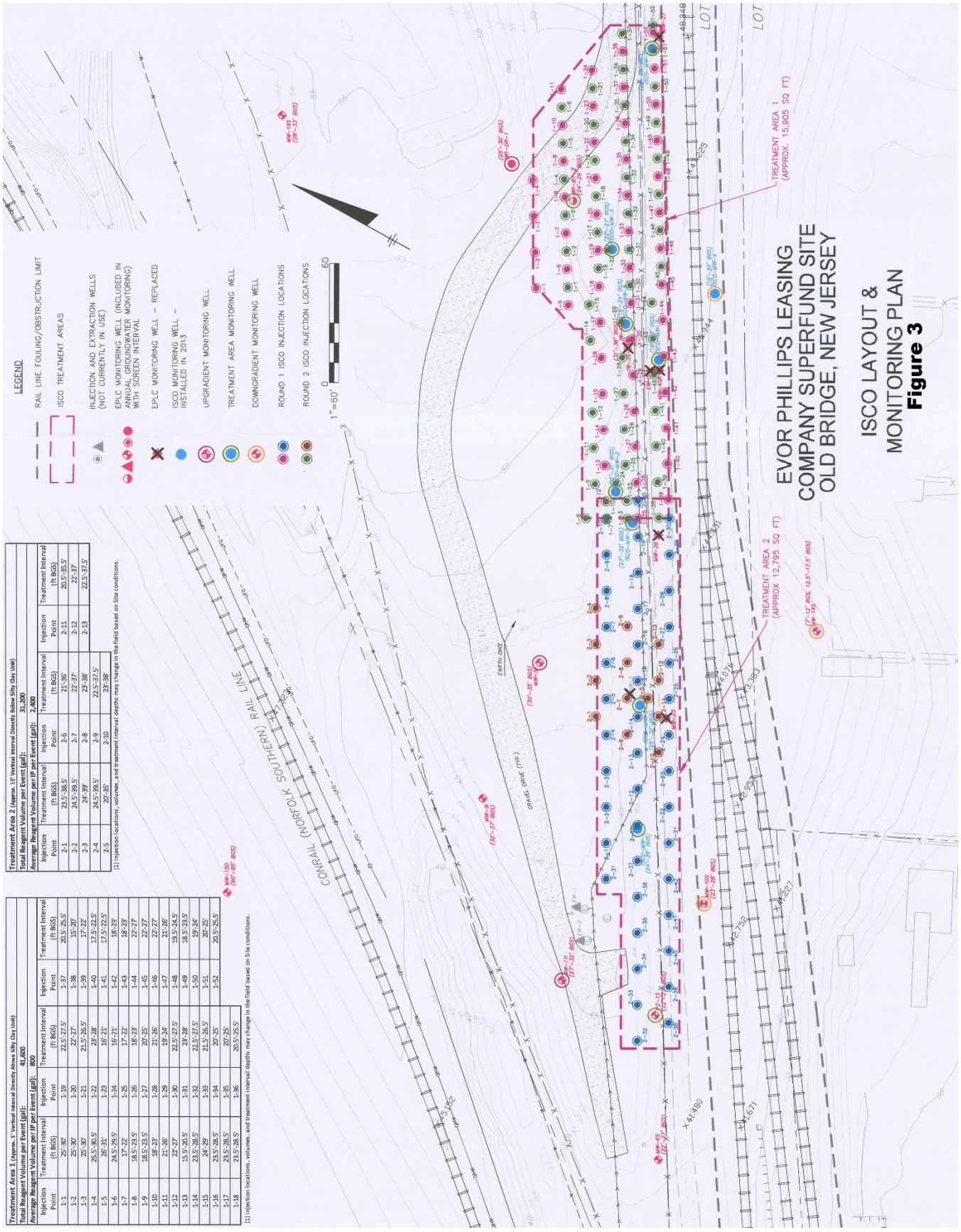


Figure 3 – ISCO Layout



Treatment Area 1 (Approx. 5' Vertical Interval Directly Above Silty Clay Unit)

Total Reagent Volume per Event (gal):	41,600
Average Reagent Volume per IP per Event (gal):	800

Injection Point	Treatment Interval (ft BGS)	Injection Point	Treatment Interval (ft BGS)	Injection Point	Treatment Interval (ft BGS)
1-1	25'-30'	1-19	22.5'-27.5'	1-37	20.5'-25.5'
1-2	25'-30'	1-20	22'-27'	1-38	15'-20'
1-3	25'-30'	1-21	21.5'-26.5'	1-39	17'-22'
1-4	25.5'-30.5'	1-22	23'-28'	1-40	17.5'-22.5'
1-5	26'-31'	1-23	16'-21'	1-41	17.5'-22.5'
1-6	24.5'-29.5'	1-24	16'-21'	1-42	18'-23'
1-7	17'-22'	1-25	17'-22'	1-43	18'-23'
1-8	18.5'-23.5'	1-26	18'-23'	1-44	22'-27'
1-9	18.5'-23.5'	1-27	20'-25'	1-45	22'-27'
1-10	18'-23'	1-28	21'-26'	1-46	22'-27'
1-11	21'-26'	1-29	19'-24'	1-47	21'-26'
1-12	22'-27'	1-30	22.5'-27.5'	1-48	19.5'-24.5'
1-13	15.5'-20.5'	1-31	23'-28'	1-49	18.5'-23.5'
1-14	23.5'-28.5'	1-32	22.5'-27.5'	1-50	19'-24'
1-15	24'-29'	1-33	21.5'-26.5'	1-51	20'-25'
1-16	23.5'-28.5'	1-34	20'-25'	1-52	20.5'-25.5'
1-17	23.5'-28.5'	1-35	20'-25'		
1-18	23.5'-28.5'	1-36	20.5'-25.5'		

(1) Injection locations, volumes, and treatment interval depths may change in the field based on Site conditions.

Treatment Area 2 (Approx. 15' Vertical Interval Directly Below Silty Clay Unit)

Total Reagent Volume per Event (gal):	31,200
Average Reagent Volume per IP per Event (gal):	2,400

Injection Point	Treatment Interval (ft BGS)	Injection Point	Treatment Interval (ft BGS)	Injection Point	Treatment Interval (ft BGS)
2-1	23.5'-38.5'	2-6	21'-36'	2-11	20.5'-35.5'
2-2	24.5'-39.5'	2-7	22'-37'	2-12	22'-37'
2-3	24'-39'	2-8	23'-38'	2-13	22.5'-37.5'
2-4	24.5'-39.5'	2-9	22.5'-37.5'		
2-5	20'-35'	2-10	23'-38'		

(1) Injection locations, volumes, and treatment interval depths may change in the field based on Site conditions.

Figure 4 - ISCO MW-2

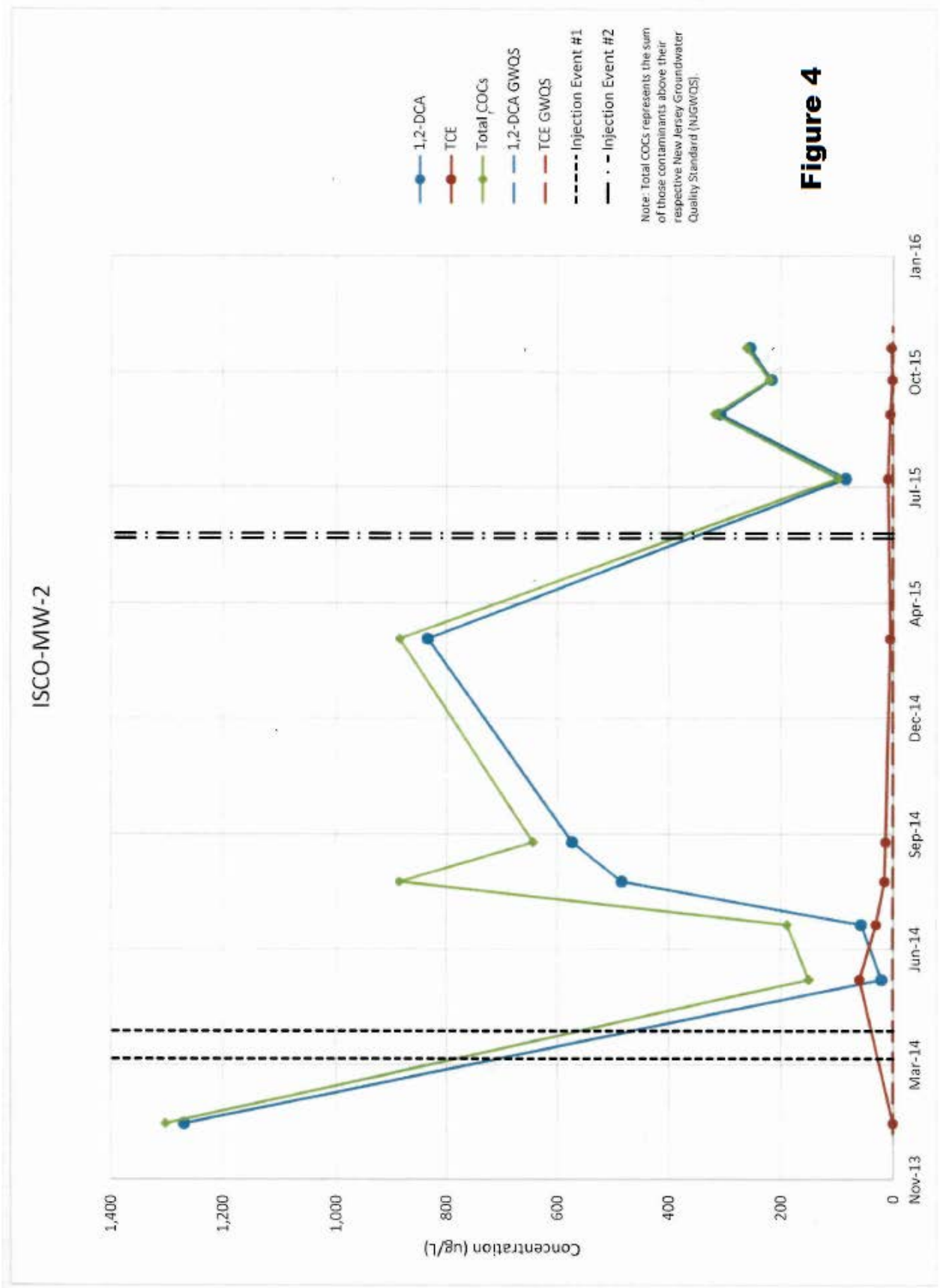


Figure 5 - ISCO MW-3

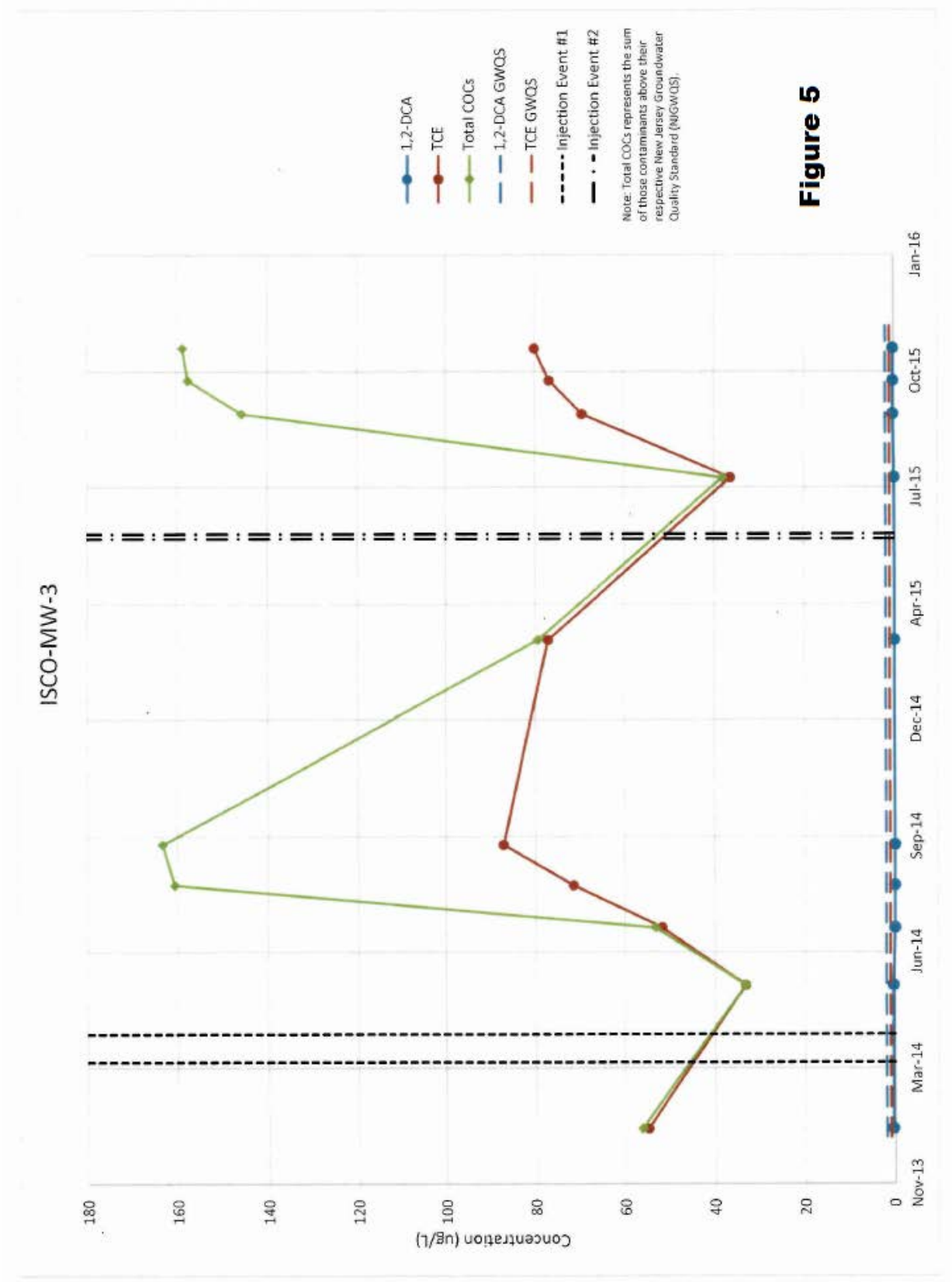
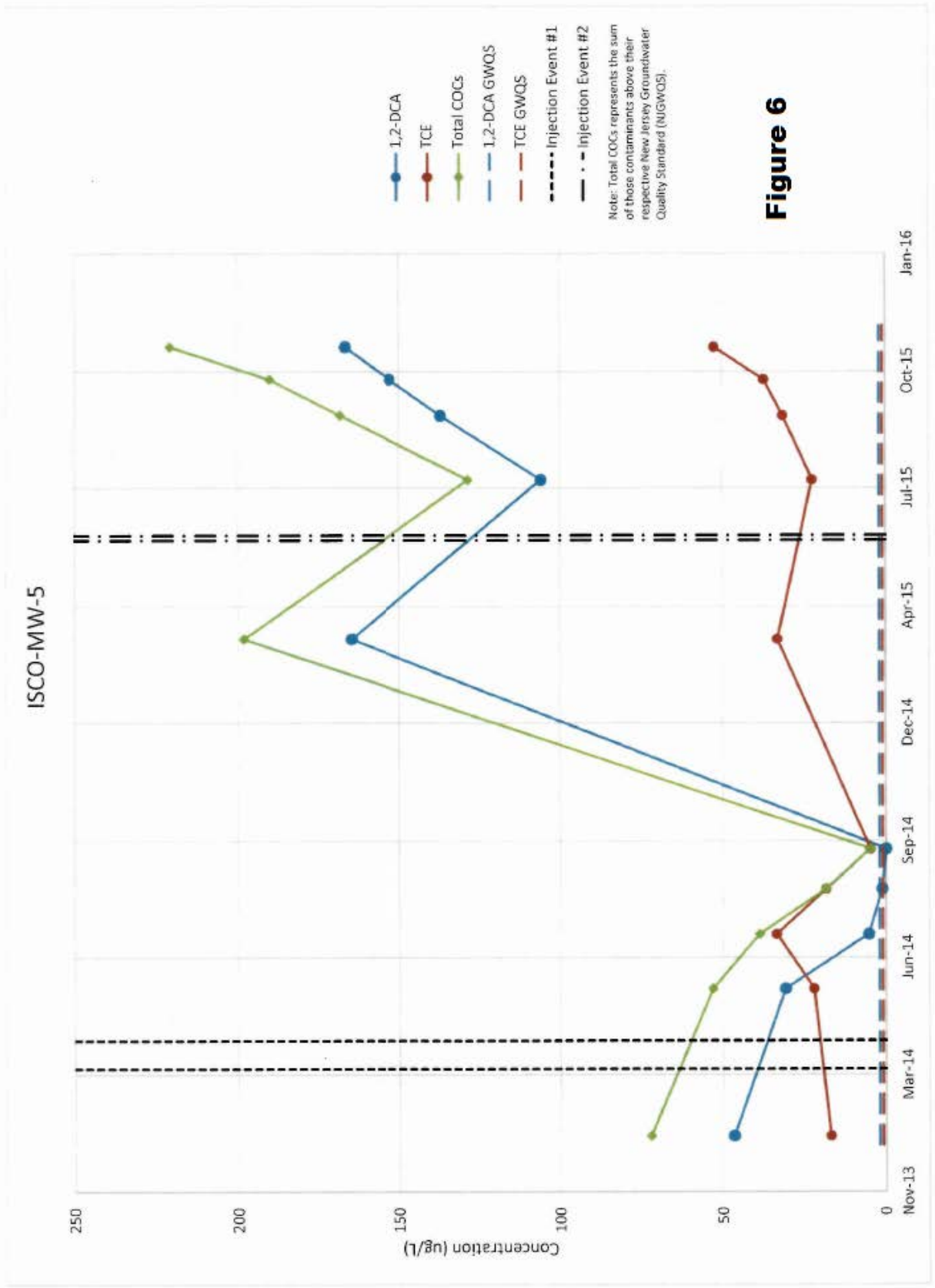


Figure 6 - ISCO MW-5



APPENDIX B - REFERENCE LIST

Document List for Evor Phillips Site 2017 Five Year Review

Record of Decision – Evor Phillips Leasing Company Site, September 30, 1992 (OU1)
Explanation of Significant Differences - Evor Phillips Leasing Company, May 22, 2002
Classification Exception Area - Evor Phillips Leasing Co. February 24, 2003
Deed Notice – (Inst # DE 2004 027403) December 11, 2004
Record of Decision – Evor Phillips Leasing Company Site, September 30, 2008 (OU2)
Record of Decision – Evor Phillips Leasing Company Site, September 10, 2012 (OU3)
2014 Annual Groundwater Monitoring Report - Evor Phillips Leasing Company Site, September 9 2014
Remedial Action OU3 – Injection Event #1/ Post-Injection Monitoring Report, November 21, 2014
2015 Annual Groundwater Monitoring Report - Evor Phillips Leasing Company Site, February 5, 2016
Remedial Action OU3 – Injection Event #2/ Post-Injection Monitoring Report, February 5, 2016