

**MAY 21, 2018**

**2016 ANNUAL GROUNDWATER MONITORING  
REPORT**

**ARKEMA COATING RESINS  
340 RAILROAD STREET  
SAUKVILLE, WISCONSIN 53080  
WDNR FID#: 246004330  
BRRTS #: 02-46-000767**

**ENDPOINT PROJECT No. 341-001-002-005**

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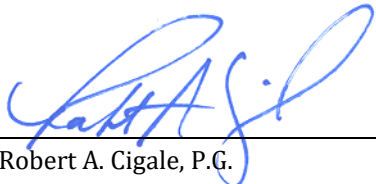
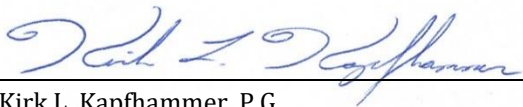
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## GLOSSARY

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AOC	Area of Concern
Arkema	Arkema Coating Resins
BETX	Benzene, Ethylbenzene, Toluene, and Total Xylenes
CCP	CCP Composites US
CMS	Corrective Measures Study
COC	Chain-of-Custody
CVOC	Chlorinated Volatile Organic Compounds
cis-1,2 - DCE	cis-1,2 - Dichloroethene
EDD	Electronic Data Download
Endpoint	Endpoint Solutions Corp.
ES	WAC Chapter NR 140 Enforcement Standard
ft	Feet
Freeman	Freeman Chemical Corporation
gpm	Gallons per Minute
GEMS	Groundwater and Environmental Monitoring System
GWMP	Groundwater Monitoring Plan
MPPE	Macro-Porous Polymer Extraction
µg/kg	Micrograms per Kilogram
µg/L	Micrograms per Liter
msl	Mean Sea Level
PAL	WAC Chapter NR 140 Preventive Action Limit
PCB	Polychlorinated Biphenyl
POTW	Publicly Owned Treatment Works
RC	Ranney Collector
RCRA	Resource Conservation and Recovery Act
Reaction water	Esterification water
RFI	RCRA Facility Investigation
SVE	Soil Vapor Extraction
SVOC	Semi-Volatile Organic Compound
trans-1,2-DCE	trans-1,2-Dichloroethene
1,1,1 - TCA	1,1,1 - Trichloroethane
TCE	Trichloroethene
URS	URS Corp.
USEPA	United States Environmental Protection Agency
VC	Vinyl Chloride
VOC	Volatile Organic Compounds
WAC	Wisconsin Administrative Code
WDNR	Wisconsin Department of Natural Resources
WDWPC	Wisconsin Department of Water Pollution Control
WPDES	Wisconsin Pollutant Discharge Elimination System

## EXECUTIVE SUMMARY

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This Annual Report is to summarize the groundwater data collected during the previous year of sampling at the Arkema Coating Resins (Arkema) Saukville facility (the “Saukville Facility”), discuss any changes to the monitoring network, evaluate the effectiveness of the existing on-site extraction system and determine whether any changes to the monitoring or extraction networks are necessary to maintain control of the contaminants in the subsurface. In July 2011, the ownership of the real property of the Saukville facility was transferred from CCP Composites US (CCP) to Arkema. On December 31, 2015, Arkema idled the Saukville facility, and responsibility for operating and maintaining the groundwater extraction system was transferred to RETIA USA LLC, a legacy site services group owned by Total Petrochemicals (the former owner of CCP).

No changes to the Wisconsin Department of Natural Resources (WDNR) approved 2005 Revised Groundwater Monitoring Plan (GWMP) for the Saukville facility occurred in 2016. A summary of the revised 2005 GWMP is presented below.

### WINTER QUARTER

The Winter quarterly sampling event is performed in January and is limited to the sampling of Municipal Water Supply Well No. 1 (**MW-1**).

### SPRING QUARTER

The Spring quarterly sampling event is performed in April and includes sampling the receptor monitoring points and the perimeter monitoring points, in addition to groundwater elevation measurements from all wells in the monitoring network.

### SUMMER QUARTER

The Summer quarterly sampling event is performed in July and is limited to the sampling of **MW-1**.

### FALL QUARTER

The Fall quarterly sampling event is performed in October and includes sampling the receptor monitoring points, the perimeter monitoring points and the remediation progress points. Groundwater elevation measurements are collected from all wells in the monitoring network.

The following exceptions to the 2005 revised GWMP occurred during the 2016 sampling events.

- During the Fall 2016 sampling event, samples for semi-volatile organic compounds (SVOCs), arsenic and barium could not be collected from shallow dolomite extraction well **W-21A** due to a lack of water, and no sample could be collected from shallow dolomite extraction well W-28 do a lack of water.

Results of the groundwater sampling performed in 2016 indicate that contaminant concentrations are generally consistent with the trends observed during previous years. With the exception of elevated concentrations of benzene, 1,4-dioxane, trichlorofluoromethane, vinyl chloride, barium and bis(2-ethylhexyl)phthalate detected in the sample collected from deep dolomite pumping well

**W-30**, no contaminants were detected in the Municipal Water Supply Wells **MW-1**, **MW-3** and **MW-4** screened in the deep dolomite aquifer.

The groundwater extraction system currently operating at the Arkema Saukville facility was designed to minimize the downward migration of impacts from the glacial drift and shallow dolomite aquifers to the deep dolomite aquifer, and to control the off-site migration of impacts from within the glacial drift, shallow dolomite, and deep dolomite aquifers. Results of the groundwater sampling conducted in 2016 continue to indicate the extraction system is operating as designed.

In 2016, the perimeter monitoring wells remained generally free of detectable concentrations of VOCs. However, impacts from off-site sources continue to be detected in several upgradient perimeter monitoring wells, as well as several on-site monitoring wells. In addition, elevated concentrations of contaminants continue to be detected in the shallow dolomite aquifer along the southern fence line. However, the results from the glacial drift monitoring points along the southern fence line are free of detections.

Groundwater samples collected in 2016 from the on-site remediation progress points continue to indicate that contaminants are effectively being contained on-site and are slowly being removed from the subsurface through the active extraction system.

## 1.0 INTRODUCTION

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Arkema Resin Coatings (Arkema) operated a polyester, acrylic and alkyd resin manufacturing facility located at 340 Railroad Street in Saukville, Wisconsin (the “Saukville facility”). The location of the Saukville facility is depicted on **Figure 1**. In 2011, Arkema purchased the Saukville facility from CCP Composites US (CCP). Although Arkema purchased the Saukville facility, the responsibility for operating and maintaining the groundwater extraction system remained with CCP. Prior to 1991, the Saukville facility was owned and operated by Freeman Chemical Corporation (Freeman). The Saukville facility was initially operated as a cannery until 1949 when Freeman installed resin manufacturing equipment. Alkyd, polyester and urethane synthetic resins have been manufactured at the Saukville facility since 1949. On December 31, 2015, Arkema idled the Saukville facility, and responsibility for operating and maintaining the groundwater extraction system was transferred to RETIA USA LLC, a legacy site services group owned by Total Petrochemicals (the former owner of CCP).

From 1952 to 1968, esterification water (reaction water) produced as a byproduct of the resin manufacturing process was disposed in a dry well formerly located on the western edge of the Saukville facility with approval from the Wisconsin Division of Water Pollution Control (WDWPC). The dry well method of disposal for the reaction water was replaced with an on-site hazardous waste incinerator in 1968, located south of the main office. The original hazardous waste incinerator was replaced in the early 1990’s with a new hazardous waste incinerator east of the existing tank farm. The hazardous waste incinerator was in operation until 2003 when a macroporous polymer extraction (MPPE) system was added to the process to render the hazardous reaction water non-hazardous. The incinerator continued to operate as a non-hazardous incinerator to dispose of the post-MPPE, non-hazardous reaction water, until October 2004. From October 2004 to 2014, reaction water was disposed off-site via deep well injection in Texas after transport by rail.

Three (3) Areas of Concern (AOCs) were identified on the Saukville facility during the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI). The three (3) AOCs are as follows:

### AOC No. 1 – Former Urethane Laboratory/Former Liquids Incinerator Area

The former liquids incinerator was used to dispose reaction water from 1968 to 1989. AOC No. 1 is located on the northeast portion of the Saukville facility in the vicinity of the former solid waste incinerator and the former soil vapor extraction (SVE) system near monitoring well **W-47**. In addition to being identified as an AOC in the Consent Order, AOC No. 1 is also regulated by the Wisconsin Department of Natural Resources (WDNR) under a *Closure Plan Modification (RMT – April 1992)* related to the former hazardous waste incinerator.

### AOC No. 2 – Former Dry Well

The former dry well was used from approximately 1952 through 1968 to dispose of reaction water as approved by the WDWPC. AOC No. 2 is located in the west-central portion of the Saukville facility near monitoring well **W-06A**.



### AOC No. 3 – Former Tank Farm Storage Area

A tank farm consisting of an earthen berm utilized for the storage of raw materials and finished product formerly occupied this area. AOC No. 3 is located near the center of the Saukville facility to the east and south of the existing non-hazardous liquid waste incinerator, in the vicinity of the existing concrete tank farm.

The existing layout of the Saukville facility, including the location of monitoring points and AOCs, is depicted on the Existing Site Layout included as **Figure 2**.

In compliance with the 1987 Corrective Action Order on Consent (Docket #V-W-88-R-002), October 19, 1987, 3008h order for RCRA, quarterly groundwater monitoring is required to be performed and reported for specific wells. RETIA USA LLC retains the obligation to remediate the site as determined in the Consent Order.

Groundwater samples were collected and submitted to Synergy Environmental Lab Inc. under standard chain-of-custody (COC) procedures by Endpoint Solutions Corp. (Endpoint) personnel for all 2016 sampling events. The field data and results were compiled by Endpoint. All results were submitted on a quarterly basis to the WDNR. Exceedances of the Wisconsin Administrative Code (WAC) Chapter NR 140 Preventive Action Limits (PALs) and Enforcement Standards (ESs) were reported quarterly in accordance with WAC Chapter NR 508. This report was prepared to summarize the results of the groundwater monitoring during the 2016 calendar year and to compare the results from the 2016 sampling events with those from previous years.

## 2.0 PURPOSE AND SCOPE

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This document presents a summary of the data collected during the quarterly, semi-annual and annual groundwater sampling events conducted during 2016, and provides an evaluation of the historical groundwater elevation and quality trends at the Saukville facility. The water quality data has been submitted to the WDNR in the quarterly reports. Additionally, electronic data downloads (EDDs) of the analytical data are submitted to the WDNR Bureau of Waste Management Groundwater and Environmental Monitoring System (GEMS) on a quarterly basis. Copies of the analytical result summary tables created for each of the quarterly events in 2016 are included in **Appendix A**.

The contents of this report include the following:

- A summary of the site groundwater monitoring program, and contaminant concentrations by wells;
- Isoconcentration maps for select contaminants in groundwater in the glacial drift and shallow dolomite units;
- Time versus concentration plots of selected volatile organic compounds (VOCs) in groundwater in selected wells;
- An evaluation of the trends in groundwater quality for each of the monitoring groups;
- An evaluation of the effectiveness of the containment of the groundwater impacts by the on-site groundwater extraction system, based on groundwater flow and quality data; and,
- An estimate of the total VOC mass removed by the extraction system since 1992.

## 3.0 SITE HYDROGEOLOGY

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### 3.1 DESCRIPTION OF HYDROGEOLOGIC UNITS

The geology at the Saukville facility has been divided into three (3) distinct hydrogeologic units. These units include the unconsolidated glacial drift deposits, the shallow dolomite unit consisting of the Silurian dolomite to approximately 100 feet below the ground surface (ft bgs), and the deep dolomite unit consisting of Silurian dolomite between approximately 100 ft and 600 ft bgs. A detailed description of the three (3) units is provided below.

#### 3.1.1 GLACIAL DRIFT

The glacial drift unit consists of a complex succession of fill and glaciolacustrine deposits that is underlain by a glacial till. The materials that compose this unit have been extensively used as fill at the Saukville facility. Both the till and the glaciolacustrine deposits are considered to be part of a partially confining hydrostratigraphic unit.

The total thickness of the glacial drift varies between 10 ft and 30 ft in the vicinity of the Saukville facility, but the glacial drift is generally on the order of 10 ft thick beneath the Saukville facility. Glaciolacustrine deposits are up to 20 ft thick on the western side of the Saukville facility, and consist of interbedded sands, silts and clays. The clay is soft to medium hard, gray, and plastic to slightly plastic. Between five (5) ft and 25 ft of glacial till is present beneath the eastern side of the Saukville facility. The till is composed of interbedded silty sands and sandy gravel. The sandy gravel varies from loose to very dense, is brown to gray, and is typically well-graded.

The stratigraphic order of the deposits from the ground surface is generally sand and silt overlying a laterally continuous layer of laminated silt and clay (glaciolacustrine deposits) above dense clay (glacial till). A thin layer of sand and gravel (glacial outwash) lies between this till unit and bedrock.

#### 3.1.2 SHALLOW DOLOMITE

The glacial deposits are unconformably underlain by fractured, thin- to massive-bedded Silurian dolomite, with a total thickness of approximately 600 ft in the area, which includes the deep dolomite aquifer.

The uppermost 100 ft of the Silurian dolomite in the Saukville area tends to have a lower permeability than the underlying deep dolomite aquifer. Occasionally, transmissive zones are encountered in the shallow dolomite, such as at monitoring well **W-24A**, which extracts groundwater at 40 gallons per minute (gpm) and yet shows little drawdown.

#### 3.1.3 DEEP DOLOMITE

The deep dolomite aquifer is defined as the Silurian dolomite from approximately 100 ft to 600 ft bgs. The dominant lithology in the deep dolomite aquifer in the Saukville area is the Racine Formation. Municipal wells in the vicinity of the Saukville facility are typically cased to approximately 100 ft bgs, and are completed in the Silurian dolomite to depths in the range of 450 ft to 550 ft bgs.

Several solution features have been identified in the dolomite beneath the Saukville facility. An apparent sinkhole, filled with glacial deposits, which extends to a depth of approximately 200 ft bgs, was encountered on the eastern edge of the Saukville facility during the installation of wells **W-3A**, **W-3B**, and **W-20**. The aerial extent of the sinkhole was further defined based on the seismic refraction survey performed by Minnesota Geophysical Associates. Further evidence of the karstic features includes solution enlarged joints in the dolomite observed during the borehole video logging of deep pumping well **W-30**. These observations, coupled with the hydraulic response of the aquifer during pumping tests in Saukville, suggest that groundwater flow in the Silurian dolomite is primarily fracture controlled in the vicinity of the Saukville facility.

### **3.2 GROUNDWATER LEVELS AND FLOW PATTERNS IN 2016**

Groundwater levels in the monitoring wells were measured prior to purging and sampling during the Spring and Fall sampling events. **Table 1 – 2016 Summary of Groundwater Level Measurements** presents a summary of the water level measurements collected in 2016. The water level data collected in 2016 was used to develop water table maps for the glacial drift unit, and potentiometric surface maps for the shallow and deep dolomite units. These maps were created using groundwater elevation data from the Fall 2016 sampling event and are attached as **Figure 3** and **Figure 4**.

Groundwater elevations on-site are influenced by the groundwater extraction systems active at the Saukville facility. A total of nine (9) glacial drift wells, four (4) shallow dolomite wells, and one (1) deep dolomite well are actively pumped to contain the extent of impacts. **Table 2 – 2016 Summary of Well Running Times and Volume Removed**, provides a summary of the monthly pump running times and an estimate of the volume of groundwater removed by each well during 2016. A review of the estimated volumes removed indicates that the majority of groundwater extraction during 2016 occurred in the deep dolomite unit. Approximately 131,400,000 gallons of groundwater were removed from the deep dolomite aquifer through near-continuous pumping of **W-30**. Due to the shutdown of production at the Saukville facility, the discharge from **W-30** is no longer needed for non-contact cooling water (NCCW). Therefore, the pumping rate has been reduced to approximately 250 gallons per minute (gpm). An additional 2,216,943 gallons of groundwater were removed from the glacial drift aquifer, and 3,173,928 gallons of groundwater were removed from the shallow dolomite aquifer during 2016. In total, approximately 136,790,871 gallons of groundwater were removed from the glacial, shallow dolomite and deep dolomite aquifers at the Saukville facility in 2016. With the exception of the groundwater extracted from deep dolomite well **W-30**, all extracted groundwater is discharged to the Saukville publicly-owned treatment works (POTW). Groundwater extracted from the deep dolomite aquifer is discharged to the Milwaukee River via Outfall 001 under limits imposed by the Wisconsin Pollutant Discharge Elimination System (WPDES) permit.

In order to evaluate the continued effectiveness of the on-site groundwater extraction system, annual pump run times and volume removal rates were evaluated. A summary of the trends observed are as follows.

## Glacial Drift Unit

Extraction Point	Hours	Gallons
W-31	5.3	22
W-32	5.1	21
W-33	12.8	54
W-34	579.0	2,432
W-35	8.6	36
RC-1	1,105.7	199,026
RC-2	8,897.3	1,601,514
RC-3	2,299.1	413,838

## Shallow Dolomite Unit

Extraction Point	Hours	Gallons
W-21A	253.0	30,360
W-24	1,178.7	2,828,880
W-28	5.8	696
W-29	436.1	313,992

**Appendix B** includes plots of Pump Run Time Trends from 1992 – 2016.

### 3.2.1 GROUNDWATER ELEVATION TRENDS

Groundwater elevation trends from 1995 to 2016 were also evaluated as part of this Annual Report. The water levels tend to follow a general trend where increases are observed during the Spring and Summer quarters and decreases are observed during the Fall and Winter quarters. The water level measurements continue to indicate that dewatering of the on-site glacial deposits is occurring, there is convergent flow within the shallow dolomite unit towards the extraction wells, and the on-site extraction system is controlling off-site migration of groundwater in the glacial drift.

### 3.2.2 GLACIAL DRIFT HYDROGEOLOGIC UNIT

Monitoring well **W-20** is constructed as a piezometer within the glacial drift present in the sinkhole identified in the northeast corner of the Saukville facility, and the hydraulic head within this well is representative of groundwater flow in the shallow dolomite unit. Therefore, water levels from monitoring well **W-20** were not used to construct the water table maps, but have been used to construct the potentiometric surface maps for the shallow dolomite unit.

The water table occurs in the glacial drift unit. The water table beneath the Saukville facility generally slopes from the southwest to the northeast, towards the Milwaukee River. However, on-site shallow groundwater flow is diverted towards the Ranney Collectors and the active on-site extraction network.

### 3.2.3 SHALLOW DOLOMITE UNIT

The piezometers constructed at the Saukville facility have been completed at varying depths in the dolomite. The shallow dolomite and deep dolomite are typically mapped as one (1) unit. In general, the potentiometric surface in the shallow and deep dolomite aquifers indicate a steep cone of depression in the vicinity of deep dolomite well W-30. The continuous pumping at deep dolomite well W-30 appears to have dewatered the shallow dolomite in the vicinity of shallow dolomite extraction well W-28. The influence of pumping W-30 appears to extend approximately over 50% of the Arkema facility, as well as the adjoining Saukville Feed Mill and JT Roofing properties to the west.

### 3.2.4 DEEP DOLOMITE UNIT

Well **W-30** has a bottom elevation of approximately 215 ft above mean sea level (amsl), and was previously utilized to provide NCCW extracted from deep dolomite unit. Since production at the Saukville facility ceased at the end of 2015, the pumping rate of **W-30** has been reduced to approximately 250 gpm. Based on the results of the groundwater modeling conducted during the RFI, groundwater flow in the deep dolomite unit in the Saukville area is towards well **W-30**, and the three (3) existing off-site Saukville municipal water supply wells (**MW-1**, **MW-3** and **MW-4**). Only one (1) on-site data point (W-30) is available to document flow direction in the deep dolomite unit. Therefore, there is insufficient data to prepare potentiometric surface maps for the deep dolomite unit. However, groundwater on the Saukville facility exhibits a strong downward flow from the glacial deposits and the shallow dolomite unit to the deep dolomite unit due to the continuous pumping of well **W-30**. At all three (3) of the glacial drift/shallow dolomite nested pairs (W-18/W-22, W-43/W-38 and W-16A/W-40), the groundwater elevation in the glacial drift wells is five (5) to 11 feet higher than the groundwater elevation measured in the paired shallow dolomite wells.

## 3.3 GROUNDWATER GRADIENTS

### 3.3.1 HORIZONTAL GRADIENTS

#### 3.3.1.1 GLACIAL DRIFT AQUIFER

In 2016, the groundwater in the glacial drift aquifer flowed eastward with a horizontal gradient of 0.019. According to information included in the *Site Conditions and Construction Report* (Hatcher Incorporated – February 15, 1988), the permeability of the glacial deposits was measured to range between  $1.2 \times 10^{-8}$  to  $5.5 \times 10^{-8}$  centimeters per second (cm/sec).

#### 3.3.1.2 SHALLOW DOLOMITE AQUIFER

In 2016, the groundwater in the shallow dolomite unit exhibited convergent flow towards deep dolomite pumping well W-30. The gradient appears much steeper to the west of W-30 as compared to the east, based on the natural west to east flow in the dolomite aquifers. The hydraulic gradient ranged from 0.44 to the west of W-30 to 0.30 to the east of W-30. According to information included in the *Site Conditions and Construction Report* (Hatcher Incorporated – February 15, 1988), the natural potentiometric gradient in the dolomite aquifer was 0.0125 from the center of the Arkema facility to the Milwaukee River prior to the onset of pumping from the extraction system and deep dolomite well.

### 3.3.2 VERTICAL GRADIENT

The vertical gradient between the glacial drift and shallow dolomite aquifers was calculated using the groundwater elevations measured in nested pairs during the Fall 2016 sampling event.

Glacial Drift		Shallow Dolomite		Gradient	
Well ID	Water Elevation	Well ID	Water Elevation	Downwards	Upwards
W-18A	768.01	W-22	761.76	0.15	
W-43	764.37	W-38	753.95	0.29	
W-16A	759.14	W-40	754.63	0.16	
W-3B	743.81	W-3A	743.48	0.00	
W-49	756.29	W-50	752.71	0.19	
W-51	760.49	W-52	751.68	0.44	
AVERAGE				0.21	

Hydrogeologic calculations are summarized in **Appendix C**.

## 4.0 GROUNDWATER MONITORING PROGRAM

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### 4.1 PROGRAM DESCRIPTION

The groundwater monitoring network at the Saukville facility includes 46 monitoring points consisting of 21 glacial drift wells, 14 shallow dolomite wells, five (5) deep dolomite wells, three (3) RCs, and three (3) sample points at the Village of Saukville POTW. The monitoring points are further grouped according to four (4) sampling objectives: receptor points, perimeter monitoring points, remediation progress points, and groundwater elevation monitoring points. The organization of the monitoring wells by monitoring objective is summarized in **Table 3 – Modified Groundwater Monitoring Plan Summary**.

Receptor monitoring points include three (3) municipal water supply wells (**MW-1**, **MW-3**, and **MW-4**), POTW influent, effluent, and sludge, and three (3) RCs. The RCs are essentially French drains which intercept shallow groundwater and discharge to the sanitary sewer system. The receptor monitoring points are sampled semi-annually during the Spring and Fall quarterly sampling events. Municipal water supply well **MW-2** was abandoned by CCP in November 2004 following transfer of the **MW-2** property from the Village of Saukville to CCP. At the request of the Village of Saukville, Municipal water supply well **MW-1** is sampled on a quarterly basis.

Perimeter monitoring points include monitoring wells which are located both on-site and off-site at, or beyond, the edge of the extent of the VOC impacts. These monitoring points provide necessary information to define the extent of the plume. The perimeter monitoring points are sampled semi-annually during the Spring and Fall sampling events.

Remediation progress points are monitoring wells and extraction wells located within the area of impacts. These wells provide an indication regarding the effectiveness of the on-site extraction wells. The remediation progress points are sampled annually during the Fall sampling event.

Each of the monitoring points is also grouped based on hydrogeologic unit monitored. The hydrogeologic units monitored at the Saukville facility include: glacial drift; shallow dolomite; and deep dolomite units. This subdivision allows for more effective evaluation of the on-site groundwater flow and quality trends.

### 4.2 CHANGES IN MONITORING NETWORK

Since the onset of the monitoring program, three (3) monitoring points have been abandoned. Monitoring wells **W-25** (shallow dolomite) and **W-37** (glacial drift) were abandoned due to damage to the wells from nearby construction projects. Municipal water supply well **MW-2** (deep dolomite) was abandoned following transfer of ownership from the Village of Saukville to CCP in 2004. These wells have not been replaced since the remaining monitoring network is providing sufficient data for plume assessment.

In July 2005, the WDNR approved a revised GWMP for the Saukville facility. The revised GWMP reflected the abandonment of the two (2) perimeter monitoring points (**W-25** and **W-37**), the abandonment of the Village water supply well (**MW-2**), the addition of five (5) new perimeter



monitoring points (W-49, W-50, W-51, W-52 and W-53), and historical concentration trends for the existing monitoring network.

#### 4.3 SAMPLING SCHEDULE

**Table 3 – Modified Groundwater Sampling Plan Summary** presents the sampling schedule that was developed as part of the revised GWMP, submitted to, and approved by the WDNR, along with the analytical methods used each quarter. The methods and associated parameters are listed in **Table 4 – Summary of Analytes and Methods**. The analytical testing was performed by Synergy Environmental Lab located in Appleton, Wisconsin (WI Certification # 445037560). The following methods were used to analyze the submitted samples:

VOC	SW846 8260B
Semi-Volatile Organic Compounds (SVOC)	SW846 8270C
Metals	SW846 6020
Polychlorinated Biphenyls (PCBs)	SW846 8081

## 5.0 GROUNDWATER QUALITY

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### 5.1 VOC SAMPLING RESULTS

The tabulated results of the VOC concentrations in each well and the supporting laboratory data were presented in each of the four (4) quarterly reports. Copies of the result summary tables included in each of the quarterly reports are attached in **Appendix A**.

The individual detected VOCs in the glacial drift, and the shallow dolomite unit for 2016 are depicted on **Figure 5 – VOC Detections - Glacial Drift Aquifer – Fall 2016** and **Figure 6 – VOC Detections - Shallow and Deep Dolomite Aquifers – Fall 2016**. A discussion of the VOC detections during 2016 follows.

#### 5.1.1 MUNICIPAL WATER SUPPLY WELLS

Results of the groundwater samples collected from the Municipal Water Supply Wells during 2016 were as follows:

- Winter 2016 – No VOCs were detected in the sample collected from municipal well **MW-1**, the blind duplicate or the associated trip blank.
- Spring 2016 – No VOCs were detected in any of the samples collected from the three (3) municipal wells (**MW-1, MW-3 and MW-4**), the blind duplicate sample or the associated trip blank.
- Summer 2016 – No VOCs were detected in the sample collected from municipal well **MW-1**, the blind duplicate or the associated trip blank.
- Fall 2016 – No VOCs were detected in any of the samples collected from the three (3) municipal wells (**MW-1, MW-3 and MW-4**), the blind duplicate sample or the associated trip blank.

#### 5.1.2 POTW

Samples were collected from the Village of Saukville POTW during the Spring and Fall 2016 sampling events per the revised GWMP. Samples were collected from the **POTW-Influent, POTW-Effluent** and the **POTW-Sludge** and submitted for VOC analysis. During 2016, the total VOC concentration in the **POTW-Influent** ranged between 15.21 micrograms per liter ( $\mu\text{g/L}$ ) during the Spring 2016 sampling event and 46.65  $\mu\text{g/L}$  during the Fall 2016 sampling event. Individual constituents detected in the **POTW-Influent** samples included: acetone during both sampling events; methylene chloride during the Spring sampling event and ethylbenzene, toluene and xylenes during the Fall sampling event.

VOCs were not detected in the **POTW-Effluent** samples collected during the 2016 Spring and Fall sampling events.

The total VOC concentration in the **POTW-Sludge** samples ranged from non-detect during the Fall sampling event to 450  $\mu\text{g/L}$  during the Spring sampling event, consisting entirely of toluene. Both of the **POTW-sludge** samples were diluted 1,000 times due to the presence of high organics.

### 5.1.3 RANNEY COLLECTORS

Ranney Collectors are wells with horizontal slotted stainless-steel pipes that stretch out like spider legs (French Drains) and drain water from soil by gravity to the center well casing where the pump is located. The approximate layout of each of the RC legs are depicted on **Figure 2** through **Figure 15**. All three (3) Ranney Collectors were sampled during both the Spring and Fall sampling events.

- **RC-1** – The samples collected from Ranney Collector **RC-1** contained 80.60 µg/L total VOCs in the sample collected during the Fall 2016 sampling event to 4,957 µg/L total VOCs in the sample collected during the Spring 2016 sampling event. Both samples contained elevated concentrations of cis-1,2-dichloroethene and vinyl chloride. The sample collected during the Fall 2016 sampling event also contained elevated concentrations of trichloroethene (TCE) and trans-1,2-dichloroethene. The sample collected during the Spring 2016 sampling event contained elevated concentrations of benzene, ethylbenzene, toluene and xylenes. Ranney Collector **RC-1** is located on the eastern portion of the Saukville facility and collects groundwater to the east of AOCs 1 and 3.
- **RC-2** – No VOC constituents were detected in the samples collected from Ranney Collector **RC-2** during the Spring and Fall 2016 sampling events. Ranney Collector **RC-2** is located in the southwest corner of the Saukville facility with a single leg which extends to the north along the west side of AOC 2.
- **RC-3** – Total VOC concentrations in the samples collected from Ranney Collector **RC-3** ranged between 3,335 µg/L during the Spring 2016 sampling event to 9,568.2 µg/L during the Fall 2016 sampling event. Both samples contained elevated concentrations of ethylbenzene, toluene and xylenes. The sample collected during the Fall 2016 sampling event also contained an elevated concentration of benzene. Ranney Collector **RC-3** is located near the center of the Saukville facility with legs which extending to the east and southwest of AOC 1 and to south in between AOCs 2 and 3.

### 5.1.4 DETECTED CONTAMINANTS IN THE GLACIAL DRIFT UNIT

The distribution of VOCs detected in the glacial drift aquifer in 2016 is depicted on **Figure 5 – VOC Detections - Glacial Drift Aquifer – Fall 2016**. Monitoring points in the glacial drift unit include the following:

#### Perimeter Monitoring

- **W-01A, W-03B, W-04A, W-08R, W-16A, W-27, W-49 and W-51.**

#### Remediation Progress

- **W-06A, W-19A, W-41, W-42, W-43 and W-47.**

As discussed in **Section 3.2.2**, monitoring well **W-20** is completed in the glacial drift deposit within the sinkhole in the shallow dolomite unit, and therefore, the results obtained from **W-20** are more representative of the water quality in the shallow dolomite aquifer. Isoconcentration contours in the glacial drift unit do not include total VOC concentrations in the RCs. The RC samples are

composite groundwater samples that are collected from broad areas of the Saukville facility through radial collection lines.

The distribution of VOCs in the groundwater in the glacial drift in 2016 is generally similar to the distribution observed in the past. In general, the impacts observed in the glacial drift aquifer are closely related to the three (3) on-site AOCs. Exceedances for benzene, ethylbenzene, toluene and total xylenes are primarily located in AOCs Nos. 1 and 2.

Chlorinated VOCs (CVOCs), primarily in the form of TCE, 1,2-dichloroethene (cis- and trans-) and vinyl chloride, were detected in the groundwater samples collected from glacial drift wells **W-19A** and **W-27**. TCE was detected at concentrations of 16.5 µg/L to 36 µg/L in the samples collected from **W-27** during the Spring 2016 and Fall 2016 sampling events, respectively. TCE was detected at a concentration of 30.2 µg/L in the sample collected from **W-19A** during the Fall 2016 sampling event. Both of these wells are located hydrogeologically upgradient of the Saukville facility. These results continue to indicate an off-site, upgradient source of the CVOC impacts. Currently, a site investigation is underway on the adjacent property to the west (the former Northern Signal property) to evaluate the character and extent of CVOC impacts in the soil and groundwater beneath that site.

#### *5.1.4.1 PERIMETER MONITORING GROUP – GLACIAL DRIFT*

In general, VOC concentrations in the glacial drift perimeter monitoring wells have not changed significantly since 1995. No detectable VOC constituents were reported in the samples collected from the following glacial drift monitoring well in 2016:

**W-01A, W-03B, W-04A, W-08R, W-16A, W-49 and W-51.** These monitoring points are located either on the Saukville facility or hydrogeologically downgradient of the Saukville facility.

The following provides a discussion of the character and concentration of contaminants detected in glacial drift monitoring wells sampled in 2016.

#### W-27

Samples collected from upgradient glacial drift monitoring well **W-27** during the Spring and Fall sampling events both contained elevated concentrations of TCE and cis-1,2-dichloroethene. The concentrations of trichloroethene detected in the samples collected during the Spring and Fall sampling events both exceeded its ES.

It should be noted, perimeter monitoring point **W-27** is located upgradient of the Saukville facility on the JT Roofing (former Laubenstein Roofing and Northern Signal) property. CVOCs have never been utilized at the Saukville facility. However, a chlorinated solvent degreasing pit was historically located at the former Northern Signal site in the general vicinity of perimeter monitoring point **W-27**.

According to information contained on the WDNR Bureau of Remediation and Redevelopment Tracking System (BRRTS) online database, the Northern Signal/Laubenstein Property is identified as a closed environmental repair program (ERP) site (BRRTS # 02-46-535604). However, as of

November 2, 2016, WDNR did not approve the Site Investigation report and requested additional investigation. It should be noted that there is also an open leaking underground storage tank (LUST) case at the JT Roofing property (BRRTS # 03-46-218762). The WDNR indicates that diesel fuel has impacted the soil and fractured bedrock.

#### 5.1.4.2 REMEDIATION PROGRESS GROUP

Six (6) glacial drift remediation progress wells (**W-6A**, **W-19A**, **W-41**, **W-42**, **W-43** and **W-47**) are sampled annually during the Fall sampling event. In general, these wells are located on the Saukville facility within the AOCs. However, **W-19A** is located hydrogeologically upgradient of the Saukville facility on the JT Roofing property.

Overall, contaminant concentrations in the glacial drift remediation progress wells have been relatively stable since 1995, with annual variance in the range of a standard deviation. Remediation progress points are sampled once annually during the Fall sampling event. A discussion of the specific contaminant concentrations observed in the glacial drift remediation progress wells during 2016 is as follows.

- The groundwater sample collected from glacial drift remediation progress monitoring well **W-06A** during the Fall 2016 sampling event contained the highest detectable concentrations of total xylenes (96,800 µg/L), toluene (37,000 µg/L) and ethylbenzene (22,200 µg/L). In addition, the groundwater sample collected from glacial drift remediation progress monitoring well **W-06A** during the Fall 2016 sampling event contained detectable concentrations of arsenic (41.6 µg/L), barium (52.5 µg/L), acetophenone (31 µg/L), 4-chloro-3-methylphenol (8.4 µg/L), cresol (88 µg/L), 2,4-dimethylphenol (146 µg/L), naphthalene (9.8 µg/L) and phenol (20.8 µg/L). The concentrations of total xylenes, toluene, ethylbenzene and arsenic exceeded their respective ESs. Glacial drift remediation progress monitoring well **W-06A** is located along the west fence of the Saukville facility within AOC 3.
- As previously discussed, the groundwater sample collected from glacial drift remediation progress point **W-19A** during the Fall 2016 sampling event contained detectable concentrations of cis-1,2-dichloroethene (30.6 µg/L), TCE (30.2 µg/L), trans-1,2-dichloroethene (1.45 µg/L) and vinyl chloride (1.26 µg/L). The concentrations of TCE and vinyl chloride exceeded their respective ESs while the concentration of cis-1,2-dichloroethene exceeded its PAL. Glacial drift remediation progress point **W-19A** is located to the west of the Saukville facility on the adjoining JT Roofing (former Northern Signal) property and is hydrogeologically upgradient to the Saukville facility.
- The groundwater sample collected from glacial drift remediation progress monitoring point **W-41** during the Fall 2016 sampling event contained detectable concentrations of total xylenes (5.4 µg/L) and benzene (1.6 µg/L). The concentrations of benzene exceeded its PAL. Glacial drift remediation progress monitoring point **W-41** is located in the southwest corner of the Saukville facility south of AOC 2.
- The groundwater sample collected from glacial drift remediation progress monitoring well **W-42** during the Fall 2016 sampling event contained detectable concentrations of total

xylenes (7,700 µg/L), ethylbenzene (183 µg/L) and benzene (82 µg/L). The concentrations of total xylenes and benzene exceed their respective ESs while the concentration of ethylbenzene exceeded its PAL. Glacial drift remediation progress monitoring well **W-42** is located along the west fence of the Saukville facility between AOCs 1 and 2.

- The groundwater sample collected from glacial drift remediation progress monitoring well **W-43** during the Fall 2016 sampling event contained detectable concentrations of ethylbenzene (430 µg/L), xylenes (118 µg/L), benzene (4.5 µg/L), arsenic (18.2 µg/L), barium (42.2 µg/L), acenaphthene (6.4 µg/L) and bis(2-ethylhexyl)phthalate (3.9 µg/L). The concentrations of ethylbenzene, benzene, arsenic and bis(2-ethylhexyl)phthalate exceeded their respective PALs. Glacial drift remediation progress monitoring well **W-43** is located adjacent to the southwest corner of the tank farm near AOC 3.
- The groundwater sample collected from glacial drift remediation progress monitoring well **W-47** during the Fall 2016 sampling event contained detectable concentrations of total xylenes (31,000 µg/L), ethylbenzene (3,600 µg/L), toluene (1,230 µg/L), benzene (89 µg/L), cis-1,2-dichloroethene (53 µg/L), arsenic (7.01 µg/L) barium (94.8 µg/L), 2,4-dimethylphenol (254 µg/L), 4-chloro-3-methylphenol (30.4 µg/L), acetophenone (22.6 µg/L), naphthalene (21.4 µg/L), cresol (15.4 µg/L) and Arochlor-1242 (0.373 µg/L). The concentrations of total xylenes, ethylbenzene, toluene, benzene and Arochlor-1242 exceeded their respective ESs, while the concentrations of cis-1,2-dichloroethene, arsenic and naphthalene exceeded their respective PALs. Glacial drift remediation progress monitoring well **W-47** is located in the northeast portion of the Saukville facility within AOC 1.

#### 5.1.5 DETECTED CONTAMINANTS IN THE SHALLOW DOLOMITE UNIT

VOC concentrations detected in the shallow dolomite aquifer in 2016 are shown on **Figure 6- VOC Detections – Shallow and Deep Dolomite Aquifers – Fall 2016**. Monitoring points in shallow dolomite unit include the following:

##### Perimeter Monitoring

**W-03A, W-07, W-20, W-22, W-23, W-40, W-50 and W-52.**

##### Remediation Progress

**W-21A, W-24A, W-28, W-29 and W-38.**

The overall horizontal extent of the contaminants observed in the shallow dolomite wells is generally the same as observed in previous years. More details regarding the results of the sampling are presented in the following sections.

##### 5.1.5.1 PERIMETER MONITORING GROUP – SHALLOW DOLOMITE

In general, VOC concentrations in the shallow dolomite perimeter monitoring wells have not changed significantly since 1995. No detectable concentrations of VOCs were noted in the following wells during 2016:

- **W-03A, W-07, W-20, W-40 and W-50** during the Spring and Fall 2016 sampling events. In addition, the sample collected during the Fall 2016 sampling event from **W-22** did not contain any detectable of detectable VOC constituents.

A discussion of the specific contaminant concentrations observed in the shallow dolomite perimeter monitoring wells during 2016 is as follows.

- The groundwater samples collected from perimeter shallow dolomite monitoring point **W-22** contained an elevated concentration of methyl-ethyl-ketone (53 µg/L) during the Spring 2016 sampling event. The concentration did not exceed its PAL. Shallow dolomite monitoring point **W-22** is located upgradient of the Saukville facility on the adjoining Saukville Feeds site, a closed leaking underground storage tank (LUST) site.
- The groundwater samples collected from perimeter shallow dolomite monitoring point **W-23** during the Spring and Fall 2016 sampling events contained a estimated concentrations of cis-1,2-dichloroethene (0.79 µg/L to 0.82 µg/L). The detected concentrations did not exceed its PAL. Shallow dolomite monitoring point **W-23** is located along the south fence of the Saukville facility away from former production areas.
- The groundwater samples collected from perimeter shallow dolomite piezometer **W-52** during the Spring and Fall 2016 sampling events contained detectable concentrations of cis-1,2-dichloroethene (36 µg/L and 26.9 µg/L), vinyl chloride (29 µg/L and 15.4 µg/L), benzene (10.8 µg/L and 12 µg/L), trans-1,2-dichloroethene (1.84 µg/L and 1.43 µg/L) and TCEe (0.57 µg/L and 0.61 µg/L) and. The concentrations of benzene and vinyl chloride detected during both sampling events exceeded their respective ESs, while the concentrations of cis-1,2-dichloroethene and trichloroethene during both sampling events exceeded their respective PALs. Shallow dolomite piezometer **W-52** is located along the south fence of the Saukville facility away from former production areas.

#### 5.1.5.2 REMEDIATION PROGRESS GROUP – SHALLOW DOLOMITE

In general, the contaminant concentrations detected in the shallow dolomite remediation progress wells indicate a stable trend since 1995. Due to a lack of water caused by the continuous pumping of deep dolomite well **W-30** at approximately 250 gallons per minute (gpm), shallow dolomite remediation progress well **W-28** was not sampled during the Fall 2016 sampling event. Specific contaminants observed in the shallow dolomite remediation progress wells during 2016 are as follows.

- The groundwater sample collected from shallow dolomite extraction well **W-21A** during the Fall 2016 groundwater sampling event contained detectable concentrations of ethylbenzene (13,900 µg/L), xylenes (6,170 µg/L), benzene (1,010 µg/L), toluene (350 µg/L), cis-1,2-dichloroethene (29.5 µg/L) and vinyl chloride (42 µg/L). Insufficient water was available to analyze for SVOCs and metals. The concentrations of ethylbenzene, xylenes, benzene and vinyl chloride exceeded their respective ESs, while the concentration of cis-1,2-dichloroethene exceeded its PAL. Shallow dolomite extraction well **W-21A** is located north of AOC 3 and south of AOC 1.

- The groundwater sample collected from shallow dolomite extraction well **W-24A** during the Fall 2016 sampling event contained elevated concentrations of cis-1,2-dichloroethene (87 µg/L), vinyl chloride (19.9 µg/L), barium (86.1 µg/L) and bis(2-ethylhexyl)phthalate (1.14 µg/L). The concentrations of cis-1,2-dichloroethene and vinyl chloride exceeded their respective ESs, while the concentration of bis(2-ethylhexyl)phthalate exceeded its PAL. Shallow dolomite extraction well **W-24A** is located in the southwest corner of the Saukville facility, south of AOC 2.
- The groundwater sample collected from shallow dolomite extraction well **W-29** during the Fall 2016 sampling event contained elevated concentrations of cis-1,2-dichloroethene (88 µg/L), vinyl chloride (2.9 µg/L), barium (79.1 µg/L) and bis(2-ethylhexyl)phthalate (1.39). The concentration of cis-1,2-dichloroethene and vinyl chloride exceeded their respective ESs, while the concentration of bis(2-ethylhexyl)phthalate exceeded its PAL. Shallow dolomite extraction well **W-29** is located in the western portion of the Saukville facility, west of AOC 3.
- The groundwater sample collected from shallow dolomite remediation progress point **W-38** during the Fall 2016 sampling event contained a detectable concentration of benzene (1,220 µg/L) which exceeded its ES. Shallow dolomite remediation progress point **W-38** is located adjacent to the southwest corner of the tank farm near AOC 3.

#### 5.1.6 DETECTED CONTAMINANTS IN THE DEEP DOLOMITE UNIT

VOC concentrations detected in the shallow dolomite aquifer in 2016 are shown on **Figure 6 - VOC Detections - Shallow and Deep Dolomite Aquifers - Fall 2016**. In general, the contaminant concentrations detected in the deep dolomite monitoring points are consistent with results observed since sampling of these wells began. Besides the three (3) municipal water supply wells (**MW-1**, **MW-2** and **MW-3**), the only deep dolomite wells sampled as part of the groundwater monitoring program are deep dolomite extraction well **W-30** and deep dolomite monitoring well **PW-08** located on the former Northern Signal property.

- The groundwater samples collected from deep dolomite perimeter monitoring point **PW-08** during the Spring and Fall 2016 sampling events did not contain any detectable VOC constituents. Deep dolomite perimeter monitoring point **PW-08** is located hydrogeologically upgradient to the Saukville facility on the JT Roofing property. During the initial investigations conducted at the Saukville facility in the 1980s, it was determined that a large washout existed at the base of the casing of **PW-08**, approximately 30 ft bgs. Hydrogeologic tests indicated a direct connection between **PW-08** and the former Municipal Well No. 2 (**MW-2**). The washout area at the base of the casing was theorized to be the entry point for contaminants to the deep dolomite aquifer. Therefore, predecessors of Total installed a new surface casing to a depth of 104 ft bgs, resolving the washout condition at the base of the original casing.
- The groundwater sample collected from deep dolomite pumping well **W-30** during the Fall 2016 sampling event contained detectable concentrations of 1,4-dioxane (22.7 µg/L), benzene (3.4 µg/L), trichlorofluoromethane (1.66 µg/L), vinyl chloride (0.22 µg/L), barium



(96.2 µg/L) and bis(2-ethylhexyl)phthalate (1.08 µg/L). The concentrations of cis-1,2-dichloroethene and vinyl chloride exceeded their respective ESs, while the concentrations of benzene and bis(2-ethylhexyl)phthalate exceeded their respective PALs. Deep dolomite pumping well **W-30** is no longer utilized for non-contact cooling water at the Saukville facility. As such, the pumping rate has been reduced to approximately 250 gpm.

#### 5.1.7 VOC DISTRIBUTION

In general, benzene, ethylbenzene and xylene are the most common VOCs detected in the groundwater at the Saukville facility. In order to effectively evaluate the character of the extent of impacts, isoconcentration maps were developed for each of the BETX compounds and CVOCs in the glacial drift aquifer and benzene and CVOCs in the shallow dolomite aquifers

##### 5.1.7.1 GLACIAL DRIFT AQUIFER

Isoconcentration maps for benzene, ethylbenzene, toluene and total xylenes in the glacial drift aquifer are presented as **Figures 7, 8, 9 and 10**, respectively. Trichloroethene and vinyl chloride detections in the glacial drift aquifer are shown on **Figure 11**.

Based on an evaluation of the above-described maps, the VOC impacts in the glacial drift aquifer attributed to releases at the Saukville facility vary depending on the VOC constituent, but are generally located on the western side of the Saukville facility between AOCs 1 and 2. In general, benzene is detected at the lowest overall concentrations of all the BTEX constituents in the glacial drift aquifer with concentrations generally less than 100 µg/L. ES exceedances extend south from AOC 1 towards AOCs 2 and 3. PAL exceedances are estimated to extend north to south across the Saukville facility with a minor incursion onto the adjoining property to the east.

Ethylbenzene and toluene concentrations in the glacial drift aquifer generally ranged between approximately 1,000 µg/L to 37,000 µg/L. The highest concentrations for both of these constituents are detected in glacial drift remediation progress well **W-06A** located in AOC 2. ES exceedances for both constituents are located at the AOC 1 location extending to the south towards AOC 3 and within AOC 2. PAL exceedances generally connect the two (2) isolated areas of ES exceedances.

Total xylene concentrations in the glacial drift show the highest and most widespread extent of any of the BETX constituents. The highest concentration of xylene is detected within AOC 2. The concentration of xylene in AOC 1 is approximately 33% of the concentration detected in AOC 2. While lesser concentrations were detected in the area between AOC 1 and AOC 2, the concentrations detected in this area also exceeded the ES.

CVOCs, in the form of trichloroethene and vinyl chloride were detected in primarily off-site upgradient glacial drift wells during the 2016 sampling events as follows:

- The highest trichloroethene concentrations in the glacial drift aquifer were detected upgradient in perimeter monitoring points **W-27** (36 µg/L) and **W-19A** (30.2 µg/L). The concentrations of trichloroethene detected in **W-19A** and **W-27** exceed its ES. Vinyl chloride was also detected at a concentration above its ES in the sample collected from **W-**

**19A.** It should also be noted that vinyl chloride and other CVOC breakdown products were detected in the samples collected in the glacial drift by Ranney Collector **RC-1**.

#### 5.1.7.2 SHALLOW DOLOMITE AQUIFER

The concentrations of contaminants detected in the shallow dolomite aquifer are significantly less than the concentrations observed in the glacial drift aquifer. In general, benzene and CVOCs were the only contaminants detected in the shallow dolomite aquifer in 2016. Specific observations are as follows:

- The highest benzene concentration (1,220 µg/L) was detected in shallow dolomite piezometer **W-38**, located immediately adjacent to AOC 3 in the center of the Site. The extent of benzene detected in the shallow dolomite extends to the south fence line at shallow dolomite piezometer **W-52** (12 µg/L) and to the north at the **W-21A** extraction well location (1,010 µg/L).
- CVOCs, primarily in the form of degradation products (cis-1,2-dichloroethene, trans-1,2-dichloroethene and vinyl chloride) were detected in three (3) shallow dolomite extraction wells (**W-21A**, **W-24A** and **W-29**), as well as shallow dolomite piezometers W-23 and W-52, located along the south fence line. Vinyl chloride was detected in each of these wells at concentrations exceeding its ES, with the exception of **W-23**.

The isoconcentration map for benzene in the shallow dolomite aquifer is presented as **Figures 12**. CVOC detections in the shallow dolomite aquifer are shown on **Figure 13**. In contrast to the location of the VOC impacts in the glacial drift aquifer, the VOC impacts in the shallow dolomite aquifer are located near the center of the Site.

## 5.2 METALS RESULTS AND DISTRIBUTION

A total of eight (8) on-site remediation progress wells are scheduled to be sampled for arsenic and barium concentrations on an annual basis during the Fall groundwater sampling event. The wells scheduled to be sampled for metals include glacial drift monitoring wells **W-06A**, **W-43** and **W-47**, shallow dolomite extraction wells **W-21A**, **W-24A**, **W-28** and **W-29**, and deep dolomite pumping well **W-30**. In 2016, insufficient water in shallow dolomite extraction wells **W-21A** and **W-28** prevented samples for metals analysis from being submitted. The samples collected for metals analysis were field-filtered prior to preservation and analysis to provide a dissolved metals concentration result. The results of the metals analyses are depicted on **Figure 14 - Metals in Groundwater – Fall 2016**. A discussion of the results follows:

### 5.2.1 ARSENIC

Three (3) of the seven (7) wells sampled during the Fall 2016 sampling event contained detectable concentrations of arsenic. Estimated arsenic concentrations of 18.2 µg/L at glacial drift remediation progress well **W-43** and 7.01 µg/L at glacial drift remediation progress well **W-47**, and a concentration of 41.6 µg/L was detected in glacial drift remediation progress well **W-06A**. The arsenic concentration detected in **W-06A** exceeded its ES, while the arsenic concentrations detected in **W-43** and **W-47** exceeded its PAL.

The concentration trends for arsenic have been relatively stable since the onset of analyzing for arsenic in 1994. It should be noted that naturally occurring arsenic has been detected in Wisconsin at concentrations similar to those detected in the groundwater at the Saukville facility.

### 5.2.2 BARIUM

All seven (7) of the groundwater samples collected and analyzed for barium during the Fall 2016 sampling event contained detectable concentrations of barium. While barium was detected in all of the samples submitted, none of the detected barium concentrations exceeded its PAL.

## 5.3 SVOC RESULTS AND DISTRIBUTION

A total of eight (8) on-site remediation progress monitoring wells are scheduled to be sampled on an annual basis during the Fall sampling event for SVOC analysis. The wells scheduled to be sampled for SVOCs include glacial drift monitoring wells **W-06A**, **W-43** and **W-47**, shallow dolomite extraction wells **W-21A**, **W-24A**, **W-28** and **W-29**, and deep dolomite pumping well **W-30**. In 2016, insufficient water volume in shallow dolomite extraction wells **W-21A** and **W-28** prevented samples for SVOCs to be submitted.

The results of the SVOC sampling performed in 2016 are as follows:

- Five (5) of the seven (7) samples contained estimated concentrations of bis(2-ethylhexyl)phthalate ranging between 0.86 µg/L to 3.9 µg/L. All of the reported estimated concentrations of bis(2-ethylhexyl)phthalate exceeded its PAL.
- Glacial drift remediation progress monitoring well W-47 also contained an estimated concentration of naphthalene (21.4 µg/L) which exceeded its PAL.

SVOC detections in groundwater are depicted on **Figure 15 - SVOCs in Groundwater - Fall 2016**.

## 5.4 PCB RESULTS

Glacial drift monitoring point **W-47** is the only well scheduled to be sampled for PCBs during the Fall 2016 sampling event. Arochlor 1242 was detected in the sample collected from **W-47** at an estimated concentration of 0.373 µg/L which exceeds the total PCB ES of 0.03 µg/L.

Historical individual contaminant trends for selected parameters in selected wells are attached in **Appendix D**.

## 6.0 CONTAMINANT CONTAINMENT

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### 6.1 CONTAINMENT OF GROUNDWATER IMPACTS

The discussion in this section combines groundwater flow and quality trends from the receptor, perimeter, and remediation progress wells in the glacial drift and dolomite, to present an evaluation of the effectiveness of the containment at the Saukville facility.

#### 6.1.1 GLACIAL DRIFT UNIT

Based on the results of the laboratory analyses performed during 2016 on the groundwater samples collected from the glacial drift perimeter monitoring wells, the groundwater contamination resulting from historical on-site operations is contained within the bounds of the Saukville facility. Samples collected from off-site, upgradient glacial drift monitoring wells **W-19A** and **W-27** continue to contain the highest concentrations of CVOCs. VOCs have not historically been detected in the downgradient or sidegradient perimeter monitoring points in the glacial drift aquifer.

#### 6.1.2 SHALLOW DOLOMITE UNIT

Downgradient shallow dolomite monitoring points (**W-03A**, **W-40**, **W-20**, **W-07** and **W-50**) continue to be free of detectable concentrations of VOCs. The groundwater samples collected from shallow dolomite monitoring point **W-52** and shallow dolomite extraction well **W-24A**, located along the south fence line of the Saukville facility, continued to contain elevated concentrations of several VOC constituents above their respective ESs. Since shallow dolomite monitoring point **W-52** was installed in 2005, elevated concentrations of benzene and vinyl chloride have been detected and reported. The concentrations of benzene and vinyl chloride detected in the samples collected from **W-52** exceeded their respective ESs during both sampling events in 2016, while the concentrations of cis-1,2-dichloroethene and vinyl chloride detected in the sample collected from **W-24A** during the Fall 2016 sampling event exceeded their respective ESs. Since the installation of **W-52** in 2005, the concentration of benzene detected in the groundwater at this location has varied between approximately 10 µg/L and approximately 20 µg/L (See page D-44 in **Appendix D**).

#### 6.1.3 DEEP DOLOMITE UNIT

No VOCs were detected in the deep dolomite receptor (municipal) wells in 2016. However, benzene (3.4 µg/L) was detected in the sample collected from **W-30** along with estimated concentrations of 1,4-dioxane (22.7 µg/L), trichlorofluoromethane (1.66 µg/L) and vinyl chloride (0.22 µg/L) were also detected.

Production at the Saukville Facility was idled at the beginning of 2015. As part of the preparations for idling the Facility, a bypass was added to the W-30 piping to remove the flow from the water jackets surrounding the kettles. Therefore, the groundwater pumped by W-30 is no longer utilized onsite as non-contact cooling water. In addition, the output of W-30 was reduced to approximately 250 GPM.

Evaluating groundwater measurements collected from the deep dolomite pumping well **W-30** in April and October of each year since 2004 indicates the groundwater elevation in **W-30** has fluctuated between 533.44 and 690.76 ft amsl with an overall average elevation of 618.95 ft amsl. During 2016, since the **W-30** pumping rate was reduced, the groundwater elevation in **W-30** was 658.42 ft amsl in April and 656.11 ft amsl in October, approximately 40 feet above the average elevation from the previous 12 years.

The convergent flow observed around **W-30**, the relatively stable total VOC concentrations in the extracted groundwater, and the continued non-detectable concentrations of VOCs in the municipal wells indicate that the migration of the impacted groundwater in the deep dolomite aquifer continues to be effectively controlled by on-site pumping. The adjoining upgradient Saukville Feed Supply site is the former location of a bulk petroleum fuel storage and distribution facility which contained numerous large aboveground storage tanks (ASTs).

The WDNR opened a leaking underground storage tank (LUST) case (03-46-174724) in September 1997 due to soil and groundwater contaminated with leaded and unleaded gasoline and diesel fuel. In July 2005, WDNR closed the LUST case. A review of the available geographic information system (GIS) Registry submittal indicates soil with benzene concentrations as high as 1,100 micrograms per kilogram ( $\mu\text{g}/\text{kg}$ ) were detected within approximately six (6) feet of the shallow dolomite surface. However, the investigation did not include any sampling within the bedrock to evaluate whether contamination was migrating downwards in the groundwater in cracks and solution channels.

#### 6.1.4 MASS REMOVAL ESTIMATES

Utilizing annual pumping rates along with average total VOC concentration data, an estimate of total VOC mass removal has been prepared. The estimated total is based on individual total VOC mass removal trend plots for each extraction well. Since 1992, approximately 415 pounds of total VOCs are estimated to have been removed from the glacial (approximately 197 pounds), shallow dolomite (approximately 172 pounds) and deep dolomite (approximately 45.5 pounds) aquifers beneath the Saukville facility. In 2016, it is estimated nearly four and one-half (4.5) pounds of VOCs were removed.

Due to the completion of deferred maintenance on the groundwater extraction system in 2016, VOC removal increased from approximately two (2) pounds in 2015 to nearly four and one-half (4.5) pounds in 2017.

VOC removal trends are shown on the graphs included as **Appendix E**.

## 7.0 CONCLUSIONS

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The purpose of the quarterly groundwater sampling program is to document the effectiveness of the remediation system. Per the recommendations included in the Corrective Measures Study (CMS) (Woodward-Clyde, 1996), the recommended corrective measure strategy involves the following groundwater hydraulic control elements:

- Continued operation of the Ranney collector system to dewater unconsolidated soil and maintain hydraulic control of the shallow groundwater system;
- Continued operation of the shallow dolomite wells to maintain hydraulic control of the shallow groundwater system and prevent contamination of the deep dolomite aquifer; and,
- Continued operation of the deep dolomite pumping well to maintain the effective site-wide hydraulic control and provide an inward gradient for capture and recovery of off-site contaminated groundwater.

The results of the quarterly groundwater sampling performed in 2016, as summarized in this annual report, indicate the existing extraction system operating at the Saukville facility continues to effectively control off-site migration of the groundwater impacts in the glacial drift aquifer while reducing the volume of contaminants present in the groundwater. The results from shallow dolomite perimeter monitoring point **W-52** continue to indicate elevated concentrations of CVOCs and benzene along the south fence line of the Saukville facility. The elevated CVOC concentrations in **W-52** can be attributed to the upgradient source on the JT Roofing property. It is assumed the elevated benzene concentrations detected in the samples collected from MW-52 are indicative of the southern extent of the benzene contamination present in the shallow dolomite at AOC 3. As shown on page **D-44**, once the aquifer equilibrated following installation in 2005, the concentration of benzene in the groundwater samples collected from **W-52** ranged between 8.9 µg/L to 23 µg/L, with an average concentration of 12.85 µg/L over the past 17 sampling events, indicating a stable trend. As such, it is our opinion as long as the existing groundwater extraction system continues to operate, the benzene contamination detected at the **W-52** location does not constitute an expending plume margin which would require additional investigation and/or remediation. Should the concentration of benzene in samples collected from W-52 increase in the future, additional extraction may be deemed necessary.

At the **W-51/W-52** well nest, groundwater elevations indicate a downward migration from the glacial aquifer to the shallow dolomite aquifer (vertical gradient of 0.44 ft/ft). The shallow dolomite aquifer is present approximately 20 ft bgs with approximately nine (9) to ten (10) feet of non-contaminated water present within the glacial drift aquifer above the shallow dolomite aquifer. The adjoining residences are supplied with potable water via the Village municipal distribution system. Therefore, the potential groundwater exposure pathway is not complete. In addition, due to the presence of the uncontaminated glacial drift aquifer above the shallow dolomite aquifer and the downward vertical gradient, the potential vapor intrusion threat from the contaminants in the shallow dolomite is not complete. We recommend continuing to monitor the concentrations of contaminants in **W-51** and **W-52** semi-annually as required in the modified GWMP.

## 8.0 REFERENCES

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- Endpoint Solutions Corp. (Endpoint) 2016a. Report of Results – Winter 2016 Groundwater Sampling Event. April 1, 2016.*
- Endpoint 2016b. Report of Results – Spring 2016 Groundwater Sampling Event. November 28, 2016.*
- Endpoint 2016c. Report of Results – Summer 2016 Groundwater Sampling Event. November 28, 2016.*
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- Hatcher Incorporated. Summary – Hydrologic Assessment Activities. January 11, 1985.*
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- RMT, Inc. Closure Plan Modification. April 1992.*
- Wisconsin Administrative Code Chapter NR 140 – Groundwater Quality.*
- Wisconsin Department of Natural Resources. RCRA 3008(h) Corrective Action Order. September 3, 1987.*
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- Woodward-Clyde. Corrective Measures Study – On-Site Areas of Concern 1, 2 and 3. September 17, 1996.*

## **TABLES**

TABLE 1 - 2016 SUMMARY OF GROUNDWATER LEVEL MEASUREMENTS

TABLE 2 - 2016 SUMMARY OF WELL RUNNING TIMES AND VOLUME REMOVED

TABLE 3 - MODIFIED GROUNDWATER MONITORING PLAN SUMMARY

TABLE 4 - SUMMARY OF ANALYTES AND METHODS



Table 1

2016 Summary of Groundwater Level Measurements (ft, msl)  
Arkema Coating Resins  
Saukville, Wisconsin

GEOLOGIC UNIT	WELL ID	TOC	Apr-16	Oct-16
Glacial	W-1A	768.55	763.78	762.25
Glacial	W-3B	770.32	746.07	743.81
Glacial	W-4A	767.55	758.86	758.49
Glacial	W-6A	773.27	769.64	769.55
Glacial	W-8R	759.71	753.86	748.64
Glacial	W-14B	773.07	768.02	767.33
Glacial	W-16A	768.74	764.36	759.14
Glacial	W-18A	772.07	769.05	768.01
Glacial	W-19A	775.48	770.07	768.51
Glacial	W-20	767.91	744.01	741.79
Glacial	W-27	775.70	770.09	770.21
Glacial	W-37	Well Abandoned 8/1996		
Glacial	W-41	773.73	765.20	764.66
Glacial	W-42	774.40	764.42	762.49
Glacial	W-43	768.44	766.41	764.37
Glacial	W-44	769.30	764.16	NM
Glacial	W-45	767.97	759.13	756.54
Glacial	W-46	766.17	763.38	760.34
Glacial	W-47	771.22	765.68	765.4
Glacial	W-48	773.37	765.00	763.67
Glacial	W-49	765.83	756.69	756.29
Glacial	W-51	773.48	763.36	760.49
Glacial	W-53	773.12	762.70	761.45
Shallow Dolomite	W-3A	769.31	745.78	743.48
Shallow Dolomite	W-7	759.32	753.21	747.99
Shallow Dolomite	W-21A*	769.22		
Shallow Dolomite	W-22	772.29	761.18	761.76
Shallow Dolomite	W-23	768.90	748.41	746.95
Shallow Dolomite	W-24A*	772.45		
Shallow Dolomite	W-25	Well Abandoned 7/1997		
Shallow Dolomite	W-28*	772.41		
Shallow Dolomite	W-29*	765.45		
Shallow Dolomite	W-38	768.75	757.54	753.95
Shallow Dolomite	W-39	782.19	763.17	760.76
Shallow Dolomite	W-40	767.95	757.13	754.63
Shallow Dolomite	W-50	765.74	754.66	752.71
Shallow Dolomite	W-52	773.01	753.56	751.68
Deep Dolomite	MW-1	766	673	671
Deep Dolomite	MW-2	Well Abandoned 12/2004		
Deep Dolomite	MW-3	756	572	558
Deep Dolomite	MW-4	771	672	670
Deep Dolomite	PW-08	775.66	746.48	739.79
Deep Dolomite	W-30*	771.64	658.42	656.11

\* = Extraction Well

ft - feet

msl - mean sea level

NM - Not measured

TOC = top of casing

Access to measure water levels in W-21A, W-24A, W-28 and W-29 removed to provide sampling access from ground surface.

**TABLE 2**  
**2016 SUMMARY OF WELL RUNNING TIMES AND VOLUME REMOVED**  
**ARKEMA COATING RESINS**  
**SAUKVILLE, WISCONSIN**

Hydrogeologic Unit	Well ID	Monthly Running Times (hours)												Annual Total (hours)	Pumping Rate (gpm)	Volume Removed (gal)	Comments
		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.				
Glacial Drift	W-31	0.4	0.8	0.7	0.6	0.3	0.3	0.3	0.2	0.4	0.5	0.4	0.4	5.3	0.07	22	Continued pumping assists in controlling off-site migration.
	W-32	0.0	2.8	0.3	0.5	0.4	0.2	0.2	0.1	0.2	0.2	0.1	0.1	5.1	0.07	21	
	W-33	0.0	0.1	11.9	0.5	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.0	12.8	0.07	54	
	W-34	12.9	37.3	37.9	65.9	52.0	69.1	14.1	34.7	90.7	89.9	30.3	44.2	579.0	0.07	2,432	
	W-35	1.0	0.0	0.1	0.6	1.5	1.8	1.0	0.4	0.7	0.5	0.1	0.9	8.6	0.07	36	
	RC-1	0.0	619.3	168.6	0.0	0.0	0.0	4.2	157.1	156.4	0.1	0.0	0.0	1,105.7	3	199,026	
	RC-2	832.9	673.2	670.6	838.9	673.0	670.7	840.0	672.0	679.7	827.4	678.4	840.5	8,897.3	3	1,601,514	
	RC-3	0.0	148.3	220.9	572.0	108.5	484.8	51.3	61.5	213.1	242.3	187.7	8.7	2,299.1	3	413,838	
															<b>2,216,943</b>	<b>Total Removed from Glacial Drift</b>	
Shallow	W-21A	0.0	0.0	32.5	97.4	110.2	12.5	0.4	0.0	0.0	0.0	0.0	0.0	253.0	2	30,360	Pumping is contributing to the creation of a large dewatered area in the overlying glacial drift.
	W-24A	542.7	386.1	45.4	18.6	15.6	14.4	19.4	15.5	15.7	19.6	15.3	70.4	1,178.7	40	2,828,880	
	W-28	0.0	5.1	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.8	2	696	
	W-29	40.0	32.5	33.4	41.6	33.8	34.0	43.2	34.5	35.0	41.9	25.3	40.9	436.1	12	313,992	
															<b>3,173,928</b>	<b>Total Removed from Shallow Dolomite</b>	
Deep	W-30													8,760	250	131,400,000	<b>Total Removed from Deep Dolomite</b>
															<b>136,790,871</b>	<b>Total Removed from All Aquifers</b>	

gpm - Gallons Per Minute  
gal - Gallons

Table 3

Modified Groundwater Monitoring Plan Summary  
Arkema Coating Resins  
Saukville, Wisconsin

Monitoring Objective	Sampling Point	Sampling Event				Parameters	Duplicates		Sample Method
		January	April	July	October		Blind	MS/MSD	
Receptor Monitoring Points	MW-1	X	X	X	X	8260			Tap
	MW-3		X		X	8260		X	Tap
	MW-4		X		X	8260	DUP1		Tap
	RC-1		X		X	8021			Manhole
	RC-2		X		X	8021			Manhole
	RC-3		X		X	8021			Manhole
	POTW-I		X		X	8260			Trough
	POTW-E		X		X	8260			Aeration
	POTW-S		X		X	8260			Sink
Perimeter Monitoring Points	W-01A		X		X	8260			Bailer
	W-03A		X		X	8260	DUP3		Pump
	W-03B		X		X	8260			Pump
	W-04A		X		X	8260			Bailer
	W-07		X		X	8260			Bailer
	W-08R		X		X	8260			Bailer
	W-16A		X		X	8260			Bailer
	W-20		X		X	8260			Pump
	W-22		X		X	8260			Pump
	W-23		X		X	8260	DUP2		Pump
	W-27		X		X	8260			Pump
	W-40		X		X	8260			Pump
	W-49		X		X	8260			Bailer
	W-50		X		X	8260			Bailer
	W-51		X		X	8260			Bailer
	W-52		X		X	8260			Bailer
PW-08		X		X	8260			Pump	
Remediation Progress Point	W-06A				X	Appendix IX 8260, Appendix IX 8270, 7060, 6010			Bailer
	W-19A				X	8260	X		Bailer
	W-21A				X	Appendix IX 8260, Appendix IX 8270, 7060, 6010			Tap
	W-24A				X	Appendix IX 8260, Appendix IX 8270, 7060, 6010			Tap
	W-28				X	Appendix IX 8260, Appendix IX 8270, 7060, 6010			Tap
	W-29				X	Appendix IX 8260, Appendix IX 8270, 7060, 6010			Tap
	W-30				X	Appendix IX 8260, Appendix IX 8270, 7060, 6010	X		Tap
	W-38				X	8260			Pump
	W-41				X	8260		X	Bailer
	W-42				X	8260			Bailer
W-43				X	Appendix IX 8260, Appendix IX 8270, 7060, 6010			Bailer	
W-47				X	Appendix IX 8260, Appendix IX 8270, 7060, 6010, 8081	X (8081)		Peristaltic	

MS/MSD: Matrix Spike/Matrix Spike Duplicate

WPDES: Wisconsin Pollution Discharge Elimination System

TABLE 4

SUMMARY OF ANALYTES AND METHODS

Volatile Organic Compounds by Method 8260		
Chloroethane	1,1,1-Trichloroethane	2-Hexanone
Chloromethane	Carbon Tetrachloride	4-Methyl-2-Pentanone
Bromomethane	Vinyl Acetate	Tetrachloroethene
Vinyl Chloride	Bromodichloromethane	Toluene <sup>1</sup>
Methylene Chloride	1,1,2,2-Tetrachloroethane	Chlorobenzene <sup>1</sup>
Acetone	1,2-Dichloropropane	Ethylbenzene <sup>1</sup>
Carbon Disulfide	trans-1,2-Dichloropropene	Styrene
1,1-Dichloroethene	Trichloroethene	Xylenes (total) <sup>1</sup>
1,1-Dichloroethane	Dibromochloromethane	1,4-Dichlorobenzene <sup>1</sup>
1,2-Dichloroethene (total)	1,1,2-Trichloroethane	1,3-Dichlorobenzene <sup>1</sup>
Chloroform	Benzene	1,2-Dichlorobenzene <sup>1</sup>
1,2-Dichloroethane	cis-1,3-Dichloropropene	
2-Butanone	Bromoform	

Volatile Organic Compounds by Method 8021 <sup>1</sup>
Benzene
Toluene
Ethylbenzene
Chlorobenzene
Xylenes (total)
1,4-Dichlorobenzene
1,3-Dichlorobenzene
1,2-Dichlorobenzene

Semivolatile Organic Compounds by Method 8270 <sup>2</sup>
1,4-Dioxane
2,4-Dimethylphenol
2-Methylnaphthalene
2-Methylphenol
4-Methylphenol
Acetophenone
bis(2-ethylhexyl)phthalate
Naphthalene
Phenanthrene
Phenol

Polychlorinated Biphenyls (PCBs) by Method 8080 <sup>3</sup>
Arochlor 1016
Arochlor 1221
Arochlor 1232
Arochlor 1242
Arochlor 1248
Arochlor 1254
Arochlor 1260

Metals by Methods 7060, 6010 <sup>2</sup>
Barium
Arsenic

NOTES

- <sup>1</sup> Volatile organic compounds
- <sup>2</sup> Analyzed annually at wells W-06A, W-43, W-47, W-21A, W-24A, W-28, W-29, and W-30.
- <sup>3</sup> Only well W-47 is analyzed for PCBs.

## **FIGURES**

FIGURE 1 - SITE LOCATION MAP

FIGURE 2 - EXISTING SITE LAYOUT

FIGURE 3 - WATER TABLE MAP - GLACIAL DRIFT AQUIFER - FALL 2016

FIGURE 4 - POTENTIOMETRIC SURFACE MAP - SHALLOW AND DEEP DOLOMITE AQUIFERS - FALL 2016

FIGURE 5 - VOC DETECTIONS - GLACIAL DRIFT AQUIFER - FALL 2016

FIGURE 6 - VOC DETECTIONS - SHALLOW AND DEEP DOLOMITE AQUIFERS - FALL 2016

FIGURE 7 - BENZENE IN GROUNDWATER - GLACIAL DRIFT AQUIFER - FALL 2016

FIGURE 8 - ETHYLBENZENE IN GROUNDWATER - GLACIAL DRIFT AQUIFER - FALL 2016

FIGURE 9 - TOLUENE IN GROUNDWATER - GLACIAL DRIFT AQUIFER - FALL 2016

FIGURE 10 - TOTAL XYLENES IN GROUNDWATER - GLACIAL DRIFT AQUIFER - FALL 2016

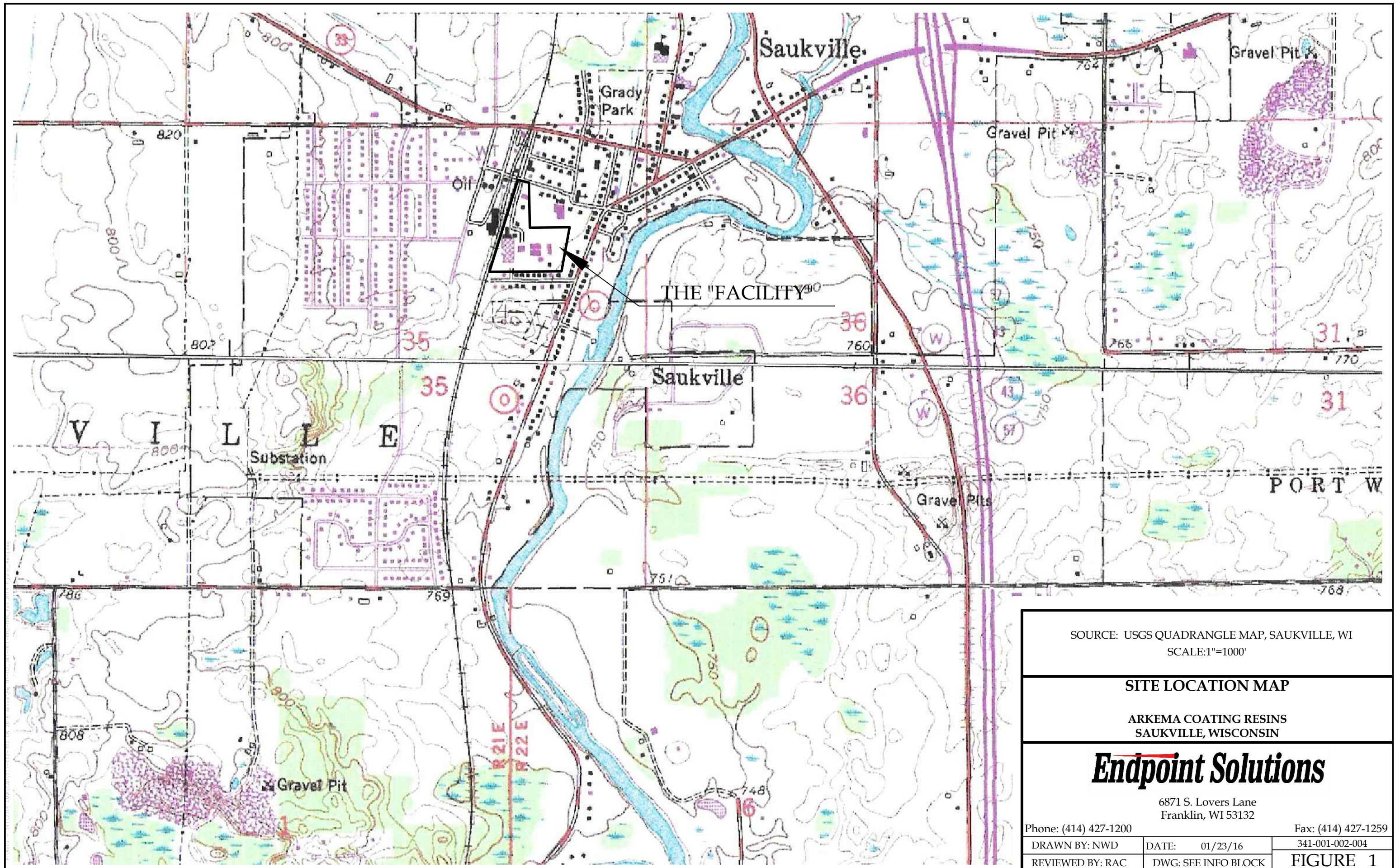
FIGURE 11 - TCE AND VC IN GROUNDWATER - GLACIAL DRIFT AQUIFER - FALL 2016

FIGURE 12 - BENZENE IN GROUNDWATER - SHALLOW AND DEEP DOLOMITE AQUIFERS - FALL 2016

FIGURE 13 - CVOCs IN GROUNDWATER - SHALLOW AND DEEP DOLOMITE AQUIFERS - FALL 2016

FIGURE 14 - METALS IN GROUNDWATER - COMBINED GLACIAL DRIFT AND DOLOMITE AQUIFERS - FALL 2016

FIGURE 15 - SVOCs IN GROUNDWATER - COMBINED GLACIAL DRIFT AND DOLOMITE AQUIFERS - FALL 2016



SOURCE: USGS QUADRANGLE MAP, SAUKVILLE, WI  
SCALE: 1"=1000'

**SITE LOCATION MAP**

ARKEMA COATING RESINS  
SAUKVILLE, WISCONSIN

**Endpoint Solutions**

6871 S. Lovers Lane  
Franklin, WI 53132

Phone: (414) 427-1200

Fax: (414) 427-1259

DRAWN BY: NWD

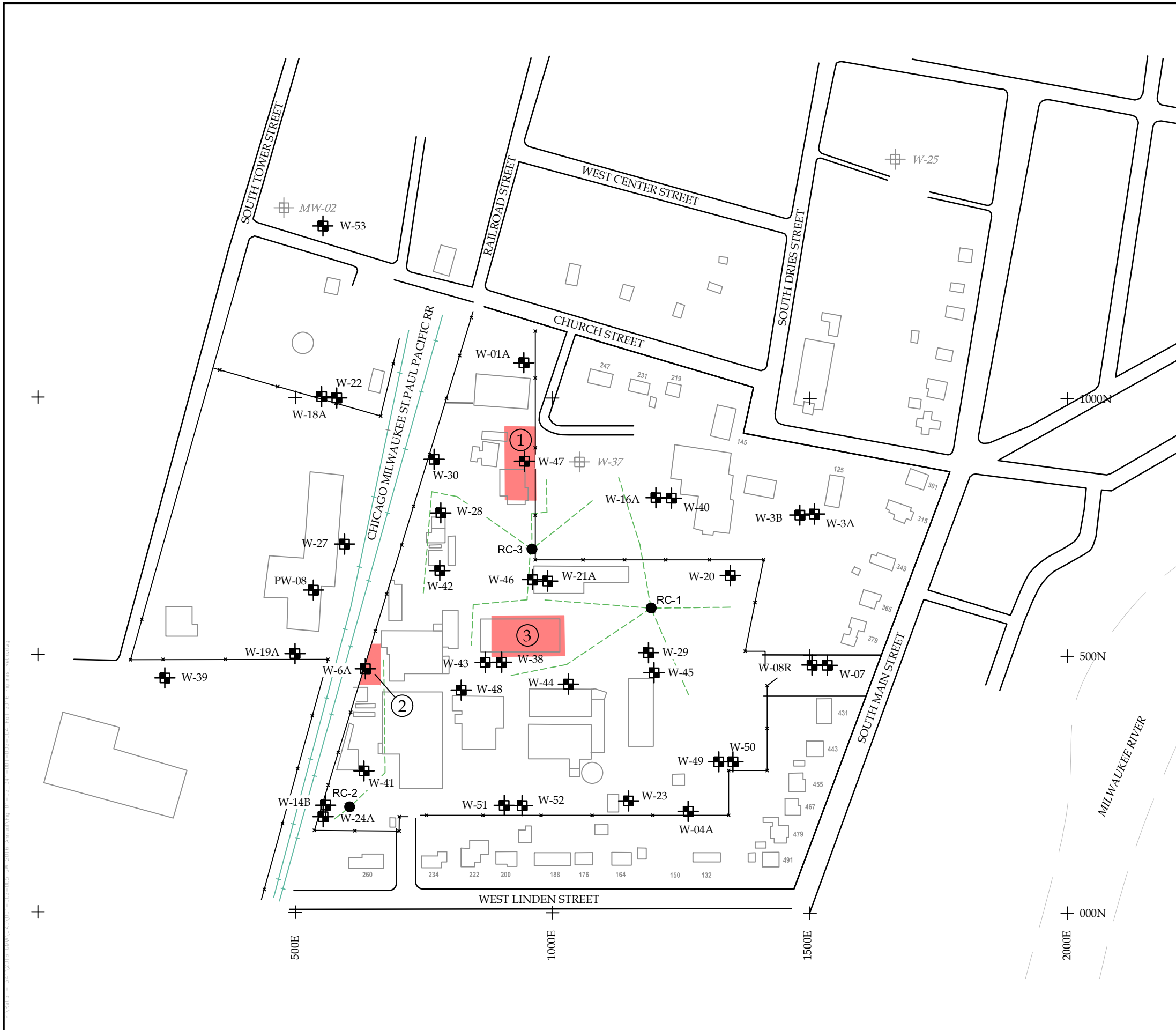
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341-001-002-004


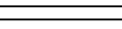
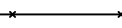





REVIEWED BY: RAC

DWG: SEE INFO BLOCK

**FIGURE 1**

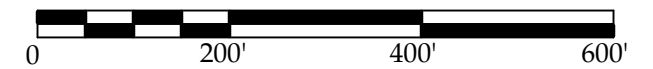


**LEGEND**

-  BUILDING
-  ROAD
-  FENCE
-  RAILROAD
-  W-18A MONITORING WELL LOCATION AND NUMBER
-  W-25 ABANDONED WELL LOCATION AND NUMBER
-  RANNEY COLLECTOR
-  ① AREA OF CONCERN

**NOTES**

1. BASE MAP WAS DEVELOPED FROM DRAWINGS PROVIDED BY RMT, INC.
2. W-37 WAS ABANDONED AUGUST 2, 1996.
3. W-25 WAS ABANDONED JULY 29, 1997.
4. MW-02 WAS ABANDONED NOVEMBER 2004.



**EXISTING SITE LAYOUT**

**ARKEMA COATING RESINS  
SAUKVILLE, WISCONSIN**

**Endpoint Solutions**

6871 S. Lovers Lane  
Franklin, WI 53132

Phone: (414) 427-1200

Fax: (414) 427-1259

DRAWN BY: NWD

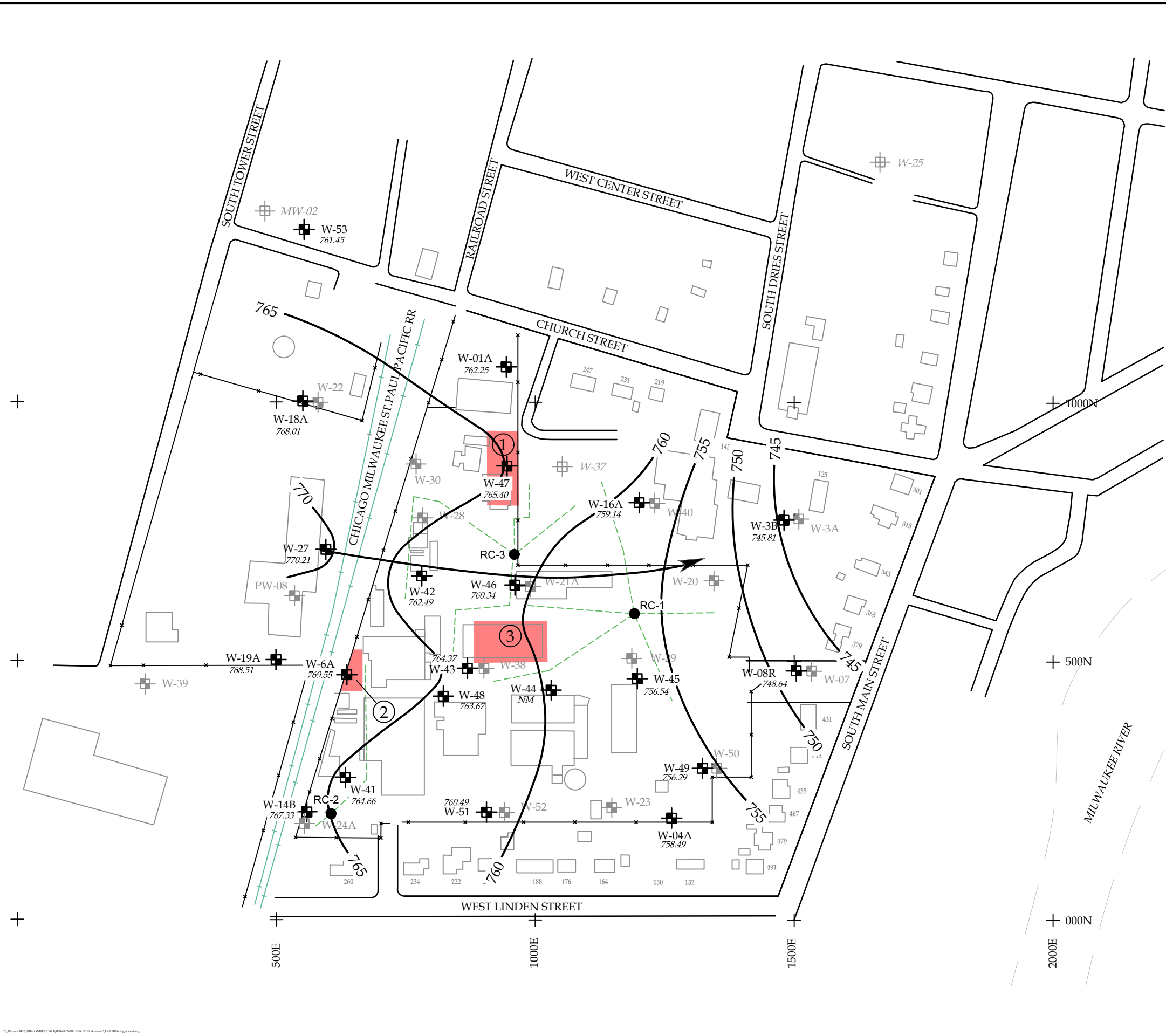
DATE: 01/23/17

341-001-002-004

REVIEWED BY: RAC

DWG: SEE INFO BLOCK

**FIGURE 2**



**LEGEND**

- W-18A MONITORING WELL LOCATION AND NUMBER
- W-18A ABANDONED WELL LOCATION AND NUMBER
- GROUNDWATER FLOW DIRECTION
- NM NOT MEASURED
- CONTOUR INTERVAL = 5 FEET
- RANNEY COLLECTOR
- AREA OF CONCERN

**NOTES**

1. BASE MAP WAS DEVELOPED FROM DRAWINGS PROVIDED BY RMT, INC.
2. W-37 WAS ABANDONED AUGUST 2, 1996.
3. W-25 WAS ABANDONED JULY 29, 1997.
4. MW-02 WAS ABANDONED NOVEMBER 2004.



SCALE: 1"=200'



WATER TABLE MAP  
 GLACIAL DRIFT AQUIFER - FALL 2016  
 ARKEMA COATING RESINS  
 SAUKVILLE, WISCONSIN

**Endpoint Solutions**

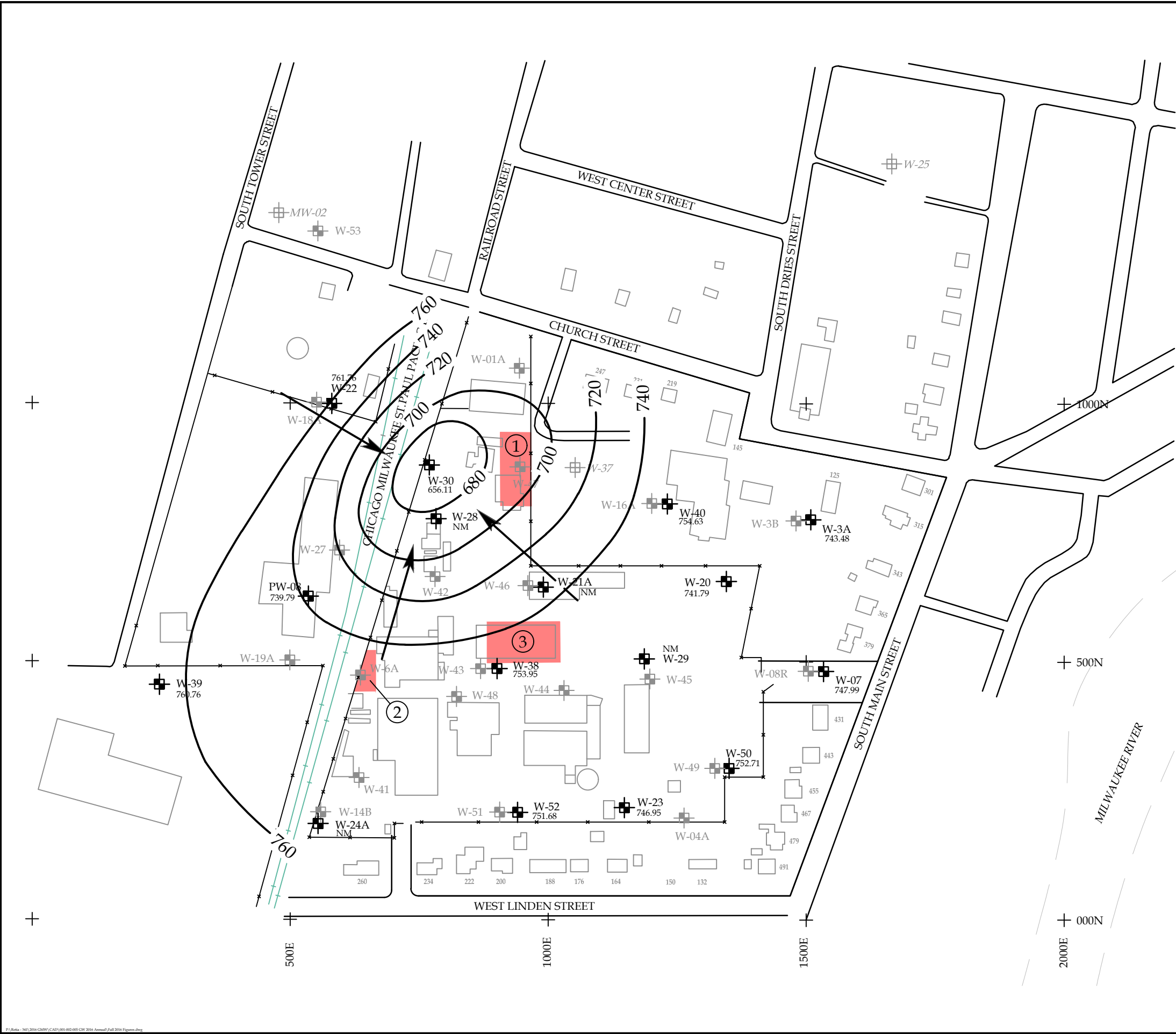
6871 S. Lovers Lane  
 Franklin, WI 53132

Phone: (414) 427-1200 Fax: (414) 427-1259

DRAWN BY: NWD DATE: 01/23/17 341-001-002-004

REVIEWED BY: RAC DWG: FALL 2016 FIGURES **FIGURE 3**



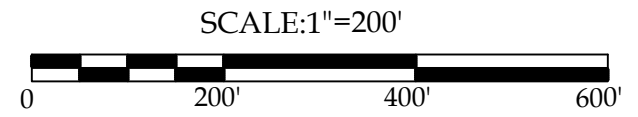


**LEGEND**

- W-18A MONITORING WELL LOCATION AND NUMBER
- W-18A ABANDONED WELL LOCATION AND NUMBER
- GROUNDWATER FLOW DIRECTION
- NM NOT MEASURED
- CONTOUR INTERVAL = 20 FEET
- AREA OF CONCERN

**NOTES**

1. BASE MAP WAS DEVELOPED FROM DRAWINGS PROVIDED BY RMT, INC.
2. W-37 WAS ABANDONED AUGUST 2, 1996.
3. W-25 WAS ABANDONED JULY 29, 1997.
4. MW-02 WAS ABANDONED NOVEMBER 2004.



POTENTIOMETRIC SURFACE MAP  
 SHALLOW AND DEEP DOLOMITE AQUIFERS - FALL 2016  
 ARKEMA COATING RESINS  
 SAUKVILLE, WISCONSIN

**Endpoint Solutions**

6871 S. Lovers Lane  
 Franklin, WI 53132

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REVIEWED BY: RAC	DWG: FALL 2016 FIGURES	<b>FIGURE 4</b>

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LEGEND

- W-18A MONITORING WELL LOCATION AND NUMBER
- W-18A ABANDONED WELL LOCATION AND NUMBER
- RANNEY COLLECTOR
- AREA OF CONCERN

B	Benzene	ND	Not Detected
c-1,2-DCE	cis-1,2-Dichloroethene	NS	Not Sampled
t-1,2-DCE	trans-1,2-Dichloroethene	J	Estimated Value
E	Ethylbenzene	<span style="background-color: yellow;"> </span>	PAL Exceedance
T	Toluene	<span style="background-color: blue;"> </span>	ES Exceedance
TCE	Trichloroethene		
VC	Vinyl Chloride		
X	Xylenes, Total		

NOTES

1. BASE MAP WAS DEVELOPED FROM DRAWINGS PROVIDED BY RMT, INC.
2. W-37 WAS ABANDONED AUGUST 2, 1996.
3. W-25 WAS ABANDONED JULY 29, 1997.
4. MW-02 WAS ABANDONED NOVEMBER 2004.



SCALE: 1"=200'



VOC DETECTIONS (ug/L)  
 GLACIAL DRIFT AQUIFER - FALL 2016  
 ARKEMA COATING RESINS  
 SAUKVILLE, WISCONSIN

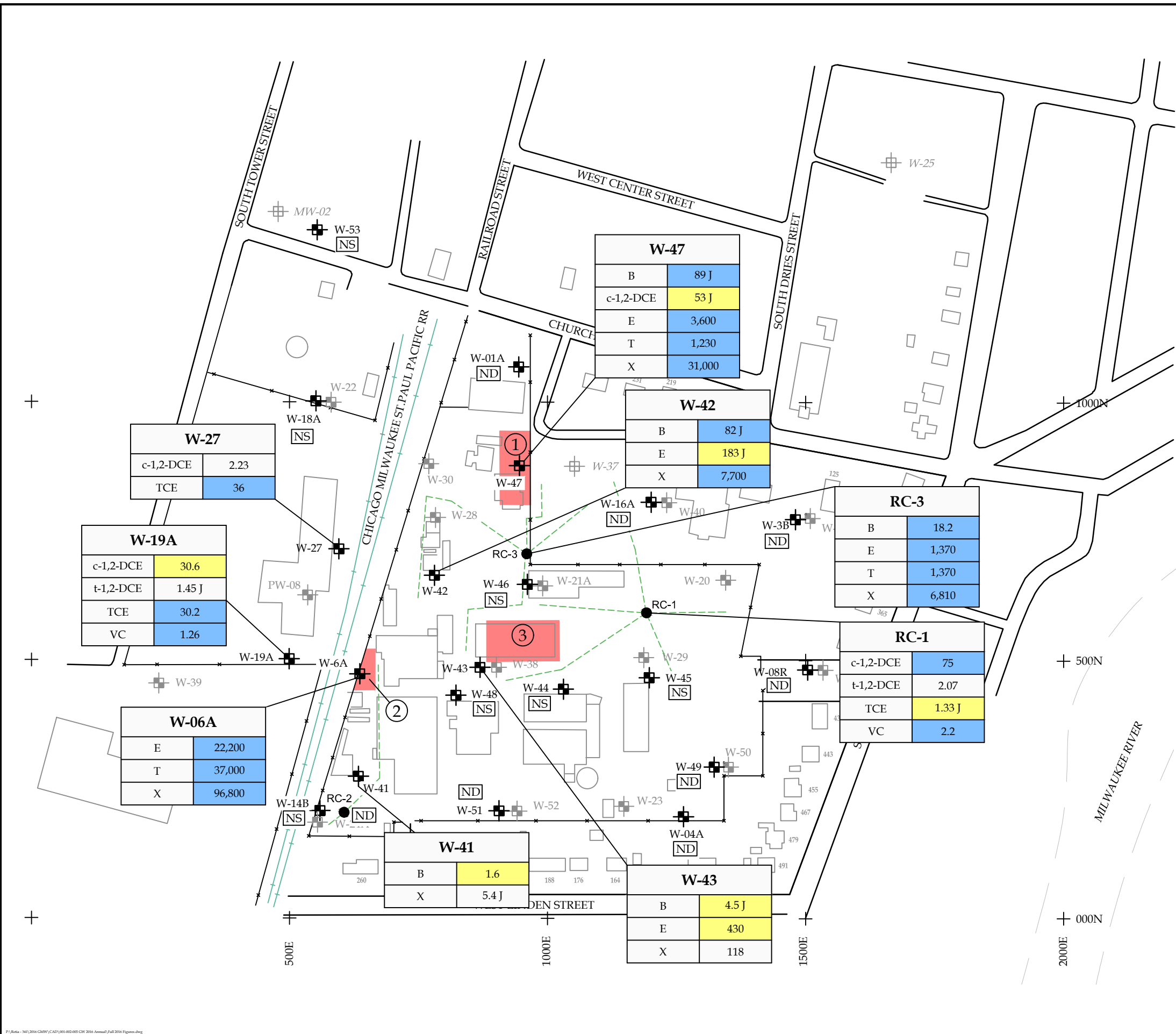
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REVIEWED BY: RAC DWG: FALL 2016 FIGURES **FIGURE 5**



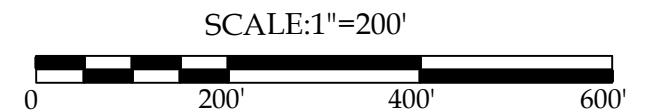
LEGEND

- W-18A  MONITORING WELL LOCATION AND NUMBER
- W-18A  ABANDONED WELL LOCATION AND NUMBER
-  AREA OF CONCERN

B	Benzene	ND	Not Detected
c-1,2-DCE	cis-1,2-Dichloroethene	NS	Not Sampled
t-1,2-DCE	trans-1,2-Dichloroethene	J	Estimated Value
1,4-D	1,4-Dioxane		PAL Exceedance
TCE	Trichloroethene		ES Exceedance
TCFM	Trichlorofluoromethane		
VC	Vinyl Chloride		
X	Total Xylenes		

NOTES

1. BASE MAP WAS DEVELOPED FROM DRAWINGS PROVIDED BY RMT, INC.
2. W-37 WAS ABANDONED AUGUST 2, 1996.
3. W-25 WAS ABANDONED JULY 29, 1997.
4. MW-02 WAS ABANDONED NOVEMBER 2004.



VOC DETECTIONS (ug/L) SHALLOW AND DEEP DOLOMITE AQUIFERS - FALL 2016  
 ARKEMA COATING RESINS  
 SAUKVILLE, WISCONSIN

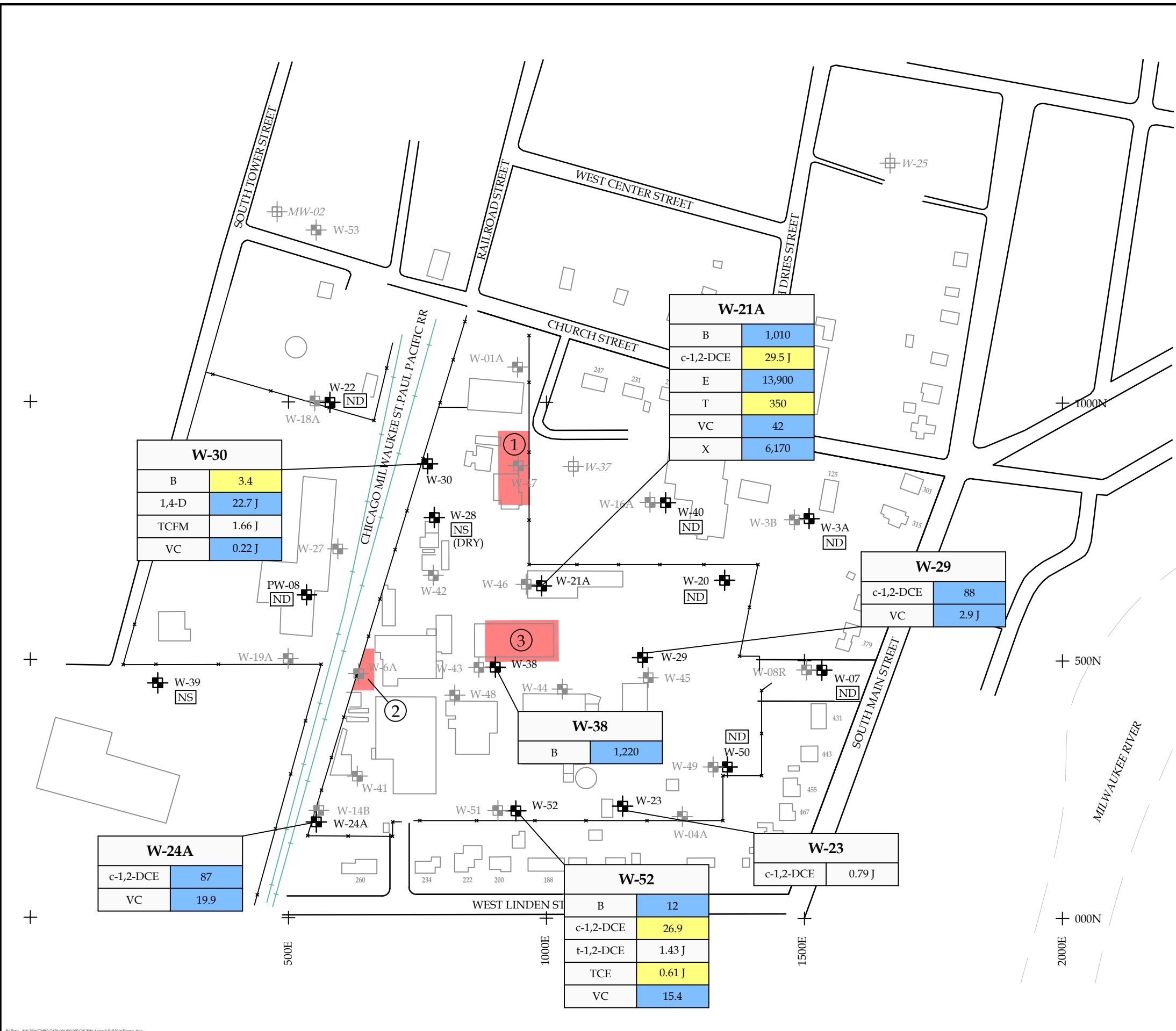
**Endpoint Solutions**

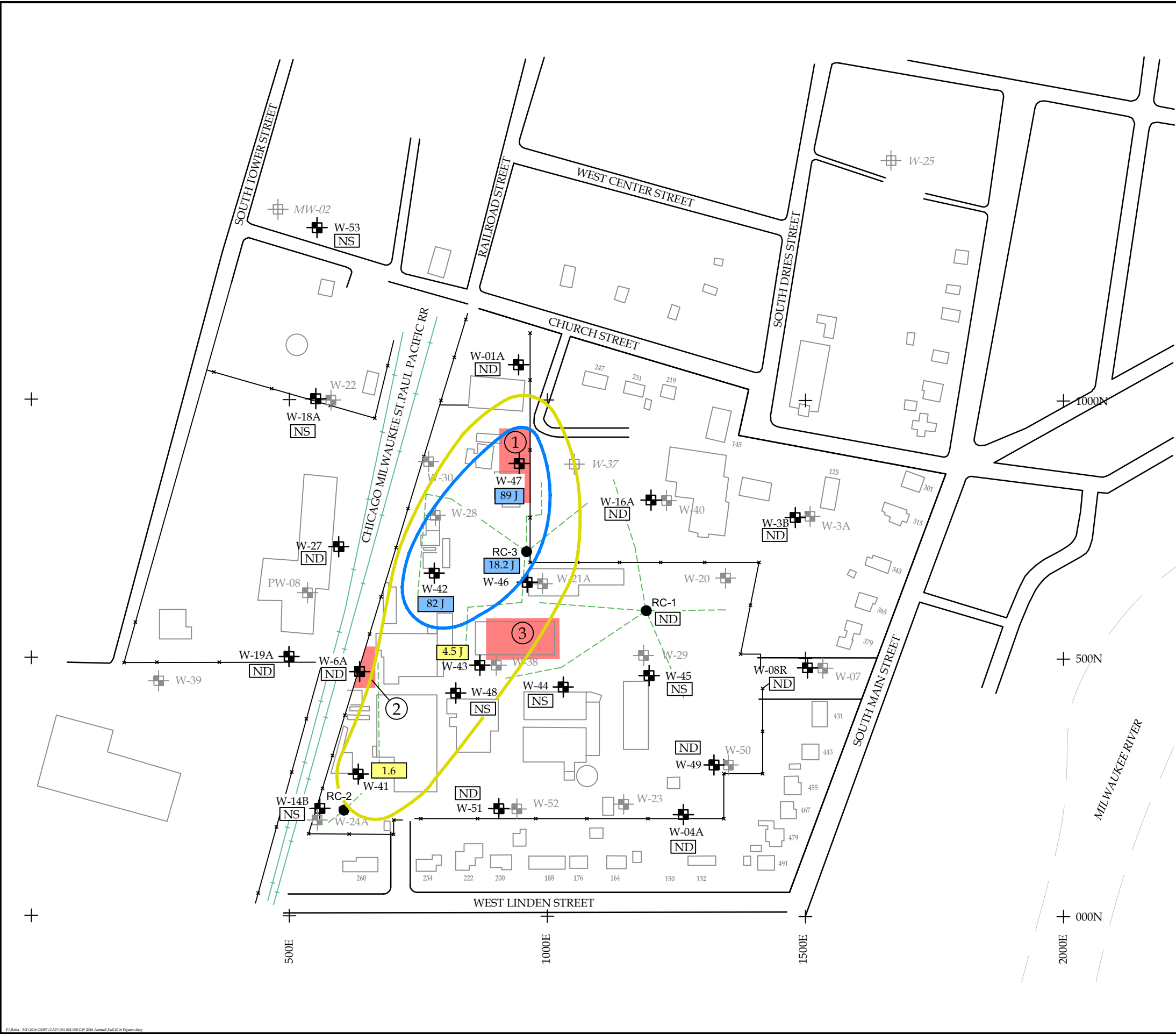
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REVIEWED BY: RAC DWG: FALL 2016 FIGURES **FIGURE 6**





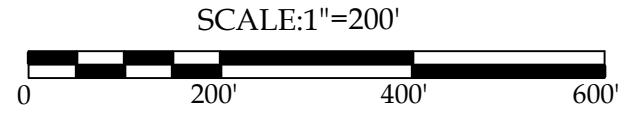
**LEGEND**

- W-18A MONITORING WELL LOCATION AND NUMBER
- W-18A ABANDONED WELL LOCATION AND NUMBER
- APPROXIMATE EXTENT OF ES LIMITS
- APPROXIMATE EXTENT OF PAL LIMITS
- RANNEY COLLECTOR
- AREA OF CONCERN

ND	Not Detected
NS	Not Sampled
J	Estimated Value
	PAL Exceedance
	ES Exceedance

**NOTES**

1. BASE MAP WAS DEVELOPED FROM DRAWINGS PROVIDED BY RMT, INC.
2. W-37 WAS ABANDONED AUGUST 2, 1996.
3. W-25 WAS ABANDONED JULY 29, 1997.
4. MW-02 WAS ABANDONED NOVEMBER 2004.



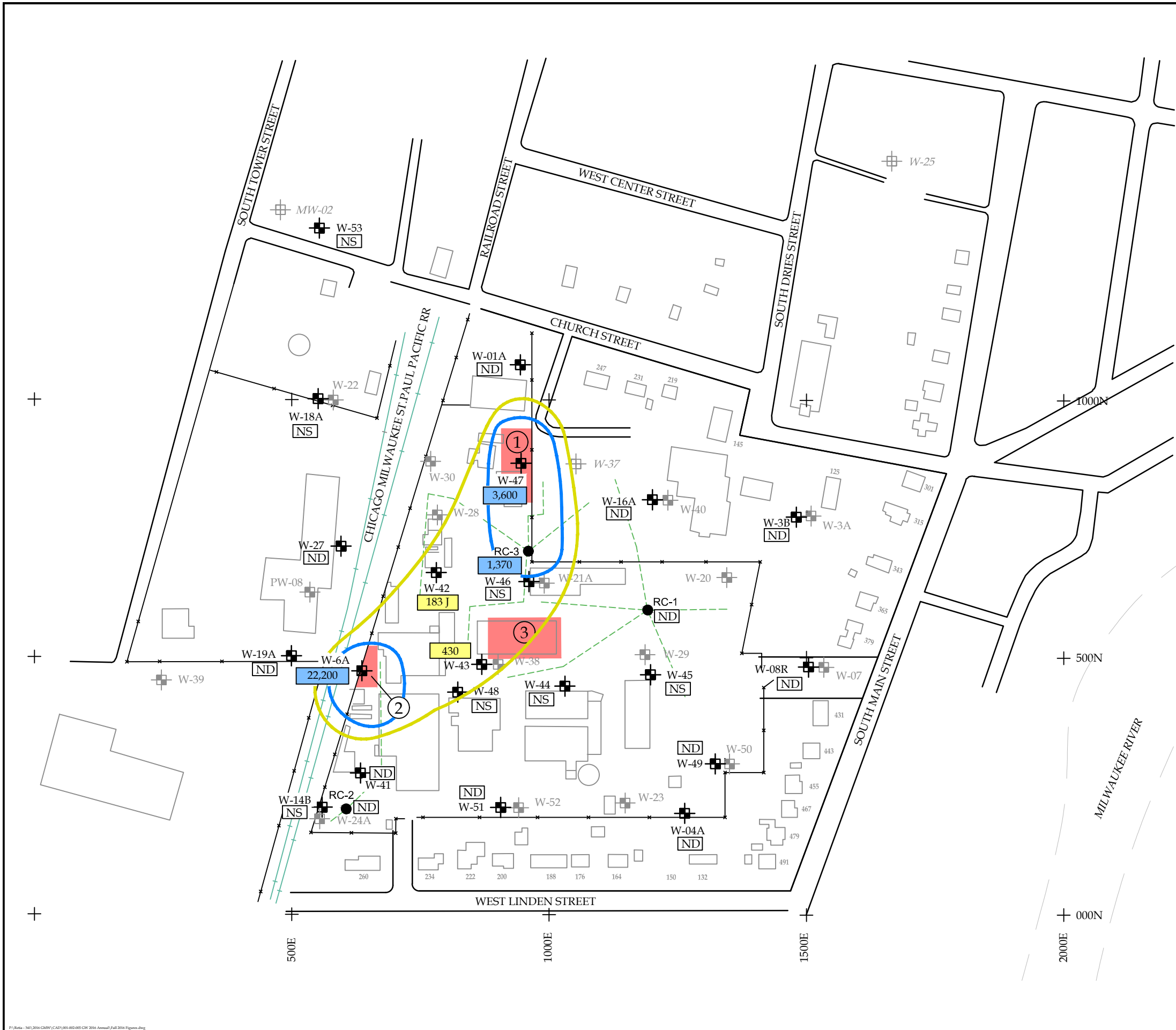
BENZENE IN GROUNDWATER (ug/L)  
 GLACIAL DRIFT AQUIFER - FALL 2016  
 ARKEMA COATING RESINS  
 SAUKVILLE, WISCONSIN

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REVIEWED BY: RAC	<b>FIGURE 7</b>	

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**LEGEND**

- W-18A MONITORING WELL LOCATION AND NUMBER
- W-18A ABANDONED WELL LOCATION AND NUMBER
- APPROXIMATE EXTENT OF ES LIMITS
- APPROXIMATE EXTENT OF PAL LIMITS
- RANNEY COLLECTOR
- AREA OF CONCERN

ND	Not Detected
NS	Not Sampled
	PAL Exceedance
	ES Exceedance

**NOTES**

1. BASE MAP WAS DEVELOPED FROM DRAWINGS PROVIDED BY RMT, INC.
2. W-37 WAS ABANDONED AUGUST 2, 1996.
3. W-25 WAS ABANDONED JULY 29, 1997.
4. MW-02 WAS ABANDONED NOVEMBER 2004.



SCALE: 1"=200'



**ETHYLBENZENE IN GROUNDWATER (ug/L)**  
**GLACIAL DRIFT AQUIFER - FALL 2016**  
**ARKEMA COATING RESINS**  
**SAUKVILLE, WISCONSIN**

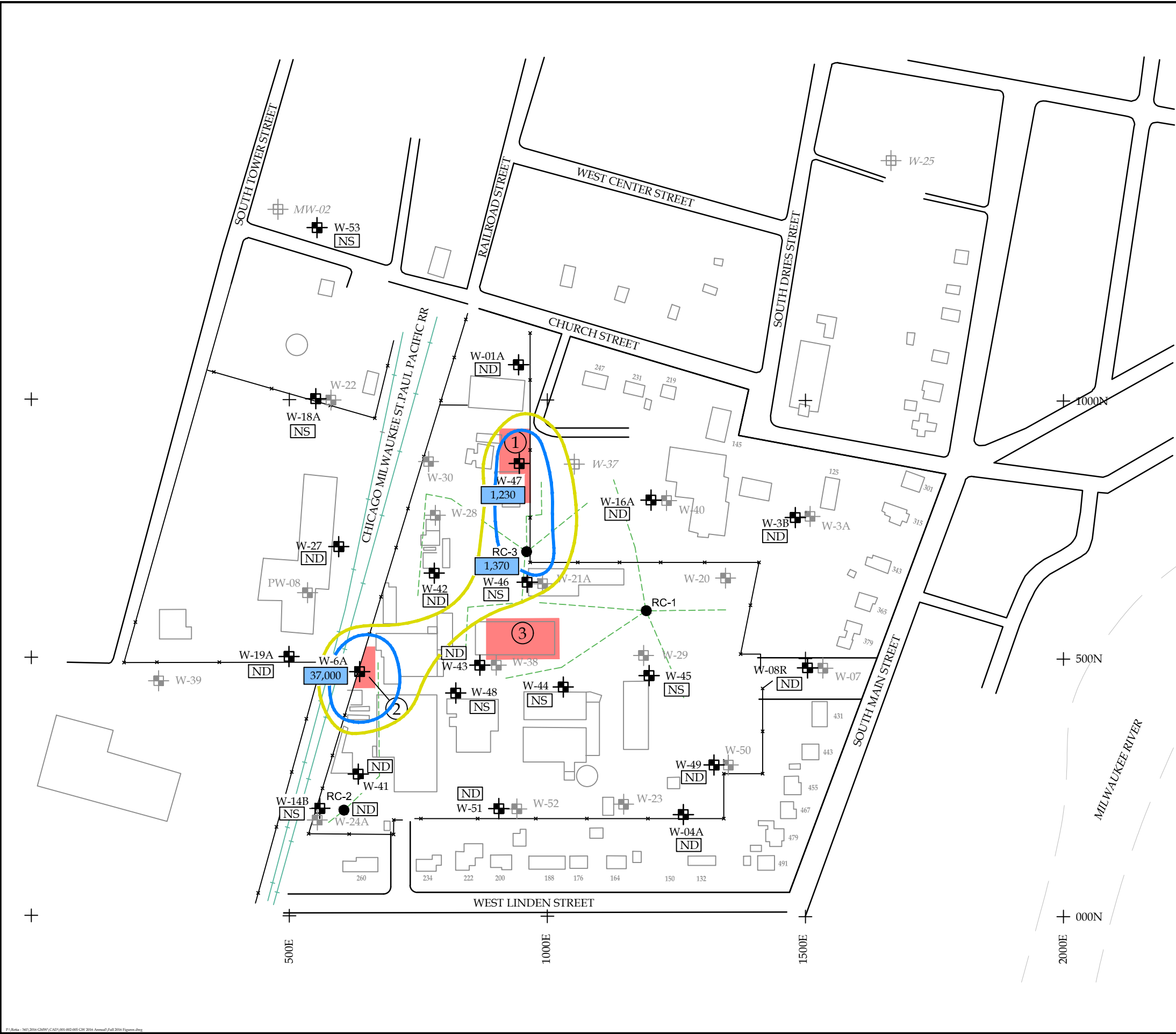
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REVIEWED BY: RAC DWG: FALL 2016 FIGURES **FIGURE 8**



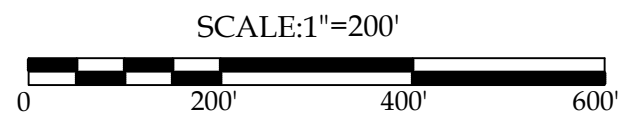
**LEGEND**

- W-18A MONITORING WELL LOCATION AND NUMBER
- W-18A ABANDONED WELL LOCATION AND NUMBER
- APPROXIMATE EXTENT OF ES LIMITS
- APPROXIMATE EXTENT OF PAL LIMITS
- RANNEY COLLECTOR
- AREA OF CONCERN

ND	Not Detected
NS	Not Sampled
	ES Exceedance

**NOTES**

1. BASE MAP WAS DEVELOPED FROM DRAWINGS PROVIDED BY RMT, INC.
2. W-37 WAS ABANDONED AUGUST 2, 1996.
3. W-25 WAS ABANDONED JULY 29, 1997.
4. MW-02 WAS ABANDONED NOVEMBER 2004.

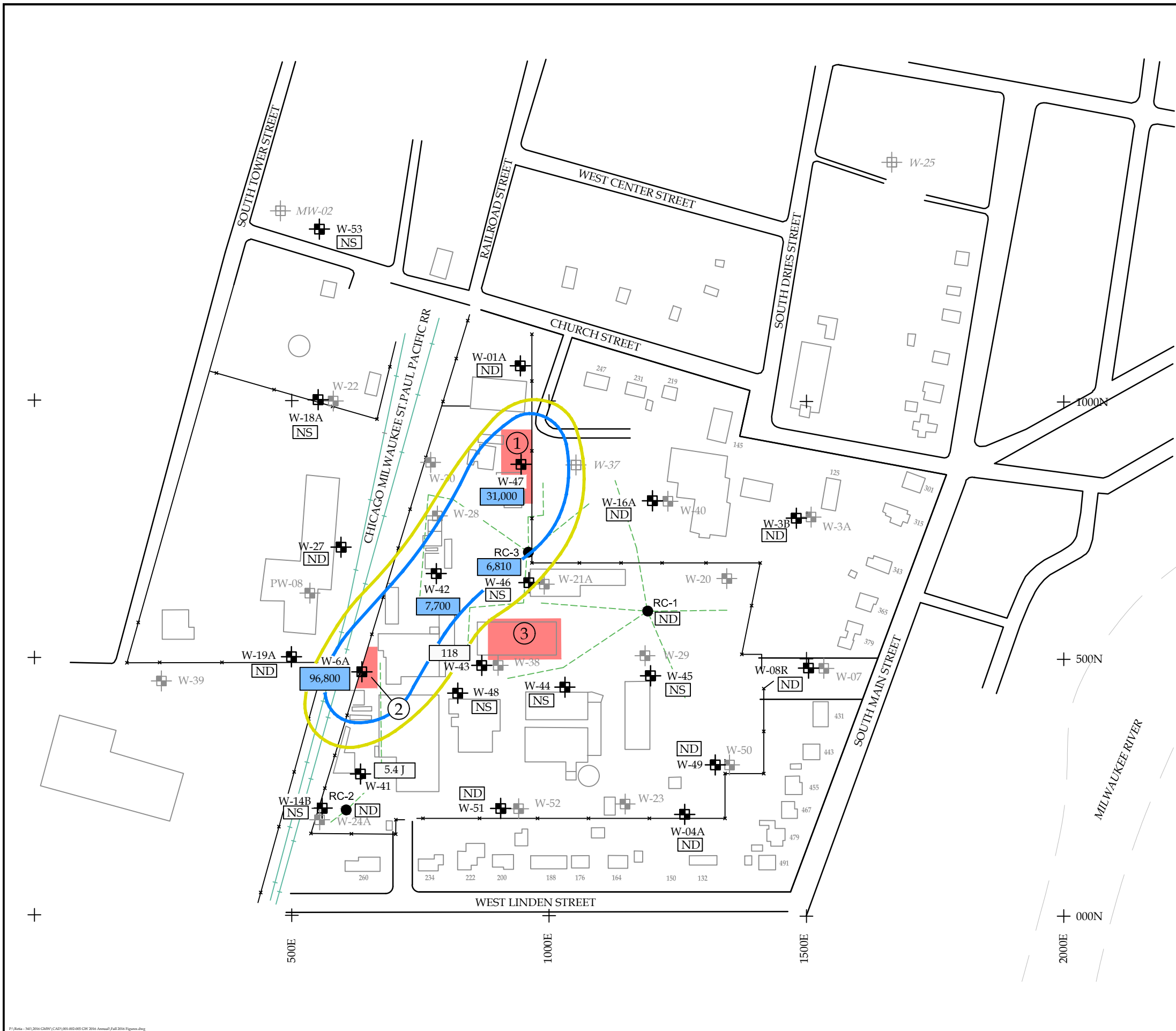


**TOLUENE IN GROUNDWATER (ug/L)**  
**GLACIAL DRIFT AQUIFER - FALL 2016**  
**ARKEMA COATING RESINS**  
**SAUKVILLE, WISCONSIN**

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REVIEWED BY: RAC	DWG: FALL 2016 FIGURES	<b>FIGURE 9</b>

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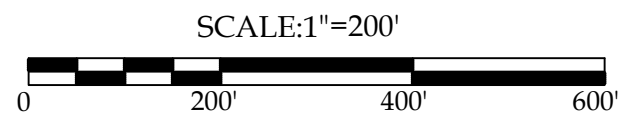
**LEGEND**

- W-18A MONITORING WELL LOCATION AND NUMBER
- W-18A ABANDONED WELL LOCATION AND NUMBER
- APPROXIMATE EXTENT OF ES LIMITS
- APPROXIMATE EXTENT OF PAL LIMITS
- RANNEY COLLECTOR
- AREA OF CONCERN

ND	Not Detected
NS	Not Sampled
J	Estimated Value
	ES Exceedance

**NOTES**

1. BASE MAP WAS DEVELOPED FROM DRAWINGS PROVIDED BY RMT, INC.
2. W-37 WAS ABANDONED AUGUST 2, 1996.
3. W-25 WAS ABANDONED JULY 29, 1997.
4. MW-02 WAS ABANDONED NOVEMBER 2004.



**TOTAL XYLENES IN GROUNDWATER (ug/L)  
GLACIAL DRIFT AQUIFER - FALL 2016  
ARKEMA COATING RESINS  
SAUKVILLE, WISCONSIN**

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REVIEWED BY: RAC	DWG: FALL 2016 FIGURES	<b>FIGURE 10</b>

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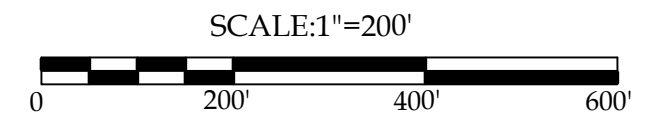
LEGEND

- W-18A MONITORING WELL LOCATION AND NUMBER
- W-18A ABANDONED WELL LOCATION AND NUMBER
- APPROXIMATE EXTENT OF GROUNDWATER CONTAINING TCE & VC
- RANNEY COLLECTOR
- AREA OF CONCERN

TCE	Trichloroethene	ND	Not Detected
VC	Vinyl Chloride	NS	Not Sampled
			ES Exceedance

NOTES

1. BASE MAP WAS DEVELOPED FROM DRAWINGS PROVIDED BY RMT, INC.
2. W-37 WAS ABANDONED AUGUST 2, 1996.
3. W-25 WAS ABANDONED JULY 29, 1997.
4. MW-02 WAS ABANDONED NOVEMBER 2004.



TCE AND VC IN GROUNDWATER (ug/L)  
 GLACIAL DRIFT AQUIFER - FALL 2016  
 ARKEMA COATING RESINS  
 SAUKVILLE, WISCONSIN

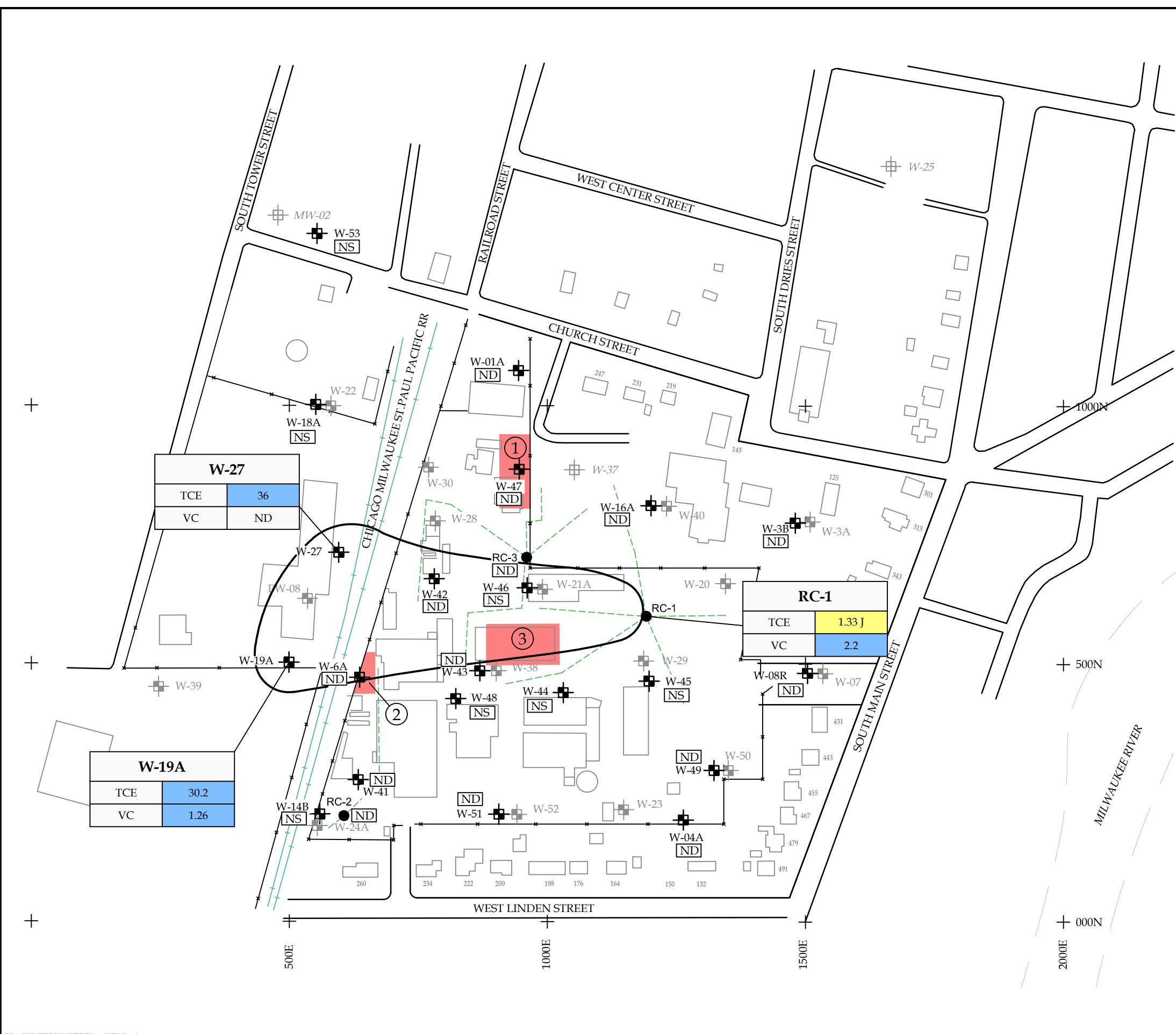
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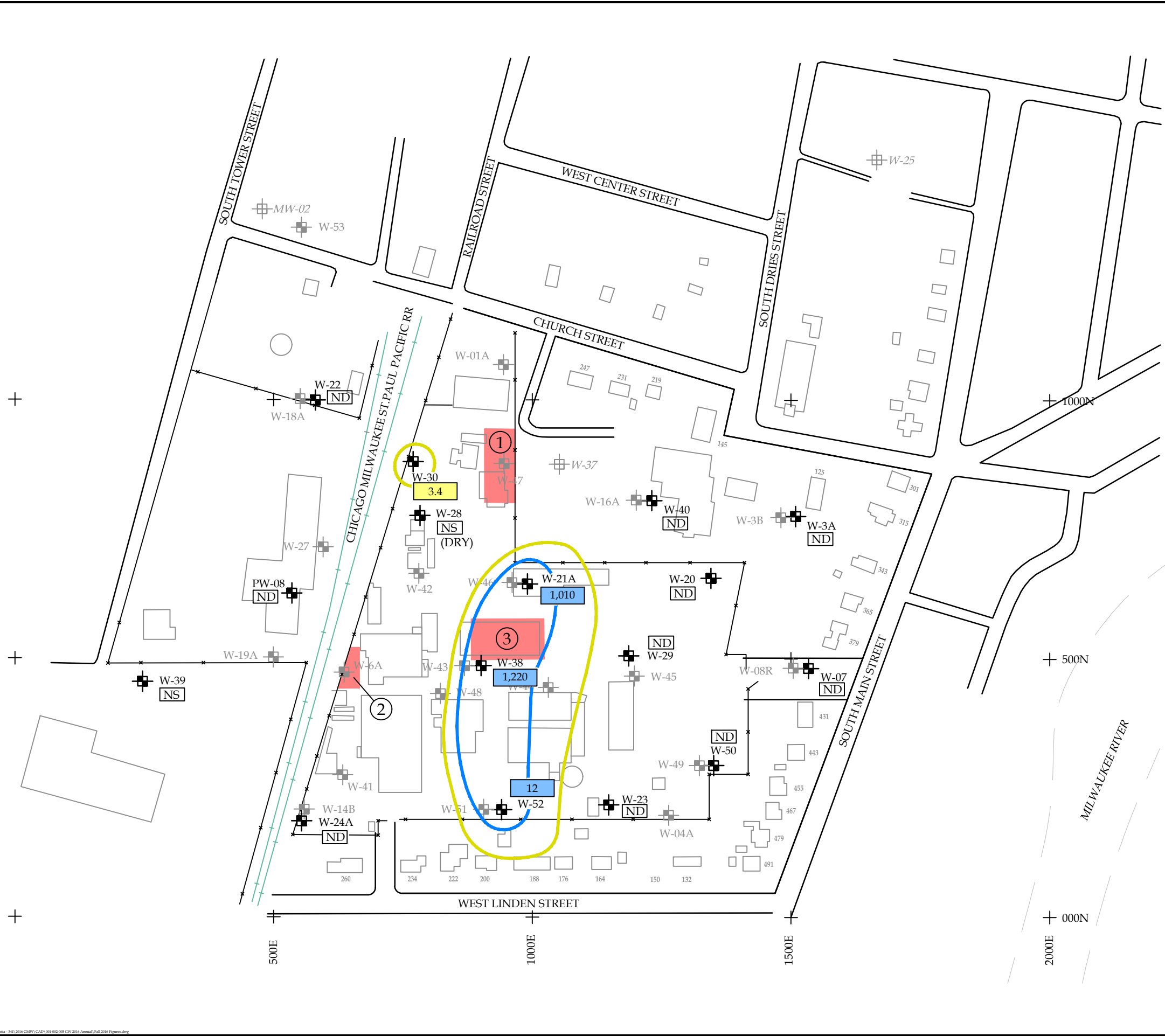
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REVIEWED BY: RAC DWG: FALL 2016 FIGURES **FIGURE 11**





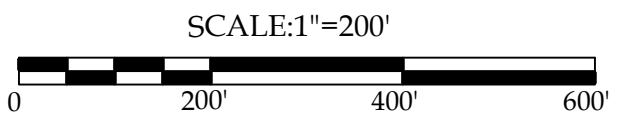


**LEGEND**

- W-18A MONITORING WELL LOCATION AND NUMBER
- W-18A ABANDONED WELL LOCATION AND NUMBER
- APPROXIMATE EXTENT OF ES LIMITS
- APPROXIMATE EXTENT OF PAL LIMITS
- AREA OF CONCERN

ND	Not Detected
NS	Not Sampled
J	Estimated Value
	PAL Exceedance
	ES Exceedance

- NOTES**
1. BASE MAP WAS DEVELOPED FROM DRAWINGS PROVIDED BY RMT, INC.
  2. W-37 WAS ABANDONED AUGUST 2, 1996.
  3. W-25 WAS ABANDONED JULY 29, 1997.
  4. MW-02 WAS ABANDONED NOVEMBER 2004.



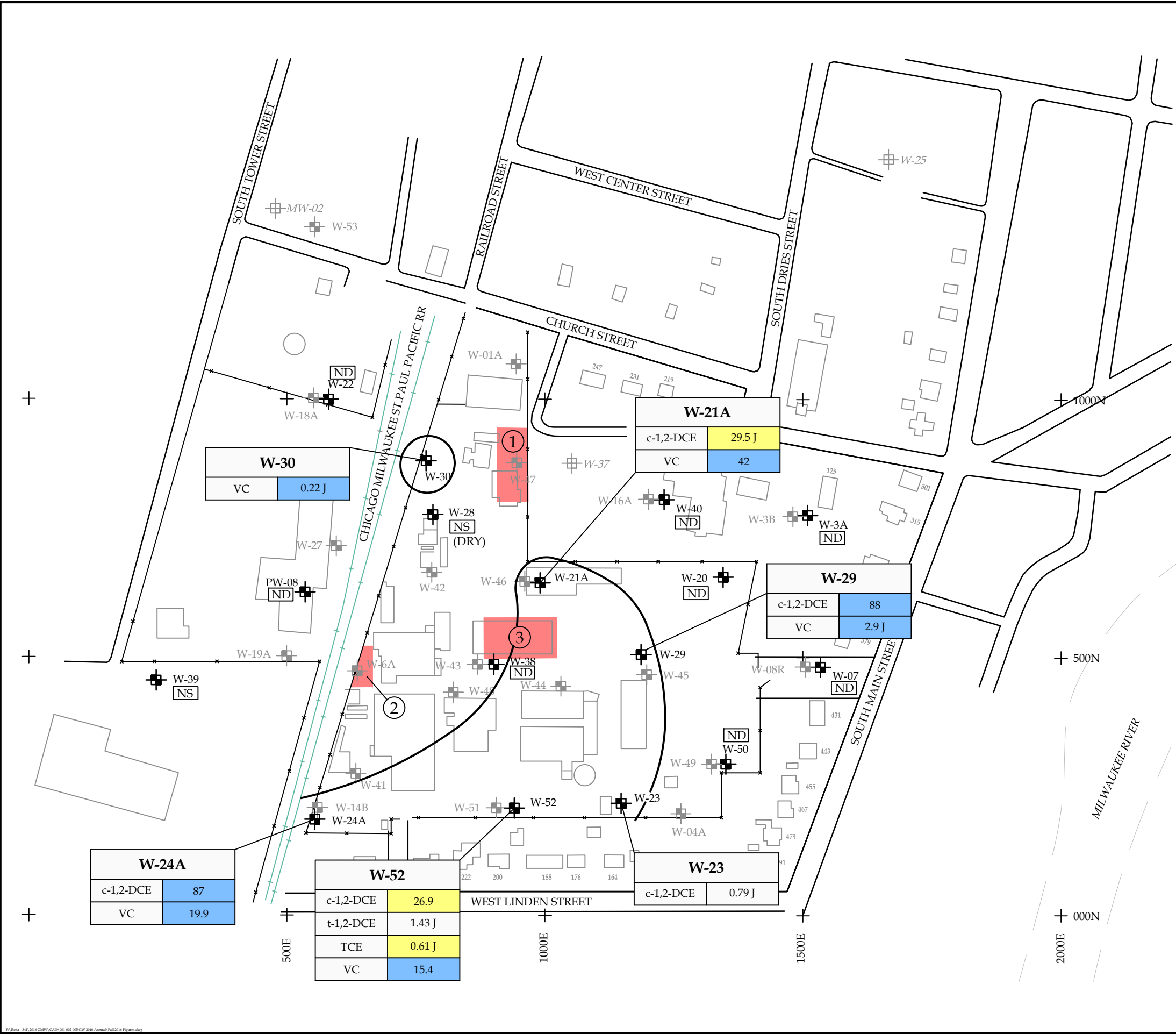
**BENZENE IN GROUNDWATER (ug/L) SHALLOW AND DEEP DOLOMITE AQUIFERS - FALL 2016**  
**ARKEMA COATING RESINS**  
**SAUKVILLE, WISCONSIN**

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REVIEWED BY: RAC	<b>FIGURE 12</b>	

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141\2016\CMW\CAD\W-01-02-05-06-07-08-09-10-11-12-13-14-15-16-17-18-19-20-21-22-23-24-25-26-27-28-29-30-31-32-33-34-35-36-37-38-39-40-41-42-43-44-45-46-47-48-49-50-51-52-53-54-55-56-57-58-59-60-61-62-63-64-65-66-67-68-69-70-71-72-73-74-75-76-77-78-79-80-81-82-83-84-85-86-87-88-89-90-91-92-93-94-95-96-97-98-99-100-101-102-103-104-105-106-107-108-109-110-111-112-113-114-115-116-117-118-119-120-121-122-123-124-125-126-127-128-129-130-131-132-133-134-135-136-137-138-139-140-141-142-143-144-145-146-147-148-149-150-151-152-153-154-155-156-157-158-159-160-161-162-163-164-165-166-167-168-169-170-171-172-173-174-175-176-177-178-179-180-181-182-183-184-185-186-187-188-189-190-191-192-193-194-195-196-197-198-199-200-201-202-203-204-205-206-207-208-209-210-211-212-213-214-215-216-217-218-219-220-221-222-223-224-225-226-227-228-229-230-231-232-233-234-235-236-237-238-239-240-241-242-243-244-245-246-247-248-249-250-251-252-253-254-255-256-257-258-259-260-261-262-263-264-265-266-267-268-269-270-271-272-273-274-275-276-277-278-279-280-281-282-283-284-285-286-287-288-289-290-291-292-293-294-295-296-297-298-299-300-301-302-303-304-305-306-307-308-309-310-311-312-313-314-315-316-317-318-319-320-321-322-323-324-325-326-327-328-329-330-331-332-333-334-335-336-337-338-339-340-341-342-343-344-345-346-347-348-349-350-351-352-353-354-355-356-357-358-359-360-361-362-363-364-365-366-367-368-369-370-371-372-373-374-375-376-377-378-379-380-381-382-383-384-385-386-387-388-389-390-391-392-393-394-395-396-397-398-399-400-401-402-403-404-405-406-407-408-409-410-411-412-413-414-415-416-417-418-419-420-421-422-423-424-425-426-427-428-429-430-431-432-433-434-435-436-437-438-439-440-441-442-443-444-445-446-447-448-449-450-451-452-453-454-455-456-457-458-459-460-461-462-463-464-465-466-467-468-469-470-471-472-473-474-475-476-477-478-479-480-481-482-483-484-485-486-487-488-489-490-491-492-493-494-495-496-497-498-499-500-501-502-503-504-505-506-507-508-509-510-511-512-513-514-515-516-517-518-519-520-521-522-523-524-525-526-527-528-529-530-531-532-533-534-535-536-537-538-539-540-541-542-543-544-545-546-547-548-549-550-551-552-553-554-555-556-557-558-559-560-561-562-563-564-565-566-567-568-569-570-571-572-573-574-575-576-577-578-579-580-581-582-583-584-585-586-587-588-589-590-591-592-593-594-595-596-597-598-599-600-601-602-603-604-605-606-607-608-609-610-611-612-613-614-615-616-617-618-619-620-621-622-623-624-625-626-627-628-629-630-631-632-633-634-635-636-637-638-639-640-641-642-643-644-645-646-647-648-649-650-651-652-653-654-655-656-657-658-659-660-661-662-663-664-665-666-667-668-669-670-671-672-673-674-675-676-677-678-679-680-681-682-683-684-685-686-687-688-689-690-691-692-693-694-695-696-697-698-699-700-701-702-703-704-705-706-707-708-709-710-711-712-713-714-715-716-717-718-719-720-721-722-723-724-725-726-727-728-729-730-731-732-733-734-735-736-737-738-739-740-741-742-743-744-745-746-747-748-749-750-751-752-753-754-755-756-757-758-759-760-761-762-763-764-765-766-767-768-769-770-771-772-773-774-775-776-777-778-779-780-781-782-783-784-785-786-787-788-789-790-791-792-793-794-795-796-797-798-799-800-801-802-803-804-805-806-807-808-809-810-811-812-813-814-815-816-817-818-819-820-821-822-823-824-825-826-827-828-829-830-831-832-833-834-835-836-837-838-839-840-841-842-843-844-845-846-847-848-849-850-851-852-853-854-855-856-857-858-859-860-861-862-863-864-865-866-867-868-869-870-871-872-873-874-875-876-877-878-879-880-881-882-883-884-885-886-887-888-889-890-891-892-893-894-895-896-897-898-899-900-901-902-903-904-905-906-907-908-909-910-911-912-913-914-915-916-917-918-919-920-921-922-923-924-925-926-927-928-929-930-931-932-933-934-935-936-937-938-939-940-941-942-943-944-945-946-947-948-949-950-951-952-953-954-955-956-957-958-959-960-961-962-963-964-965-966-967-968-969-970-971-972-973-974-975-976-977-978-979-980-981-982-983-984-985-986-987-988-989-990-991-992-993-994-995-996-997-998-999-1000-1001-1002-1003-1004-1005-1006-1007-1008-1009-1010-1011-1012-1013-1014-1015-1016-1017-1018-1019-1020-1021-1022-1023-1024-1025-1026-1027-1028-1029-1030-1031-1032-1033-1034-1035-1036-1037-1038-1039-1040-1041-1042-1043-1044-1045-1046-1047-1048-1049-1050-1051-1052-1053-1054-1055-1056-1057-1058-1059-1060-1061-1062-1063-1064-1065-1066-1067-1068-1069-1070-1071-1072-1073-1074-1075-1076-1077-1078-1079-1080-1081-1082-1083-1084-1085-1086-1087-1088-1089-1090-1091-1092-1093-1094-1095-1096-1097-1098-1099-1100-1101-1102-1103-1104-1105-1106-1107-1108-1109-1110-1111-1112-1113-1114-1115-1116-1117-1118-1119-1120-1121-1122-1123-1124-1125-1126-1127-1128-1129-1130-1131-1132-1133-1134-1135-1136-1137-1138-1139-1140-1141-1142-1143-1144-1145-1146-1147-1148-1149-1150-1151-1152-1153-1154-1155-1156-1157-1158-1159-1160-1161-1162-1163-1164-1165-1166-1167-1168-1169-1170-1171-1172-1173-1174-1175-1176-1177-1178-1179-1180-1181-1182-1183-1184-1185-1186-1187-1188-1189-1190-1191-1192-1193-1194-1195-1196-1197-1198-1199-1200-1201-1202-1203-1204-1205-1206-1207-1208-1209-1210-1211-1212-1213-1214-1215-1216-1217-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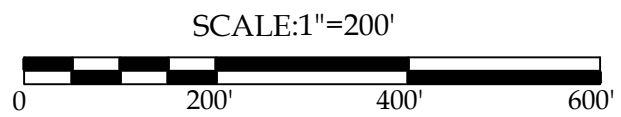
**LEGEND**

- W-18A MONITORING WELL LOCATION AND NUMBER
- W-18A ABANDONED WELL LOCATION AND NUMBER
- APPROXIMATE EXTENT OF CVOCs IN EXCESS OF PALs AND ES
- AREA OF CONCERN

c-1,2-DCE	cis-1,2-Dichloroethene	ND	Not Detected
t-1,2-DCE	trans-1,2-Dichloroethene	NS	Not Sampled
TCE	Trichloroethene	J	Estimated Value
VC	Vinyl Chloride		PAL Exceedance
			ES Exceedance

**NOTES**

1. BASE MAP WAS DEVELOPED FROM DRAWINGS PROVIDED BY RMT, INC.
2. W-37 WAS ABANDONED AUGUST 2, 1996.
3. W-25 WAS ABANDONED JULY 29, 1997.
4. MW-02 WAS ABANDONED NOVEMBER 2004.



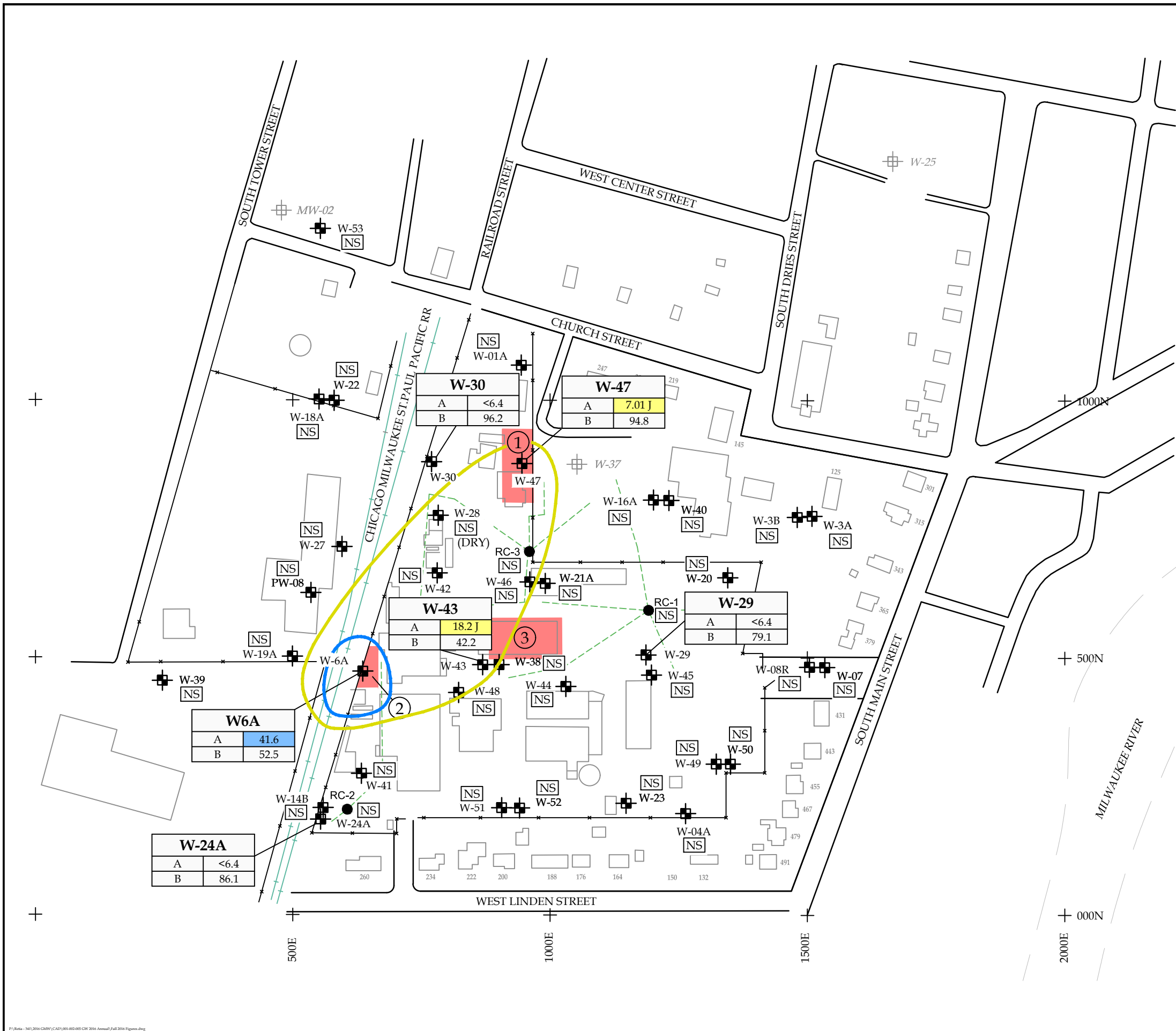
**CVOCs IN GROUNDWATER (ug/L) SHALLOW AND DEEP DOLOMITE AQUIFERS - FALL 2016**  
**ARKEMA COATING RESINS**  
**SAUKVILLE, WISCONSIN**

**Endpoint Solutions**

6871 S. Lovers Lane  
 Franklin, WI 53132

Phone: (414) 427-1200	Fax: (414) 427-1259
DRAWN BY: NWD	DATE: 06/08/17
REVIEWED BY: RAC	DWG: FALL 2016 FIGURES

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**LEGEND**

- W-18A MONITORING WELL LOCATION AND NUMBER
- W-18A ABANDONED WELL LOCATION AND NUMBER
- APPROXIMATE EXTENT OF ES LIMITS
- APPROXIMATE EXTENT OF PAL LIMITS
- RANNEY COLLECTOR
- AREA OF CONCERN

A	Arsenic
B	Barium
ND	Not Detected
NS	Not Sampled
	PAL Exceedance
	ES Exceedance

**NOTES**

1. BASE MAP WAS DEVELOPED FROM DRAWINGS PROVIDED BY RMT, INC.
2. W-37 WAS ABANDONED AUGUST 2, 1996.
3. W-25 WAS ABANDONED JULY 29, 1997.
4. MW-02 WAS ABANDONED NOVEMBER 2004.



SCALE: 1"=200'



METALS IN GROUNDWATER (ug/L) COMBINED GLACIAL DRIFT AND DOLOMITE AQUIFERS - FALL 2016  
 ARKEMA COATING RESINS  
 SAUKVILLE, WISCONSIN

**Endpoint Solutions**

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Phone: (414) 427-1200

Fax: (414) 427-1259

DRAWN BY: NWD

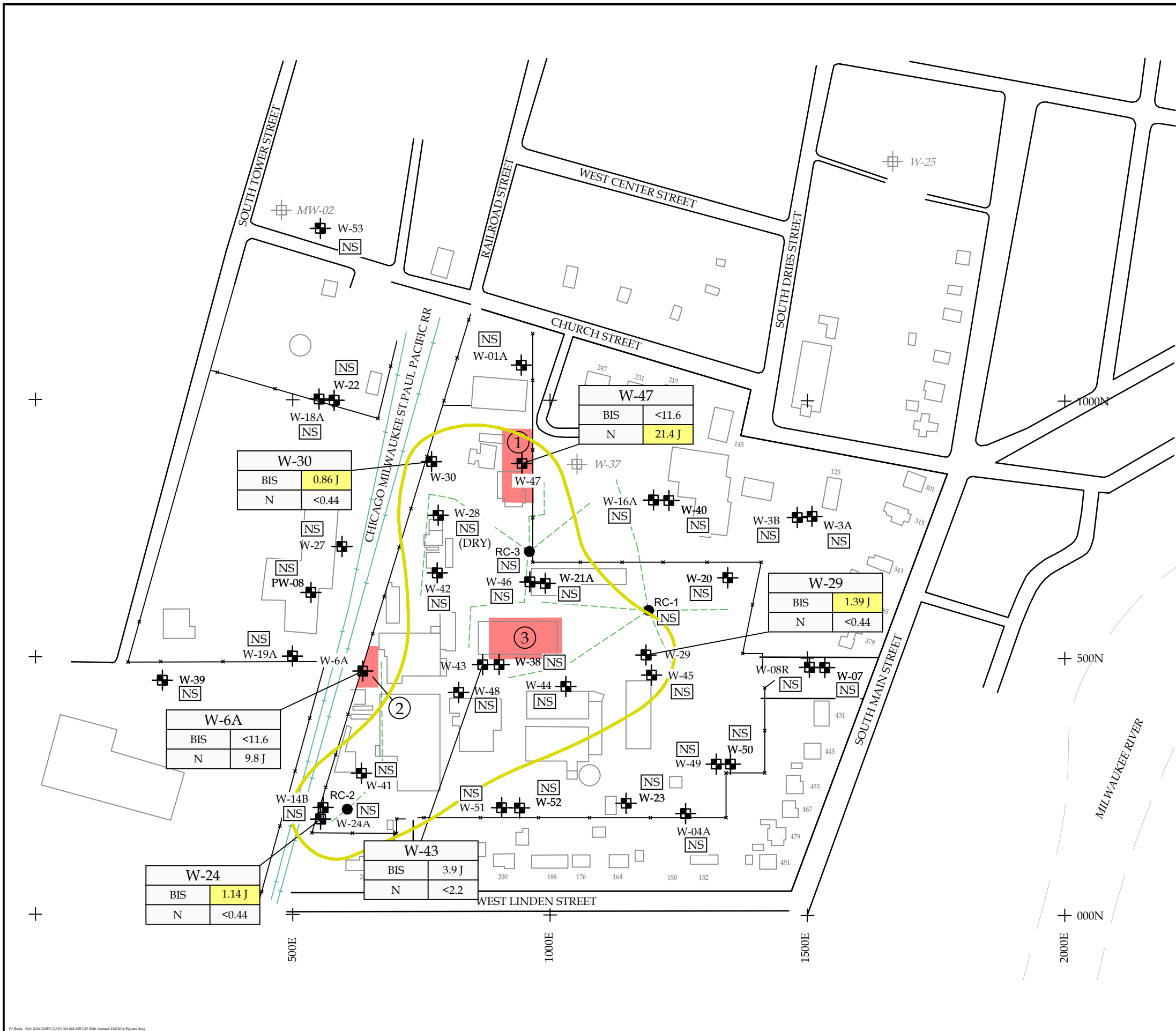
DATE: 06/08/17

341-001-002-004

REVIEWED BY: RAC

DWG: FALL 2016 FIGURES

**FIGURE 14**



**LEGEND**

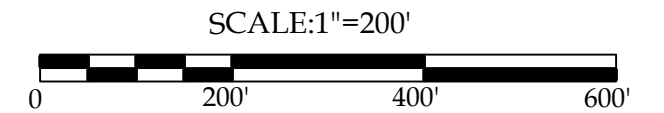
- W-18A MONITORING WELL LOCATION AND NUMBER
- W-18A ABANDONED WELL LOCATION AND NUMBER
- APPROXIMATE EXTENT OF ES LIMITS
- APPROXIMATE EXTENT OF PAL LIMITS
- RANNEY COLLECTOR
- AREA OF CONCERN

BIS	bis(2-ethylhexyl)phthalate
N	Naphthalene

ND	Not Analyzed
NS	Not Sampled
J	Estimated Value
	PAL Exceedance
	ES Exceedance

**NOTES**

1. BASE MAP WAS DEVELOPED FROM DRAWINGS PROVIDED BY RMT, INC.
2. W-37 WAS ABANDONED AUGUST 2, 1996.
3. W-25 WAS ABANDONED JULY 29, 1997.
4. MW-02 WAS ABANDONED NOVEMBER 2004.



SVOCs IN GROUNDWATER (ug/L) COMBINED GLACIAL DRIFT AND DOLOMITE AQUIFERS - FALL 2016  
 ARKEMA COATING RESINS  
 SAUKVILLE, WISCONSIN

**Endpoint Solutions**

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DRAWN BY: NWD DATE: 06/08/17 341-001-002-004

REVIEWED BY: RAC DWG: FALL 2016 FIGURES **FIGURE 15**

## **APPENDIX A**

### QUARTERLY REPORT SUMMARY TABLES

Table 1

Municipal Water Supply Wells - VOC Results  
Arkema Coating Resins  
Saukville, Wisconsin

Sample ID	MW-1-16-1	DUP1-16-1	TB-16-1			
Collection Date	1/19/2016	1/19/2016	1/19/2016			
Laboratory ID	5030419A	5030419B	5030419C			
Duplicate Parent		MW1-16-1				
Monitoring Objective	Receptor					
Hydrogeologic Unit	Deep Dolomite					
Dilution	1	1	1			
Parameter	PAL	ES	Units			
Acetone	1,800	9,000	µg/L	<5.9	<5.9	<5.9
Benzene	0.5	5	µg/L	<0.44	<0.44	<0.44
Bromodichloromethane	0.06	0.6	µg/L	<1.9	<1.9	<1.9
Bromoform	0.44	4.4	µg/L	<0.46	<0.46	<0.46
Bromomethane	1	10	µg/L	<3.2	<3.2	<3.2
Carbon disulfide	200	1,000	µg/L	<1	<1	<1
Carbon tetrachloride	0.5	5	µg/L	<0.51	<0.51	<0.51
Chlorobenzene	20	100	µg/L	<0.46	<0.46	<0.46
Chloroethane	80	400	µg/L	<0.65	<0.65	<0.65
Chloroform	0.6	6	µg/L	<0.43	<0.43	<0.43
Dibromochloromethane	6	60	µg/L	<0.45	<0.45	<0.45
1,4-Dichlorobenzene	15	75	µg/L	<0.49	<0.49	<0.49
1,3-Dichlorobenzene	120	600	µg/L	<0.52	<0.52	<0.52
1,2-Dichlorobenzene	60	600	µg/L	<0.46	<0.46	<0.46
1,2-Dichloroethane	0.5	5	µg/L	<0.48	<0.48	<0.48
1,1-Dichloroethane	85	850	µg/L	<1.1	<1.1	<1.1
1,1-Dichloroethene	0.7	7	µg/L	<0.65	<0.65	<0.65
cis-1,2-Dichloroethene	7	70	µg/L	<0.45	<0.45	<0.45
trans-1,2-Dichloroethene	20	100	µg/L	<0.54	<0.54	<0.54
1,2-Dichloropropane	0.5	5	µg/L	<0.43	<0.43	<0.43
trans-1,3-Dichloropropene	0.04	0.4	µg/L	<0.49	<0.49	<0.49
cis-1,3-Dichloropropene	0.04	0.4	µg/L	<0.42	<0.42	<0.42
Ethylbenzene	140	700	µg/L	<0.71	<0.71	<0.71
2-Hexanone	-	-	µg/L	<4.3	<4.3	<4.3
Methyl ethyl ketone (MEK)	800	4,000	µg/L	<4	<4	<4
4-Methyl-2-pentanone (MIBK)	50	500	µg/L	<4.2	<4.2	<4.2
Methylene chloride	0.5	5	µg/L	<1.3	<1.3	<1.3
Styrene	10	100	µg/L	<0.8	<0.8	<0.8
1,1,2,2-Tetrachloroethane	0.02	0.2	µg/L	<0.52	<0.52	<0.52
1,1,1,2-Tetrachloroethane	7	70	µg/L	<0.48	<0.48	<0.48
Tetrachloroethene (PCE)	0.5	5	µg/L	<0.49	<0.49	<0.49
Toluene	160	800	µg/L	<0.44	<0.44	<0.44
1,1,1-Trichloroethane	40	200	µg/L	<0.84	<0.84	<0.84
Trichloroethene (TCE)	0.5	5	µg/L	<0.47	<0.47	<0.47
Vinyl Acetate	-	-	µg/L	<0.97	<0.97	<0.97
Vinyl Chloride	0.02	0.2	µg/L	<0.17	<0.17	<0.17
m&p-Xylene	400	2,000	µg/L	<2.2	<2.2	<2.2
o-Xylene			µg/L	<0.9	<0.9	<0.9
Total VOCs			µg/L	0.0	0.0	0.0

Indicates concentration in exceedance of Wisconsin Administrative Code Chapter NR140 Preventive Action Limit (PAL)

Indicates concentration in exceedance of Wisconsin Administrative Code Chapter NR140 Enforcement Standard (ES)

- Indicates PAL and ES do not exist

VOC - volatile organic compound

µg/L - micrograms per liter

Table 1

Municipal Water Supply Wells - VOC Results  
Arkema Coating Resins  
Saukville, Wisconsin

Sample ID	MW-1-16-2	MW-3-16-2	MW-4-16-2	DUP1-16-2	Trip Blank
Collection Date	4/12/2016	4/12/2016	4/12/2016	4/12/2016	4/12/2016
Laboratory ID	5030858K	5030858J	5030858L	5028784I	5030858Y
Duplicate Parent				(MW-4-16-2)	
Monitoring Objective	Receptor	Receptor	Receptor		
Hydrogeologic Unit	Deep Dolomite	Deep Dolomite	Deep Dolomite		
Dilution	1	1	1	1	1
Parameter	PAL	ES	Units		
Acetone	# 1,800	9,000	µg/L	<5.9	<5.9
Benzene	0.5	5	µg/L	<0.44	<0.44
Bromochloromethane	-	-	µg/L	<1.9	<1.9
Bromoform	0.44	4.4	µg/L	<0.46	<0.46
Bromomethane	1	10	µg/L	<3.2	<3.2
Carbon disulfide	200	1,000	µg/L	<1	<1
Carbon tetrachloride	0.5	5	µg/L	<0.51	<0.51
Chlorobenzene	20	100	µg/L	<0.46	<0.46
Chloroethane	80	400	µg/L	<0.65	<0.65
Chloroform	0.6	6	µg/L	<0.43	<0.43
Dibromochloromethane	6	60	µg/L	<0.45	<0.45
1,4-Dichlorobenzene	15	75	µg/L	<0.49	<0.49
1,3-Dichlorobenzene	120	600	µg/L	<0.52	<0.52
1,2-Dichlorobenzene	60	600	µg/L	<0.46	<0.46
1,2-Dichloroethane	0.5	5	µg/L	<0.48	<0.48
1,1-Dichloroethane	85	850	µg/L	<1.1	<1.1
1,1-Dichloroethene	0.7	7	µg/L	<0.65	<0.65
cis-1,2-Dichloroethene	7	70	µg/L	<0.45	<0.45
trans-1,2-Dichloroethene	20	100	µg/L	<0.54	<0.54
1,2-Dichloropropane	0.5	5	µg/L	<0.43	<0.43
trans-1,3-Dichloropropene	0.04	0.4	µg/L	<0.49	<0.49
cis-1,3-Dichloropropene	0.04	0.4	µg/L	<0.42	<0.42
Ethylbenzene	140	700	µg/L	<0.71	<0.71
2-Hexanone	-	-	µg/L	<4.3	<4.3
Methyl ethyl ketone (MEK)	800	4,000	µg/L	<4	<4
Methyl isobutyl ketone (MIBK)	50	500	µg/L	<4.2	<4.2
Methylene chloride	0.5	5	µg/L	<1.3	<1.3
Styrene	10	100	µg/L	<0.8	<0.8
1,1,2,2-Tetrachloroethane	0.02	0.2	µg/L	<0.52	<0.52
1,1,1,2-Tetrachloroethane	7	70	µg/L	<0.48	<0.48
Tetrachloroethene	0.5	5	µg/L	<0.49	<0.49
Toluene	160	800	µg/L	<0.44	<0.44
1,1,1-Trichloroethane	40	200	µg/L	<0.84	<0.84
Trichloroethene (TCE)	0.5	5	µg/L	<0.47	<0.47
Vinyl Acetate	-	-	µg/L	<0.97	<0.97
Vinyl Chloride	0.02	0.2	µg/L	<0.17	<0.17
m&p-Xylene			µg/L	<2.2	<2.2
o-Xylene	400	2,000	µg/L	<0.9	<0.9
Total VOCs			µg/L	0.0	0.0
Previous Results			µg/L	0.0	0.0
Date				Oct-15	Jan-16
Dissolved Oxygen			mg/L	2.68	3.50
pH				7.01	6.93
Conductivity			ms/cm	0.538	0.599
Temperature			°C	10.64	10.01
Oxidation-Reduction Potential			mV	5.0	52.3

Indicates concentration in exceedance of Wisconsin Administrative Code Chapter NR140 Preventive Action Limit (PAL)

Indicates concentration in exceedance of Wisconsin Administrative Code Chapter NR140 Enforcement Standard (ES)

"-" Indicates no published standard.

VOC - volatile organic compound

mg/L - milligrams per liter

µg/L - micrograms per liter

ms/cm - microsiemens per centimeter

°C - degrees celsius

mV - millivolts

Table 2

POTW VOC Results  
Arkema Coating Resins  
Saukville, Wisconsin

Sample ID	POTW-I-16-2	POTW-E-16-2	POTW-S-16-2
Collection Date	4/12/2016	4/12/2016	4/12/2016
Laboratory ID	5030858H	5030858G	5030858I
Duplicate Parent			
Monitoring Objective	Receptor	Receptor	Receptor
Hydrogeologic Unit	POTW	POTW	POTW
Dilution	1	1	1000
Parameter	Units		
Acetone	µg/L	<b>12.6 J</b>	<5.9
Benzene	µg/L	<0.44	<440
Bromochloromethane	µg/L	<1.9	<1900
Bromoform	µg/L	<0.46	<460
Bromomethane	µg/L	<3.2	<3200
Carbon disulfide	µg/L	<1	<1000
Carbon tetrachloride	µg/L	<0.51	<510
Chlorobenzene	µg/L	<0.46	<460
Chloroethane	µg/L	<0.65	<650
Chloroform	µg/L	<0.43	<430
Dibromochloromethane	µg/L	<0.45	<450
1,4-Dichlorobenzene	µg/L	<0.49	<490
1,3-Dichlorobenzene	µg/L	<0.52	<520
1,2-Dichlorobenzene	µg/L	<0.46	<460
1,2-Dichloroethane	µg/L	<0.48	<480
1,1-Dichloroethane	µg/L	<1.1	<1100
1,1-Dichloroethene	µg/L	<0.65	<650
cis-1,2-Dichloroethene	µg/L	<0.45	<450
trans-1,2-Dichloroethene	µg/L	<0.54	<540
1,2-Dichloropropane	µg/L	<0.43	<430
trans-1,3-Dichloropropene	µg/L	<0.49	<490
cis-1,3-Dichloropropene	µg/L	<0.42	<420
Ethylbenzene	µg/L	<0.71	<710
2-Hexanone	µg/L	<4.3	<4300
Methyl ethyl ketone (MEK)	µg/L	<4	<4000
Methyl isobutyl ketone (MIBK)	µg/L	<4.2	<4200
Methylene chloride	µg/L	<b>2.61 J</b>	<1.3
Styrene	µg/L	<0.8	<800
1,1,2,2-Tetrachloroethane	µg/L	<0.52	<520
1,1,1,2-Tetrachloroethane	µg/L	<0.48	<480
Tetrachloroethene	µg/L	<0.49	<490
Toluene	µg/L	<0.44	<b>450 J</b>
1,1,1-Trichloroethane	µg/L	<0.84	<840
Trichloroethene (TCE)	µg/L	<0.47	<470
Vinyl Acetate	µg/L	<0.97	<970
Vinyl Chloride	µg/L	<0.17	<170
m&p-Xylene	µg/L	<2.2	<2200
o-Xylene	µg/L	<0.9	<900
Total VOCs	µg/L	<b>15.21</b>	<b>0.00</b>
Previous Results	µg/L	28.56	0.00
Date		Oct-15	Oct-15

"J" indicates estimated result between the limit of detection (LOD) and the limit of quantitation (LOQ).

VOC - volatile organic compound

µg/L - micrograms per liter



Table 3

Ranney Collector VOC Results  
Arkema Coating Resins  
Saukville, Wisconsin

Sample ID	RC-1-16-2	RC-2-16-2	RC-3-16-2
Collection Date	4/12/2016	4/12/2016	4/12/2016
Laboratory ID	5030858P	5030858O	5030858N
Duplicate Parent			
Monitoring Objective	Receptor	Receptor	Receptor
Hydrogeologic Unit	Glacial Drift	Glacial Drift	Glacial Drift
Dilution	20	1	20
Parameter	PAL	ES	Units
Acetone	1,800	9,000	µg/L
Benzene	0.5	5	µg/L
Bromochloromethane	-	-	µg/L
Bromoform	0.44	4.4	µg/L
Bromomethane	1	10	µg/L
Carbon disulfide	200	1,000	µg/L
Carbon tetrachloride	0.5	5	µg/L
Chlorobenzene	20	100	µg/L
Chloroethane	80	400	µg/L
Chloroform	0.6	6	µg/L
Dibromochloromethane	6	60	µg/L
1,4-Dichlorobenzene	15	75	µg/L
1,3-Dichlorobenzene	120	600	µg/L
1,2-Dichlorobenzene	60	600	µg/L
1,2-Dichloroethane	0.5	5	µg/L
1,1-Dichloroethane	85	850	µg/L
1,1-Dichloroethene	0.7	7	µg/L
cis-1,2-Dichloroethene	7	70	µg/L
trans-1,2-Dichloroethene	20	100	µg/L
1,2-Dichloropropane	0.5	5	µg/L
trans-1,3-Dichloropropene	0.04	0.4	µg/L
cis-1,3-Dichloropropene	0.04	0.4	µg/L
Ethylbenzene	140	700	µg/L
2-Hexanone	-	-	µg/L
Methyl ethyl ketone (MEK)	800	4,000	µg/L
Methyl isobutyl ketone (MIBK)	50	500	µg/L
Methylene chloride	0.5	5	µg/L
Styrene	10	100	µg/L
1,1,2,2-Tetrachloroethane	0.02	0.2	µg/L
1,1,1,2-Tetrachloroethane	7	70	µg/L
Tetrachloroethene	0.5	5	µg/L
Toluene	160	800	µg/L
1,1,1-Trichloroethane	40	200	µg/L
Trichloroethene (TCE)	0.5	5	µg/L
Vinyl Acetate	-	-	µg/L
Vinyl Chloride	0.02	0.2	µg/L
m&p-Xylene	400	2,000	µg/L
o-Xylene			µg/L
Total VOCs			µg/L
Previous Results			µg/L
Date			

Indicates concentration in exceedance of Wisconsin Administrative Code Chapter NR140 Preventive Action Limit (PAL)

Indicates concentration in exceedance of Wisconsin Administrative Code Chapter NR140 Enforcement Standard (ES)

"-" Indicates not published standard.

Table 4

Perimeter - Glacial Drift Monitoring Wells - VOC Results  
Arkema Coating Resins  
Saukville, Wisconsin

Sample ID	W-01A-16-2	W-03B-16-2	W-04A-16-2	W-08R-16-2	W-16A-16-2	W-27-16-2	W-49-16-2	W-51-16-2
Collection Date	4/11/2016	4/13/2016	4/12/2016	4/11/2016	4/13/2016	4/12/2016	4/11/2016	4/12/2016
Laboratory ID	5030858C	530858BB	5030858R	5030858E	530858AA	5030858X	5030858A	5030858U
Duplicate Parent								
Monitoring Objective	Perimeter	Perimeter	Perimeter	Perimeter	Perimeter	Perimeter	Perimeter	Perimeter
Hydrogeologic Unit	Glacial Drift	Glacial Drift	Glacial Drift	Glacial Drift	Glacial Drift	Glacial Drift	Glacial Drift	Glacial Drift
Dilution	1	1	1	1	1	1	1	1
Parameter	PAL	ES	Units					
Acetone	1,800	9,000	µg/L	<5.9	<5.9	<5.9	<5.9	<5.9
Benzene	0.5	5	µg/L	<0.44	<0.44	<0.44	<0.44	<0.44
Bromochloromethane	-	-	µg/L	<1.9	<1.9	<1.9	<1.9	<1.9
Bromoform	0.44	4.4	µg/L	<0.46	<0.46	<0.46	<0.46	<0.46
Bromomethane	1	10	µg/L	<3.2	<3.2	<3.2	<3.2	<3.2
Carbon disulfide	200	1,000	µg/L	<1	<1	<1	<1	<1
Carbon tetrachloride	0.5	5	µg/L	<0.51	<0.51	<0.51	<0.51	<0.51
Chlorobenzene	20	100	µg/L	<0.46	<0.46	<0.46	<0.46	<0.46
Chloroethane	80	400	µg/L	<0.65	<0.65	<0.65	<0.65	<0.65
Chloroform	0.6	6	µg/L	<0.43	<0.43	<0.43	<0.43	<0.43
Dibromochloromethane	6	60	µg/L	<0.45	<0.45	<0.45	<0.45	<0.45
1,4-Dichlorobenzene	15	75	µg/L	<0.49	<0.49	<0.49	<0.49	<0.49
1,3-Dichlorobenzene	120	600	µg/L	<0.52	<0.52	<0.52	<0.52	<0.52
1,2-Dichlorobenzene	60	600	µg/L	<0.46	<0.46	<0.46	<0.46	<0.46
1,2-Dichloroethane	0.5	5	µg/L	<0.48	<0.48	<0.48	<0.48	<0.48
1,1-Dichloroethane	85	850	µg/L	<1.1	<1.1	<1.1	<1.1	<1.1
1,1-Dichloroethene	0.7	7	µg/L	<0.65	<0.65	<0.65	<0.65	<0.65
cis-1,2-Dichloroethene	7	70	µg/L	<0.45	<0.45	<0.45	1.28	J
trans-1,2-Dichloroethene	20	100	µg/L	<0.54	<0.54	<0.54	<0.54	<0.54
1,2-Dichloropropane	0.5	5	µg/L	<0.43	<0.43	<0.43	<0.43	<0.43
trans-1,3-Dichloropropene	0.04	0.4	µg/L	<0.49	<0.49	<0.49	<0.49	<0.49
cis-1,3-Dichloropropene	0.04	0.4	µg/L	<0.42	<0.42	<0.42	<0.42	<0.42
Ethylbenzene	140	700	µg/L	<0.71	<0.71	<0.71	<0.71	<0.71
2-Hexanone	-	-	µg/L	<4.3	<4.3	<4.3	<4.3	<4.3
Methyl ethyl ketone (MEK)	800	4,000	µg/L	<4	<4	<4	<4	<4
Methyl isobutyl ketone (MIBK)	50	500	µg/L	<4.2	<4.2	<4.2	<4.2	<4.2
Methylene chloride	0.5	5	µg/L	<1.3	<1.3	<1.3	<1.3	<1.3
Styrene	10	100	µg/L	<0.8	<0.8	<0.8	<0.8	<0.8
1,1,2,2-Tetrachloroethane	0.02	0.2	µg/L	<0.52	<0.52	<0.52	<0.52	<0.52
1,1,1,2-Tetrachloroethane	7	70	µg/L	<0.48	<0.48	<0.48	<0.48	<0.48
Tetrachloroethene	0.5	5	µg/L	<0.49	<0.49	<0.49	<0.49	<0.49
Toluene	160	800	µg/L	<0.44	<0.44	<0.44	<0.44	<0.44
1,1,1-Trichloroethane	40	200	µg/L	<0.84	<0.84	<0.84	<0.84	<0.84
Trichloroethene (TCE)	0.5	5	µg/L	<0.47	<0.47	<0.47	16.5	<0.47
Vinyl Acetate	-	-	µg/L	<0.97	<0.97	<0.97	<0.97	<0.97
Vinyl Chloride	0.02	0.2	µg/L	<0.17	<0.17	<0.17	<0.17	<0.17
m&p-Xylene	400	2,000	µg/L	<2.2	<2.2	<2.2	<2.2	<2.2
o-Xylene			µg/L	<0.9	<0.9	<0.9	<0.9	<0.9
Total VOCs			µg/L	0.0	0.0	0.0	17.78	0.0
Previous Results			µg/L	0.00	0.00	0.00	74.94	0.00
Date				Oct-15	Oct-15	Oct-15	Oct-15	Oct-15
Dissolved Oxygen			mg/L	8.03	0.90	8.71	8.74	9.15
pH				6.61	7.60	6.79	5.04	6.73
Conductivity			ms/cm	0.670	0.756	1.565	0.536	0.473
Temperature			°C	8.10	10.59	7.32	7.80	6.95
Oxidation-Reduction Potential			mV	90.1	-128.8	10.3	166.5	28.1

Indicates concentration in exceedance of Wisconsin Administrative Code Chapter NR140 Preventive Action Limit (PAL)  
 Indicates concentration in exceedance of Wisconsin Administrative Code Chapter NR140 Enforcement Standard (ES)  
 "-" Indicates no published standard.  
 VOC - volatile organic compound  
 mg/L - milligrams per liter  
 µg/L - micrograms per liter  
 "J" indicates estimated result between the limit of detection (LOD) and the limit of quantitation (LOQ).  
 ms/cm - microsiemens per centimeter  
 °C - degrees celsius

Table 5

Perimeter - Shallow and Deep Dolomite Wells - VOC Results  
Arkema Coating Resins  
Saukville, Wisconsin

Sample ID	W-03A-16-2	DUP3-16-2	W-07-16-2	W-20-16-2	W-22-16-2	W-23-16-2	DUP2-16-2	W-40-16-2	W-50-16-2	W-52-16-2	PW-08-16-2			
Collection Date	4/13/2016	4/13/2016	4/11/2016	4/12/2016	4/12/2016	4/12/2016	4/12/2016	4/13/2016	4/11/2016	4/12/2016	4/13/2016			
Laboratory ID	530858CC	530858DD	5030858D	5030858Q	5030858W	5030858S	5030858T	5030858Z	5030858B	5030858V	530858EE			
Duplicate Parent		(W-03A-16-2)					(W-23-16-2)							
Monitoring Objective	Perimeter		Perimeter	Perimeter	Perimeter	Perimeter		Perimeter	Perimeter	Perimeter	Perimeter			
Hydrogeologic Unit	Shallow Dolomite		Shallow Dolomite	Shallow Dolomite	Shallow Dolomite	Shallow Dolomite		Shallow Dolomite	Shallow Dolomite	Shallow Dolomite	Deep Dolomite			
Dilution	1	1	1	1	1	1	1	1	1	1	1			
Parameter	PAL	ES	Units	W-03A-16-2	DUP3-16-2	W-07-16-2	W-20-16-2	W-22-16-2	W-23-16-2	DUP2-16-2	W-40-16-2	W-50-16-2	W-52-16-2	PW-08-16-2
Acetone	1,800	9,000	µg/L	<5.9	<5.9	<5.9	<5.9	22.3	<5.9	<5.9	<5.9	<5.9	<5.9	<5.9
Benzene	0.5	5	µg/L	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	10.8	<0.44
Bromochloromethane	-	-	µg/L	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9
Bromoform	0.44	4.4	µg/L	<0.46	<0.46	<0.46	<0.46	<0.46	<0.46	<0.46	<0.46	<0.46	<0.46	<0.46
Bromomethane	1	10	µg/L	<3.2	<3.2	<3.2	<3.2	<3.2	<3.2	<3.2	<3.2	<3.2	<3.2	<3.2
Carbon disulfide	200	1,000	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Carbon tetrachloride	0.5	5	µg/L	<0.51	<0.51	<0.51	<0.51	<0.51	<0.51	<0.51	<0.51	<0.51	<0.51	<0.51
Chlorobenzene	20	100	µg/L	<0.46	<0.46	<0.46	<0.46	<0.46	<0.46	<0.46	<0.46	<0.46	<0.46	<0.46
Chloroethane	80	400	µg/L	<0.65	<0.65	<0.65	<0.65	<0.65	<0.65	<0.65	<0.65	<0.65	<0.65	<0.65
Chloroform	0.6	6	µg/L	<0.43	<0.43	<0.43	<0.43	<0.43	<0.43	<0.43	<0.43	<0.43	<0.43	<0.43
Dibromochloromethane	6	60	µg/L	<0.45	<0.45	<0.45	<0.45	<0.45	<0.45	<0.45	<0.45	<0.45	<0.45	<0.45
1,4-Dichlorobenzene	15	75	µg/L	<0.49	<0.49	<0.49	<0.49	<0.49	<0.49	<0.49	<0.49	<0.49	<0.49	<0.49
1,3-Dichlorobenzene	120	600	µg/L	<0.52	<0.52	<0.52	<0.52	<0.52	<0.52	<0.52	<0.52	<0.52	<0.52	<0.52
1,2-Dichlorobenzene	60	600	µg/L	<0.46	<0.46	<0.46	<0.46	<0.46	<0.46	<0.46	<0.46	<0.46	<0.46	<0.46
1,2-Dichloroethane	0.5	5	µg/L	<0.48	<0.48	<0.48	<0.48	<0.48	<0.48	<0.48	<0.48	<0.48	<0.48	<0.48
1,1-Dichloroethane	85	850	µg/L	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1
1,1-Dichloroethene	0.7	7	µg/L	<0.65	<0.65	<0.65	<0.65	<0.65	<0.65	<0.65	<0.65	<0.65	<0.65	<0.65
cis-1,2-Dichloroethene	7	70	µg/L	<0.45	<0.45	<0.45	<0.45	0.82	J	0.88	J	<0.45	36	<0.45
trans-1,2-Dichloroethene	20	100	µg/L	<0.54	<0.54	<0.54	<0.54	<0.54	<0.54	<0.54	<0.54	<0.54	1.84	<0.54
1,2-Dichloropropane	0.5	5	µg/L	<0.43	<0.43	<0.43	<0.43	<0.43	<0.43	<0.43	<0.43	<0.43	<0.43	<0.43
trans-1,3-Dichloropropene	0.04	0.4	µg/L	<0.49	<0.49	<0.49	<0.49	<0.49	<0.49	<0.49	<0.49	<0.49	<0.49	<0.49
cis-1,3-Dichloropropene	0.04	0.4	µg/L	<0.42	<0.42	<0.42	<0.42	<0.42	<0.42	<0.42	<0.42	<0.42	<0.42	<0.42
Ethylbenzene	140	700	µg/L	<0.71	<0.71	<0.71	<0.71	<0.71	<0.71	<0.71	<0.71	<0.71	<0.71	<0.71
2-Hexanone	-	-	µg/L	<4.3	<4.3	<4.3	<4.3	<4.3	<4.3	<4.3	<4.3	<4.3	<4.3	<4.3
Methyl ethyl ketone (MEK)	800	4,000	µg/L	<4	<4	<4	<4	53	<4	<4	<4	<4	<4	<4
Methyl isobutyl ketone (MIBK)	50	500	µg/L	<4.2	<4.2	<4.2	<4.2	<4.2	<4.2	<4.2	<4.2	<4.2	<4.2	<4.2
Methylene chloride	0.5	5	µg/L	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3
Styrene	10	100	µg/L	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
1,1,2,2-Tetrachloroethane	0.02	0.2	µg/L	<0.52	<0.52	<0.52	<0.52	<0.52	<0.52	<0.52	<0.52	<0.52	<0.52	<0.52
1,1,1,2-Tetrachloroethane	7	70	µg/L	<0.48	<0.48	<0.48	<0.48	<0.48	<0.48	<0.48	<0.48	<0.48	<0.48	<0.48
Tetrachloroethene	0.5	5	µg/L	<0.49	<0.49	<0.49	<0.49	<0.49	<0.49	<0.49	<0.49	<0.49	<0.49	<0.49
Toluene	160	800	µg/L	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44
1,1,1-Trichloroethane	40	200	µg/L	<0.84	<0.84	<0.84	<0.84	<0.84	<0.84	<0.84	<0.84	<0.84	<0.84	<0.84
Trichloroethene (TCE)	0.5	5	µg/L	<0.47	<0.47	<0.47	<0.47	<0.47	<0.47	<0.47	<0.47	<0.47	0.57	J
Vinyl Acetate	-	-	µg/L	<0.97	<0.97	<0.97	<0.97	<0.97	<0.97	<0.97	<0.97	<0.97	<0.97	<0.97
Vinyl Chloride	0.02	0.2	µg/L	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	29	<0.17
m&p-Xylene	-	-	µg/L	<2.2	<2.2	<2.2	<2.2	<2.2	<2.2	<2.2	<2.2	<2.2	<2.2	<2.2
o-Xylene	400	2,000	µg/L	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9
Total VOCs			µg/L	0.0	0.0	0.0	0.0	75.3	0.82	0.88	0.00	0.00	78.21	0.00
Previous Results			µg/L	0.0		0.0	0.0	17.4	0.0		0.0	0.0	63.14	0.0
Date				Oct-15		Oct-15	Oct-15	Oct-15	Oct-15		Oct-15	Oct-15	Oct-15	Oct-15
Dissolved Oxygen			mg/L	0.69		7.30	0.82	1.42	0.66		1.17	5.40	4.60	0.71
pH				8.46		7.45	7.83	7.38	6.99		7.23	7.20	7.22	7.65
Conductivity			ms/cm	0.283		0.512	0.420	0.818	1.872		0.616	1.009	1.066	0.384
Temperature			°C	10.53		7.14	10.58	9.91	10.74		11.30	7.80	11.40	11.15
Oxidation-Reduction Potential			mV	-329.8		37.1	-94.9	-184.7	-53.7		-110.0	73.3	3.8	-211.6

Indicates concentration in exceedance of Wisconsin Administrative Code Chapter NR140 Preventive Action Limit (PAL)

Indicates concentration in exceedance of Wisconsin Administrative Code Chapter NR140 Enforcement Standard (ES)

"-" Indicates no published standard.

VOC - volatile organic compound

mg/L - milligrams per liter

µg/L - micrograms per liter

"J" indicates estimated result between the limit of detection (LOD) and the limit of quantitation (LOQ).

ms/cm - microsiemens per centimeter

°C - degrees celsius

mV - millivolts

Table 1

Municipal Water Supply Wells - VOC Results  
Arkema Coating Resins  
Saukville, Wisconsin

	Sample ID	MW-1-16-3	DUP1-16-3	TB1-16-3		
	Collection Date	7/19/2016	7/19/2016	7/19/2016		
	Laboratory ID	5031396A	5031396B	5031396C		
	Duplicate Parent		MW1-16-3			
	Monitoring Objective	Receptor				
	Hydrogeologic Unit	Deep Dolomite				
	Dilution	1	1	1		
Parameter	PAL	ES	Units			
Benzene	0.5	5	µg/L	<0.44	<0.44	<0.44
Bromobenzene	-	-	µg/L	<0.48	<0.48	<0.48
Bromodichloromethane	0.06	0.6	µg/L	<0.46	<0.46	<0.46
Bromoform	0.44	4.4	µg/L	<0.46	<0.46	<0.46
tert-Butylbenzene	-	-	µg/L	<1.1	<1.1	<1.1
sec-Butylbenzene	-	-	µg/L	<1.2	<1.2	<1.2
n-Butylbenzene	-	-	µg/L	<1	<1	<1
Carbon tetrachloride	0.5	5	µg/L	<0.51	<0.51	<0.51
Chlorobenzene	20	100	µg/L	<0.46	<0.46	<0.46
Chloroethane	80	400	µg/L	<0.65	<0.65	<0.65
Chloroform	0.6	6	µg/L	<0.43	<0.43	<0.43
Chloromethane	80	400	µg/L	<1.9	<1.9	<1.9
2-Chlorotoluene	-	-	µg/L	<0.4	<0.4	<0.4
4-Chlorotoluene	-	-	µg/L	<0.63	<0.63	<0.63
1,2-Dibromo-3-chloropropane	0.02	0.2	µg/L	<1.4	<1.4	<1.4
Dibromochloromethane	6	60	µg/L	<0.45	<0.45	<0.45
1,4-Dichlorobenzene	15	75	µg/L	<0.49	<0.49	<0.49
1,3-Dichlorobenzene	120	600	µg/L	<0.52	<0.52	<0.52
1,2-Dichlorobenzene	60	600	µg/L	<0.46	<0.46	<0.46
Dichlorodifluoromethane	200	1000	µg/L	<0.87	<0.87	<0.87
1,2-Dichloroethane	0.5	5	µg/L	<0.48	<0.48	<0.48
1,1-Dichloroethane	85	850	µg/L	<1.1	<1.1	<1.1
1,1-Dichloroethene	0.7	7	µg/L	<0.65	<0.65	<0.65
cis-1,2-Dichloroethene	7	70	µg/L	<0.45	<0.45	<0.45
trans-1,2-Dichloroethene	20	100	µg/L	<0.54	<0.54	<0.54
1,2-Dichloropropane	0.5	5	µg/L	<0.43	<0.43	<0.43
2,2-Dichloropropane	-	-	µg/L	<3.1	<3.1	<3.1
1,3-Dichloropropane	0.04	0.4	µg/L	<0.42	<0.42	<0.42
Di-isopropyl ether	-	-	µg/L	<0.44	<0.44	<0.44
EDB (1,2-Dibromoethane)	-	-	µg/L	<0.63	<0.63	<0.63
Ethylbenzene	140	700	µg/L	<0.71	<0.71	<0.71
Hexachlorobutadiene	-	-	µg/L	<2.2	<2.2	<2.2
Isopropylbenzene	-	-	µg/L	<0.82	<0.82	<0.82
p-Isopropylbenzene	-	-	µg/L	<1.1	<1.1	<1.1
Methylene chloride	0.5	5	µg/L	<1.3	<1.3	<1.3
Methyl tert-butyl ether (MTBE)	12	60	µg/L	<1.1	<1.1	<1.1
Naphthalene	10	100	µg/L	<1.6	<1.6	<1.6
n-Propylbenzene	-	-	µg/L	<0.77	<0.77	<0.77
1,1,2,2-Tetrachloroethane	0.02	0.2	µg/L	<0.52	<0.52	<0.52
1,1,1,2-Tetrachloroethane	7	70	µg/L	<0.48	<0.48	<0.48
Tetrachloroethene (PCE)	0.5	5	µg/L	<0.49	<0.49	<0.49
Toluene	160	800	µg/L	<0.44	<0.44	<0.44
1,2,4-Trichlorobenzene	14	70	µg/L	<1.7	<1.7	<1.7
1,2,3-Trichlorobenzene	-	-	µg/L	<2.7	<2.7	<2.7
1,1,1-Trichloroethane	40	200	µg/L	<0.84	<0.84	<0.84
1,1,2-Trichloroethane	0.5	5	µg/L	<0.48	<0.48	<0.48
Trichloroethene (TCE)	0.5	5	µg/L	<0.47	<0.47	<0.47
Trichlorofluoromethane	-	-	µg/L	<0.87	<0.87	<0.87
1,2,4-Trimethylbenzene	-	-	µg/L	<1.6	<1.6	<1.6
1,3,5-Trimethylbenzene	96	480	µg/L	<1.5	<1.5	<1.5
Vinyl Chloride	0.02	0.2	µg/L	<0.17	<0.17	<0.17
m&p-Xylene	400	2,000	µg/L	<2.2	<2.2	<2.2
o-Xylene	-	-	µg/L	<0.9	<0.9	<0.9
Total VOCs			µg/L	0.0	0.0	0.0

Indicates concentration in exceedance of Wisconsin Administrative Code Chapter NR140 Preventive Action Limit (PAL)

Indicates concentration in exceedance of Wisconsin Administrative Code Chapter NR140 Enforcement Standard (ES)

- Indicates PAL and ES do not exist

VOC - volatile organic compound

µg/L - micrograms per liter

Table 1

Municipal Water Supply Wells - VOC Results  
Arkema Coating Resins  
Saukville, Wisconsin

Sample ID	MW-01-16-4	MW-03-16-4	MW-04-16-4	DUP1-16-4	TRIP BLANK			
Collection Date	10/4/2016	10/4/2016	10/4/2016	10/4/2016	10/4/2016			
Laboratory ID	5031844Y	5031844X	5031844Z	531844AA	5031844T			
Duplicate Parent				(MW-4-16-4)				
Monitoring Objective	Receptor	Receptor	Receptor					
Hydrogeologic Unit	Deep Dolomite	Deep Dolomite	Deep Dolomite					
Dilution	1	1	1	1	1			
Parameter	PAL	ES	Units					
Acetone	1,800	9,000	µg/L	<5.9	<5.9	<5.9	<5.9	<5.9
Benzene	0.5	5	µg/L	<0.44	<0.44	<0.44	<0.44	<0.44
Bromochloromethane	-	-	µg/L	<1.9	<1.9	<1.9	<1.9	<1.9
Bromoform	0.44	4.4	µg/L	<0.46	<0.46	<0.46	<0.46	<0.46
Bromomethane	1	10	µg/L	<3.2	<3.2	<3.2	<3.2	<3.2
Carbon disulfide	200	1,000	µg/L	<1	<1	<1	<1	<1
Carbon tetrachloride	0.5	5	µg/L	<0.51	<0.51	<0.51	<0.51	<0.51
Chlorobenzene (Monochlorobenzene)	20	100	µg/L	<0.46	<0.46	<0.46	<0.46	<0.46
Chloroethane	80	400	µg/L	<0.65	<0.65	<0.65	<0.65	<0.65
Chloroform	0.6	6	µg/L	<0.43	<0.43	<0.43	<0.43	<0.43
Dibromochloromethane	6	60	µg/L	<0.45	<0.45	<0.45	<0.45	<0.45
1,4-Dichlorobenzene	15	75	µg/L	<0.49	<0.49	<0.49	<0.49	<0.49
1,3-Dichlorobenzene	120	600	µg/L	<0.52	<0.52	<0.52	<0.52	<0.52
1,2-Dichlorobenzene	60	600	µg/L	<0.46	<0.46	<0.46	<0.46	<0.46
1,2-Dichloroethane	0.5	5	µg/L	<0.48	<0.48	<0.48	<0.48	<0.48
1,1-Dichloroethane	85	850	µg/L	<1.1	<1.1	<1.1	<1.1	<1.1
1,1-Dichloroethene	0.7	7	µg/L	<0.65	<0.65	<0.65	<0.65	<0.65
cis-1,2-Dichloroethene	7	70	µg/L	<0.45	<0.45	<0.45	<0.45	<0.45
trans-1,2-Dichloroethene	20	100	µg/L	<0.54	<0.54	<0.54	<0.54	<0.54
1,2-Dichloropropane	0.5	5	µg/L	<0.43	<0.43	<0.43	<0.43	<0.43
trans-1,3-Dichloropropene	0.04	0.4	µg/L	<0.49	<0.49	<0.49	<0.49	<0.49
cis-1,3-Dichloropropene	0.04	0.4	µg/L	<0.42	<0.42	<0.42	<0.42	<0.42
Ethylbenzene	140	700	µg/L	<0.71	<0.71	<0.71	<0.71	<0.71
2-Hexanone (methyl butyl ketone)	-	-	µg/L	<4.3	<4.3	<4.3	<4.3	<4.3
Methyl ethyl ketone (MEK)	800	4,000	µg/L	<4	<4	<4	<4	<4
Methyl isobutyl ketone (MIBK)	50	500	µg/L	<4.2	<4.2	<4.2	<4.2	<4.2
Methylene chloride	0.5	5	µg/L	<1.3	<1.3	<1.3	<1.3	<1.3
Styrene	10	100	µg/L	<0.8	<0.8	<0.8	<0.8	<0.8
1,1,2,2-Tetrachloroethane	0.02	0.2	µg/L	<0.52	<0.52	<0.52	<0.52	<0.52
1,1,1,2-Tetrachloroethane	7	70	µg/L	<0.48	<0.48	<0.48	<0.48	<0.48
Tetrachloroethene (PCE)	0.5	5	µg/L	<0.49	<0.49	<0.49	<0.49	<0.49
Toluene	160	800	µg/L	<0.44	<0.44	<0.44	<0.44	<0.44
1,1,1-Trichloroethane	40	200	µg/L	<0.84	<0.84	<0.84	<0.84	<0.84
Trichloroethene (TCE)	0.5	5	µg/L	<0.47	<0.47	<0.47	<0.47	<0.47
Vinyl Acetate	-	-	µg/L	<0.97	<0.97	<0.97	<0.97	<0.97
Vinyl Chloride	0.02	0.2	µg/L	<0.17	<0.17	<0.17	<0.17	<0.17
m&p-Xylene	400	2,000	µg/L	<2.2	<2.2	<2.2	<2.2	<2.2
o-Xylene			µg/L	<0.9	<0.9	<0.9	<0.9	<0.9
Total VOCs			µg/L	0.0	0.0	0.0	0.0	0.0
Previous Results			µg/L	0.0	0.0	0.0		
Date				July-16	Apr-16	Apr-16		
Dissolved Oxygen			mg/L	3.06	6.47	2.92		
pH				7.85	8.26	7.64		
Conductivity			mS/cm	0.712	0.801	0.676		
Temperature			°C	10.66	10.71	10.58		
Oxidation-Reduction Potential			mV	34.0	29.5	43.5		

Indicates concentration in exceedance of Wisconsin Administrative Code Chapter NR140 Preventive Action Limit (PAL)

Indicates concentration in exceedance of Wisconsin Administrative Code Chapter NR140 Enforcement Standard (ES)

VOC - volatile organic compound

µg/L - micrograms per liter

mg/L - milligrams per liter

mS/cm - millisiemens per centimeter

°C - degrees celsius

mV - millivolts

Table 2

POTW VOC Results  
Arkema Coating Resins  
Saukville, Wisconsin

Sample ID	POTW-I-16-4	POTW-E-16-4	POTW-S-16-4
Collection Date	10/4/2016	10/4/2016	10/4/2016
Laboratory ID	5031844V	5031844U	5031844W
Duplicate Parent			
Monitoring Objective	Receptor	Receptor	Receptor
Hydrogeologic Unit	POTW	POTW	POTW
Dilution	1	1	1000
Parameter	Units		
Acetone	µg/L	<b>6.6 J</b>	<5.9
Benzene	µg/L	<0.44	<440
Bromochloromethane	µg/L	<1.9	<1900
Bromoform	µg/L	<0.46	<460
Bromomethane	µg/L	<3.2	<3200
Carbon disulfide	µg/L	<1	<1000
Carbon tetrachloride	µg/L	<0.51	<510
Chlorobenzene	µg/L	<0.46	<460
Chloroethane	µg/L	<0.65	<650
Chloroform	µg/L	<0.43	<430
Dibromochloromethane	µg/L	<0.45	<450
1,4-Dichlorobenzene	µg/L	<0.49	<490
1,3-Dichlorobenzene	µg/L	<0.52	<520
1,2-Dichlorobenzene	µg/L	<0.46	<460
1,2-Dichloroethane	µg/L	<0.48	<480
1,1-Dichloroethane	µg/L	<1.1	<1100
1,1-Dichloroethene	µg/L	<0.65	<650
cis-1,2-Dichloroethene	µg/L	<0.45	<450
trans-1,2-Dichloroethene	µg/L	<0.54	<540
1,2-Dichloropropane	µg/L	<0.43	<430
trans-1,3-Dichloropropene	µg/L	<0.49	<490
cis-1,3-Dichloropropene	µg/L	<0.42	<420
Ethylbenzene	µg/L	<b>3.05</b>	<710
2-Hexanone	µg/L	<4.3	<4300
Methyl ethyl ketone (MEK)	µg/L	<4	<4000
Methyl isobutyl ketone (MIBK)	µg/L	<4.2	<4200
Methylene chloride	µg/L	<1.3	<1300
Styrene	µg/L	<0.8	<800
1,1,2,2-Tetrachloroethane	µg/L	<0.52	<520
1,1,1,2-Tetrachloroethane	µg/L	<0.48	<480
Tetrachloroethene (PCE)	µg/L	<0.49	<490
Toluene	µg/L	<b>5.0</b>	<440
1,1,1-Trichloroethane	µg/L	<0.84	<840
Trichloroethene (TCE)	µg/L	<0.47	<470
Vinyl Acetate	µg/L	<0.97	<970
Vinyl Chloride	µg/L	<0.17	<170
m&p-Xylene	µg/L	<b>21.3</b>	<2200
o-Xylene	µg/L	<b>10.7</b>	<900
Total VOCs	µg/L	<b>46.65</b>	0.00
Previous Results	µg/L	15.21	450
Date		Apr-16	Apr-16

VOC - volatile organic compound  
µg/L - micrograms per liter

Table 3

Ranney Collector VOC Results  
Arkema Coating Resins  
Saukville, Wisconsin

Sample ID	RC-1-16-4	RC-2-16-4	RC-3-16-4
Collection Date	10/3/2016	10/3/2016	10/3/2016
Laboratory ID	5031844M	5031844H	5031844L
Duplicate Parent			
Monitoring Objective	Receptor	Receptor	Receptor
Hydrogeologic Unit	Glacial Drift	Glacial Drift	Glacial Drift
Dilution	1	1	20
Parameter	PAL	ES	Units
Acetone	1,800	9,000	µg/L
Benzene	0.5	5	µg/L
Bromochloromethane	-	-	µg/L
Bromoform	0.44	4.4	µg/L
Bromomethane	1	10	µg/L
Carbon disulfide	200	1,000	µg/L
Carbon tetrachloride	0.5	5	µg/L
Chlorobenzene (Monochlorobenzene)	20	100	µg/L
Chloroethane	80	400	µg/L
Chloroform	0.6	6	µg/L
Dibromochloromethane	6	60	µg/L
1,4-Dichlorobenzene	15	75	µg/L
1,3-Dichlorobenzene	120	600	µg/L
1,2-Dichlorobenzene	60	600	µg/L
1,2-Dichloroethane	0.5	5	µg/L
1,1-Dichloroethane	85	850	µg/L
1,1-Dichloroethene	0.7	7	µg/L
cis-1,2-Dichloroethene	7	70	µg/L
trans-1,2-Dichloroethene	20	100	µg/L
1,2-Dichloropropane	0.5	5	µg/L
trans-1,3-Dichloropropene	0.04	0.4	µg/L
cis-1,3-Dichloropropene	0.04	0.4	µg/L
Ethylbenzene	140	700	µg/L
2-Hexanone (Methyl butyl ketone)	-	-	µg/L
Methyl ethyl ketone (MEK)	800	4,000	µg/L
Methyl isobutyl ketone (MIBK)	50	500	µg/L
Methylene chloride	0.5	5	µg/L
Styrene	10	100	µg/L
1,1,2,2-Tetrachloroethane	0.02	0.2	µg/L
1,1,1,2-Tetrachloroethane	7	70	µg/L
Tetrachloroethene (PCE)	0.5	5	µg/L
Toluene	160	800	µg/L
1,1,1-Trichloroethane	40	200	µg/L
Trichloroethene (TCE)	0.5	5	µg/L
Vinyl Acetate	-	-	µg/L
Vinyl Chloride	0.02	0.2	µg/L
m&p-Xylene			µg/L
o-Xylene	400	2,000	µg/L
Total VOCs			µg/L
Previous Results			µg/L
Date			

VOC - volatile organic compound  
µg/L - micrograms per liter

Table 4

Perimeter - Glacial Drift Monitoring Wells - VOC Results  
Arkema Coating Resins  
Saukville, Wisconsin

Sample ID	W-01A-16-4	W-03B-16-4	W-04A-16-4	W-08R-16-4	W-16A-16-4	W-27-16-4	W-49-16-4	W-51-16-4
Collection Date	10/3/2016	10/5/2016	10/3/2016	10/3/2016	10/5/2016	10/4/2016	10/3/2016	10/3/2016
Laboratory ID	5031844C	531844SS	5031844P	5031844B	531844PP	531844JJ	5031844D	5031844F
Duplicate Parent								
Monitoring Objective	Perimeter	Perimeter	Perimeter	Perimeter	Perimeter	Perimeter	Perimeter	Perimeter
Hydrogeologic Unit	Glacial Drift	Glacial Drift	Glacial Drift	Glacial Drift	Glacial Drift	Glacial Drift	Glacial Drift	Glacial Drift
Dilution	1	1	1	1	1	1	1	1
Parameter	PAL	ES	Units					
Acetone	1,800	9,000	µg/L	<5.9	<5.9	<5.9	<5.9	<5.9
Benzene	0.5	5	µg/L	<0.44	<0.44	<0.44	<0.44	<0.44
Bromochloromethane	-	-	µg/L	<1.9	<1.9	<1.9	<1.9	<1.9
Bromoform	0.44	4.4	µg/L	<0.46	<0.46	<0.46	<0.46	<0.46
Bromomethane	1	10	µg/L	<3.2	<3.2	<3.2	<3.2	<3.2
Carbon disulfide	200	1,000	µg/L	<1	<1	<1	<1	<1
Carbon tetrachloride	0.5	5	µg/L	<0.51	<0.51	<0.51	<0.51	<0.51
Chlorobenzene Monochlorobenzene)	20	100	µg/L	<0.46	<0.46	<0.46	<0.46	<0.46
Chloroethane	80	400	µg/L	<0.65	<0.65	<0.65	<0.65	<0.65
Chloroform	0.6	6	µg/L	<0.43	<0.43	<0.43	<0.43	<0.43
Dibromochloromethane	6	60	µg/L	<0.45	<0.45	<0.45	<0.45	<0.45
1,4-Dichlorobenzene	15	75	µg/L	<0.49	<0.49	<0.49	<0.49	<0.49
1,3-Dichlorobenzene	120	600	µg/L	<0.52	<0.52	<0.52	<0.52	<0.52
1,2-Dichlorobenzene	60	600	µg/L	<0.46	<0.46	<0.46	<0.46	<0.46
1,2-Dichloroethane	0.5	5	µg/L	<0.48	<0.48	<0.48	<0.48	<0.48
1,1-Dichloroethane	85	850	µg/L	<1.1	<1.1	<1.1	<1.1	<1.1
1,1-Dichloroethene	0.7	7	µg/L	<0.65	<0.65	<0.65	<0.65	<0.65
cis-1,2-Dichloroethene	7	70	µg/L	<0.45	<0.45	<0.45	2.23	<0.45
trans-1,2-Dichloroethene	20	100	µg/L	<0.54	<0.54	<0.54	<0.54	<0.54
1,2-Dichloropropane	0.5	5	µg/L	<0.43	<0.43	<0.43	<0.43	<0.43
trans-1,3-Dichloropropene	0.04	0.4	µg/L	<0.49	<0.49	<0.49	<0.49	<0.49
cis-1,3-Dichloropropene	0.04	0.4	µg/L	<0.42	<0.42	<0.42	<0.42	<0.42
Ethylbenzene	140	700	µg/L	<0.71	<0.71	<0.71	<0.71	<0.71
2-Hexanone (methyl butyl ketone)	-	-	µg/L	<4.3	<4.3	<4.3	<4.3	<4.3
Methyl ethyl ketone (MEK)	800	4,000	µg/L	<4	<4	<4	<4	<4
Methyl isobutyl ketone (MIBK)	50	500	µg/L	<4.2	<4.2	<4.2	<4.2	<4.2
Methylene chloride	0.5	5	µg/L	<1.3	<1.3	<1.3	<1.3	<1.3
Styrene	10	100	µg/L	<0.8	<0.8	<0.8	<0.8	<0.8
1,1,2,2-Tetrachloroethane	0.02	0.2	µg/L	<0.52	<0.52	<0.52	<0.52	<0.52
1,1,1,2-Tetrachloroethane	7	70	µg/L	<0.48	<0.48	<0.48	<0.48	<0.48
Tetrachloroethene (PCE)	0.5	5	µg/L	<0.49	<0.49	<0.49	<0.49	<0.49
Toluene	160	800	µg/L	<0.44	<0.44	<0.44	<0.44	<0.44
1,1,1-Trichloroethane	40	200	µg/L	<0.84	<0.84	<0.84	<0.84	<0.84
Trichloroethene (TCE)	0.5	5	µg/L	<0.47	<0.47	<0.47	36	<0.47
Vinyl Acetate	-	-	µg/L	<0.97	<0.97	<0.97	<0.97	<0.97
Vinyl Chloride	0.02	0.2	µg/L	<0.17	<0.17	<0.17	<0.17	<0.17
m&p-Xylene	400	2,000	µg/L	<2.2	<2.2	<2.2	<2.2	<2.2
o-Xylene			µg/L	<0.9	<0.9	<0.9	<0.9	<0.9
Total VOCs			µg/L	0.00	0.00	0.00	38.23	0.00
Previous Results			µg/L	0.00	0.00	0.00	17.78	0.00
Date				Apr-16	Apr-16	Apr-16	Apr-16	Apr-16
Dissolved Oxygen			mg/L	4.46	0.28	9.72	4.35	3.90
pH				7.24	8.04	7.57	7.43	7.95
Conductivity			mS/cm	1	0.996	1.716	0.614	0.705
Temperature			°C	16.64	10.87	14.73	15.64	15.62
Oxidation-Reduction Potential			mV	287.7	-231.8	-39.3	259	-100.0
							-84.3	275.9
								236.0

Indicates concentration in exceedance of Wisconsin Administrative Code Chapter NR140 Preventive Action Limit (PAL)

Indicates concentration in exceedance of Wisconsin Administrative Code Chapter NR140 Enforcement Standard (ES)

VOC - volatile organic compound  
µg/L - micrograms per liter  
mg/L - milligrams per liter  
mS/cm - millisiemens per centimeter  
°C - degrees celsius  
mV - millivolts



Table 5

Perimeter - Shallow and Deep Dolomite Wells - VOC Results  
Arkema Coating Resins  
Saukville, Wisconsin

Sample ID	W-03A-16-4	DUP3-16-4	W-07-16-4	W-20-16-4	W-22-16-4	W-23-16-4	DUP2-16-4	W-40-16-4	W-50-16-4	W-52-16-4	PW-08-16-4		
Collection Date	10/5/2016	10/5/2016	10/3/2016	10/3/2016	10/4/2016	10/3/2016	10/3/2016	10/5/2016	10/3/2016	10/3/2016	10/4/2016		
Laboratory ID	531844QQ	531844RR	5031844A	5031844S	531844II	5031844Q	5031844R	531844OO	5031844E	5031844G	531844MM		
Duplicate Parent		(W-03A-16-4)					(W-23-16-4)						
Monitoring Objective	Perimeter	Perimeter	Perimeter	Perimeter	Perimeter	Perimeter	Perimeter	Perimeter	Perimeter	Perimeter	Perimeter		
Hydrogeologic Unit	Shallow Dolomite	Glacial Drift	Shallow Dolomite	Shallow Dolomite	Shallow Dolomite	Shallow Dolomite	Shallow Dolomite	Shallow Dolomite	Shallow Dolomite	Shallow Dolomite	Deep Dolomite		
Dilution	1	1	1	1	1	1	1	1	1	1	1		
Parameter	PAL	ES	Units										
Acetone	1,800	9,000	µg/L	<5.9	<5.9	<5.9	<5.9	<5.9	<5.9	<5.9	<5.9		
Benzene	0.5	5	µg/L	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	12	<0.44		
Bromochloromethane	-	-	µg/L	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9		
Bromoform	0.44	4.4	µg/L	<0.46	<0.46	<0.46	<0.46	<0.46	<0.46	<0.46	<0.46		
Bromomethane	1	10	µg/L	<3.2	<3.2	<3.2	<3.2	<3.2	<3.2	<3.2	<3.2		
Carbon disulfide	200	1,000	µg/L	<1	<1	<1	<1	<1	<1	<1	<1		
Carbon tetrachloride	0.5	5	µg/L	<0.51	<0.51	<0.51	<0.51	<0.51	<0.51	<0.51	<0.51		
Chlorobenzene (Monochlorobenzene)	20	100	µg/L	<0.46	<0.46	<0.46	<0.46	<0.46	<0.46	<0.46	<0.46		
Chloroethane	80	400	µg/L	<0.65	<0.65	<0.65	<0.65	<0.65	<0.65	<0.65	<0.65		
Chloroform	0.6	6	µg/L	<0.43	<0.43	<0.43	<0.43	<0.43	<0.43	<0.43	<0.43		
Dibromochloromethane	6	60	µg/L	<0.45	<0.45	<0.45	<0.45	<0.45	<0.45	<0.45	<0.45		
1,4-Dichlorobenzene	16	75	µg/L	<0.49	<0.49	<0.49	<0.49	<0.49	<0.49	<0.49	<0.49		
1,3-Dichlorobenzene	120	600	µg/L	<0.52	<0.52	<0.52	<0.52	<0.52	<0.52	<0.52	<0.52		
1,2-Dichlorobenzene	60	600	µg/L	<0.46	<0.46	<0.46	<0.46	<0.46	<0.46	<0.46	<0.46		
1,2-Dichloroethane	0.5	5	µg/L	<0.48	<0.48	<0.48	<0.48	<0.48	<0.48	<0.48	<0.48		
1,1-Dichloroethane	85	850	µg/L	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1		
1,1-Dichloroethene	0.7	7	µg/L	<0.65	<0.65	<0.65	<0.65	<0.65	<0.65	<0.65	<0.65		
cis-1,2-Dichloroethene	7	70	µg/L	<0.45	<0.45	<0.45	0.79	0.68	<0.45	26.9	<0.45		
trans-1,2-Dichloroethene	20	100	µg/L	<0.54	<0.54	<0.54	<0.54	<0.54	<0.54	1.43	<0.54		
1,2-Dichloropropane	0.5	5	µg/L	<0.43	<0.43	<0.43	<0.43	<0.43	<0.43	<0.43	<0.43		
trans-1,3-Dichloropropene	0.04	0.4	µg/L	<0.49	<0.49	<0.49	<0.49	<0.49	<0.49	<0.49	<0.49		
cis-1,3-Dichloropropene	0.04	0.4	µg/L	<0.42	<0.42	<0.42	<0.42	<0.42	<0.42	<0.42	<0.42		
Ethylbenzene	140	700	µg/L	<0.71	<0.71	<0.71	<0.71	<0.71	<0.71	<0.71	<0.71		
2-Hexanone (Methyl butyl ketone)	-	-	µg/L	<4.3	<4.3	<4.3	<4.3	<4.3	<4.3	<4.3	<4.3		
Methyl ethyl ketone (MEK)	800	4,000	µg/L	<4	<4	<4	<4	<4	<4	<4	<4		
Methyl isobutyl ketone (MIBK)	50	500	µg/L	<4.2	<4.2	<4.2	<4.2	<4.2	<4.2	<4.2	<4.2		
Methylene chloride	0.5	5	µg/L	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3		
Styrene	10	100	µg/L	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8		
1,1,2,2-Tetrachloroethane	0.02	0.2	µg/L	<0.52	<0.52	<0.52	<0.52	<0.52	<0.52	<0.52	<0.52		
1,1,1,2-Tetrachloroethane	7	70	µg/L	<0.48	<0.48	<0.48	<0.48	<0.48	<0.48	<0.48	<0.48		
Tetrachloroethene (PCE)	0.5	5	µg/L	<0.49	<0.49	<0.49	<0.49	<0.49	<0.49	<0.49	<0.49		
Toluene	160	800	µg/L	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44	<0.44		
1,1,1-Trichloroethane	40	200	µg/L	<0.84	<0.84	<0.84	<0.84	<0.84	<0.84	<0.84	<0.84		
Trichloroethene (TCE)	0.5	5	µg/L	<0.47	<0.47	<0.47	<0.47	<0.47	<0.47	0.61	<0.47		
Vinyl Acetate	-	-	µg/L	<0.97	<0.97	<0.97	<0.97	<0.97	<0.97	<0.97	<0.97		
Vinyl Chloride	0.02	0.2	µg/L	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	15.4	<0.17		
m&p-Xylene	400	2,000	µg/L	<2.2	<2.2	<2.2	<2.2	<2.2	<2.2	<2.2	<2.2		
o-Xylene			µg/L	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9		
Total VOCs			µg/L	0.00	0.00	0.00	0.00	0.79	0.68	0.00	0.00	56.34	0.0
Previous Results			µg/L	0.00		0.00	0.00	75.3	0.82	0.00	0.00	78.21	0.00
Date				Apr-16		Apr-16	Apr-16	Apr-16	Apr-16	Apr-16	Apr-16	Apr-16	Apr-16
Dissolved Oxygen			mg/L	0.26		7.55	0.44	0.27	0.62	0.48	3.73	3.74	7.53
pH				9.01		7.27	8.42	7.40	7.15	7.73	7.44	7.35	7.55
Conductivity			mS/cm	0.380		0.531	0.552	0.937	2.514	0.828	1.194	1.458	1.479
Temperature			°C	10.88		12.83	10.92	11.66	10.81	11.99	11.95	12.33	17.30
Oxidation-Reduction Potential			mV	-374.3		226.1	-142.1	-159.7	-86.0	-188.5	281.3	30.4	-98.9

Indicates concentration in exceedance of Wisconsin Administrative Code Chapter NR140 Preventive Action Limit (PAL)  
Indicates concentration in exceedance of Wisconsin Administrative Code Chapter NR140 Enforcement Standard (ES)

J - Results reported between the Method Detection Limit (MDL) and the Limit of Quantitation (LOQ) are less certain than results at or above the LOQ.  
VOC - volatile organic compound  
µg/L - micrograms per liter  
mg/L - milligrams per liter  
mS/cm - millisiemens per centimeter  
°C - degrees celsius  
mV - millivolts

Table 6

Remediation Progress - Glacial Drift and Shallow Dolomite Wells - VOC Results  
Arkema Coating Resins  
Saukville, Wisconsin

Sample ID	W-19A-16-4			DUP4-16-4			W-38-16-4			W-41-16-4			W-42-16-4		
Collection Date	10/4/2016			10/4/2016			10/4/2016			10/3/2016			10/3/2016		
Laboratory ID	531844KK			531844LL			531844HH			5031844I			5031844K		
Duplicate Parent				(W-19A-16-4)											
Monitoring Objective	Remediation Progress						Remediation Progress			Remediation Progress			Remediation Progress		
Hydrogeologic Unit	Glacial Drift						Shallow Dolomite			Glacial Drift			Glacial Drift		
Dilution	1			1			10			1			100		
Parameter	PAL	ES	Units												
Acetone	1,800	9,000	µg/L	<5.9	<5.9		<59		<5.9		<590				
Benzene	0.5	5	µg/L	<0.44	<0.44		1,220		1.6		82		J		
Bromochloromethane	-	-	µg/L	<1.9	<1.9		<19		<1.9		<190				
Bromoform	0.44	4.4	µg/L	<0.46	<0.46		<4.6		<0.46		<46				
Bromomethane	1	10	µg/L	<3.2	<3.2		<32		<3.2		<320				
Carbon disulfide	200	1,000	µg/L	<1	<1		<10		<1		<100				
Carbon tetrachloride	0.5	5	µg/L	<0.51	<0.51		<5.1		<0.51		<51				
Chlorobenzene (Monochlorobenzene)	20	100	µg/L	<0.46	<0.46		<4.6		<0.46		<46				
Chloroethane	80	400	µg/L	<0.65	<0.65		<6.5		<0.65		<65				
Chloroform	0.6	6	µg/L	<0.43	<0.43		<4.3		<0.43		<43				
Dibromochloromethane	6	60	µg/L	<0.45	<0.45		<4.5		<0.45		<45				
1,4-Dichlorobenzene	15	75	µg/L	<0.49	<0.49		<4.9		<0.49		<49				
1,3-Dichlorobenzene	120	600	µg/L	<0.52	<0.52		<5.2		<0.52		<52				
1,2-Dichlorobenzene	60	600	µg/L	<0.46	<0.46		<4.6		<0.46		<46				
1,2-Dichloroethane	0.5	5	µg/L	<0.48	<0.48		<4.8		<0.48		<48				
1,1-Dichloroethane	85	850	µg/L	<1.1	<1.1		<11		<1.1		<110				
1,1-Dichloroethene	0.7	7	µg/L	<0.65	<0.65		<6.5		<0.65		<65				
cis-1,2-Dichloroethene	7	70	µg/L	30.6	33		<4.5		<0.45		<45				
trans-1,2-Dichloroethene	20	100	µg/L	1.45	J	0.90	J		<5.4		<54				
1,2-Dichloropropane	0.5	5	µg/L	<0.43	<0.43		<4.3		<0.43		<43				
trans-1,3-Dichloropropene	0.04	0.4	µg/L	<0.49	<0.49		<4.9		<0.49		<49				
cis-1,3-Dichloropropene	0.04	0.4	µg/L	<0.42	<0.42		<4.2		<0.42		<42				
Ethylbenzene	140	700	µg/L	<0.71	<0.71		<7.1		<0.71		183		J		
2-Hexanone (Metyl butyl ketone)	-	-	µg/L	<4.3	<4.3		<43		<4.3		<430				
Methyl ethyl ketone (MEK)	800	4,000	µg/L	<4	<4		<40		<4		<400				
Methyl isobutyl ketone (MIBK)	50	500	µg/L	<4.2	<4.2		<42		<4.2		<420				
Methylene chloride	0.5	5	µg/L	<1.3	<1.3		<13		<1.3		<130				
Styrene	10	100	µg/L	<0.8	<0.8		<8		<0.8		<80				
1,1,2,2-Tetrachloroethane	0.02	0.2	µg/L	<0.52	<0.52		<5.2		<0.52		<52				
1,1,1,2-Tetrachloroethane	7	70	µg/L	<0.48	<0.48		<4.8		<0.48		<48				
Tetrachloroethene (PCE)	0.5	5	µg/L	<0.49	<0.49		<4.9		<0.49		<49				
Toluene	160	800	µg/L	<0.44	<0.44		<4.4		<0.44		<44				
1,1,1-Trichloroethane	40	200	µg/L	<0.84	<0.84		<8.4		<0.84		<84				
Trichloroethene (TCE)	0.5	5	µg/L	30.2	31.2		<4.7		<0.47		<47				
Vinyl Acetate	-	-	µg/L	<0.97	<0.97		<9.700001		<0.97		<97				
Vinyl Chloride	0.02	0.2	µg/L	1.26	1.33		<1.7		<0.17		<17				
m&p-Xylene	400	2,000	µg/L	<2.2	<2.2		<22		5.4		J	7,700			
o-Xylene			µg/L	<0.9	<0.9		<9		<0.9		<90				
Total VOCs			µg/L	63.51	66.43		1,220		7.0		7,965				
Previous Results			µg/L	131.53	117.5		1,300		17.4		8,243				
Date				Oct-15			Oct-15		Oct-15		Oct-15				
Dissolved Oxygen			mg/L				0.47		3.37		7.89				
pH							7.36		7.56		6.92				
Conductivity			mS/cm				5.445		0.989		7.063				
Temperature			°C				13.47		17.09		15.91				
Oxidation-Reduction Potential							-213.1		-92.2		-99.1				

Indicates concentration in exceedance of Wisconsin Administrative Code Chapter NR140 Preventive Action Limit (PAL)

Indicates concentration in exceedance of Wisconsin Administrative Code Chapter NR140 Enforcement Standard (ES)

VOC - volatile organic compound

J - Results reported between the Method Detection Limit (MDL) and the Limit of Quantitation (LOQ) are less certain than results at or above the LOQ.

NS - Not Sampled

µg/L - micrograms per liter

mg/L - milligrams per liter

mS/cm - millisiemens per centimeter

°C - degrees celsius

mV - millivolts

Table 7

Remediation Progress - Glacial Drift, Shallow and Deep Dolomite Wells - Metals, SVOCs and PCBs Results  
Arkema Coating Resins  
Saukville, Wisconsin

Sample ID	W-06A-16-4	W-21A-16-4	W-24A-16-4	W-28-16-4	W-29-16-4	W-30-16-4	DUP5-16-4	W-43-16-4	W-47-16-4	DUP6-16-4
Collection Date	10/3/2016	Not Sampled	10/4/2016	Not Sampled	10/4/2016	10/4/2016	10/4/2016	10/4/2016	10/3/2016	10/3/2016
Laboratory ID	5031844J	Insufficient Volume	531844FF	Dry	531844EE	531844BB	531844CC	531844GG	5031844N	5031844O
Duplicate Parent							(W-30-16-4)			(W-47-16-4)
Monitoring Objective	Remediation Progress	Remediation Progress	Remediation Progress	Remediation Progress	Remediation Progress	Remediation Progress		Remediation Progress	Remediation Progress	
Hydrogeologic Unit	Glacial Drift	Shallow Dolomite	Shallow Dolomite	Shallow Dolomite	Shallow Dolomite	Deep Dolomite		Glacial Drift	Glacial Drift	
Parameter	PAL	ES	Units							
Arsenic	1	10	µg/L	41.6	<6.4	<6.4	<6.4	18.2 J	7.01 J	
Barium	400	2,000	µg/L	52.5	86.1	79.1	96.2	96.6	42.2	94.8
Parameter	PAL	ES	Units							
Aroclor 1016			ug/L						<0.0198	<0.0198
Aroclor 1221			ug/L						<0.0244	<0.0244
Aroclor 1232			ug/L						<0.0213	<0.0213
Aroclor 1242	0.003	0.03	ug/L						0.373	0.411
Aroclor 1248			ug/L						<0.0135	<0.086
Aroclor 1254			ug/L						<0.0181	<0.0181
Aroclor 1260			ug/L						<0.0146	<0.0146
Parameter	PAL	ES	Units							
Acetophenone	-	-	µg/L	31	<0.41	<0.41	<0.41	<0.41	6.4 J	22.6 J
Acenaphthene	-	-	µg/L	<6.2	<0.31	<0.31	<0.31	<0.31	<1.55	<6.2
Anthracene	600	3,000	µg/L	<5.2	<0.26	<0.26	<0.26	<0.26	<1.3	<5.2
bis(2-ethylhexyl)phthalate	0.6	6	µg/L	<11.6	1.14 J	1.39 J	0.86 J	1.08 J	3.9 J	<11.6
4-Chloro-3-methylphenol	-	-	µg/L	8.4 J	<0.28	<0.28	<0.28	<0.28	<1.4	30.4
o-Cresol	-	-	µg/L	32	<0.38	<0.38	<0.38	<0.38	<1.9	<7.6
m & p-Cresol	-	-	µg/L	56	<0.54	<0.54	<0.54	<0.54	<2.7	15.4 J
Dibenzofuran	-	-	µg/L	<5.6	<0.28	<0.28	<0.28	<0.28	<1.4	<5.6
1,4-Dichlorobenzene	15	75	µg/L	<9	<0.45	<0.45	<0.45	<0.45	<2.25	<9
1,3-Dichlorobenzene	120	600	µg/L	<10	<0.5	<0.5	<0.5	<0.5	<2.5	<10
1,2-Dichlorobenzene	60	600	µg/L	<9.4	<0.47	<0.47	<0.47	<0.47	<2.35	<9.4
2,4-Dimethylphenol	-	-	µg/L	146	<0.4	<0.4	<0.4	<0.4	<0.4	254
Di-n-butyl phthalate	-	-	µg/L	<6.4	<0.32	<0.32	<0.32	<0.32	<1.6	<6.4
Fluorene	80	400	µg/L	<6	<0.3	<0.3	<0.3	<0.3	<1.5	<6
1-Methyl naphthalene	-	-	µg/L	<6.6	<0.33	<0.33	<0.33	<0.33	<1.65	<6.6
2-Methyl naphthalene	-	-	µg/L	<5.8	<0.29	<0.29	<0.29	<0.29	<1.45	<5.8
Naphthalene	10	100	µg/L	9.8 J	<0.44	<0.44	<0.44	<0.44	<2.2	21.4 J
Pentachlorophenol (PCP)	0.1	1	µg/L	<11	<0.55	<0.55	<0.55	<0.55	<2.75	<11
Phenanthrene	-	-	µg/L	<5.6	<0.28	<0.28	<0.28	<0.28	<1.4	<5.6
Phenol	400	2,000	µg/L	20.8	<0.27	<0.27	<0.27	<0.27	<1.35	<5.4

Indicates concentration in exceedance of Wisconsin Administrative Code Chapter NR140 Preventive Action Limit (PAL)  
Indicates concentration in exceedance of Wisconsin Administrative Code Chapter NR140 Enforcement Standard (ES)

J - Results reported between the Method Detection Limit (MDL) and the Limit of Quantitation (LOQ) are less certain than results at or above the LOQ.  
µg/L - micrograms per liter

Table 8

Remediation Progress - Glacial Drift, Shallow and Deep Dolomite Wells - VOC Results  
Arkema Coating Resins  
Saukville, Wisconsin

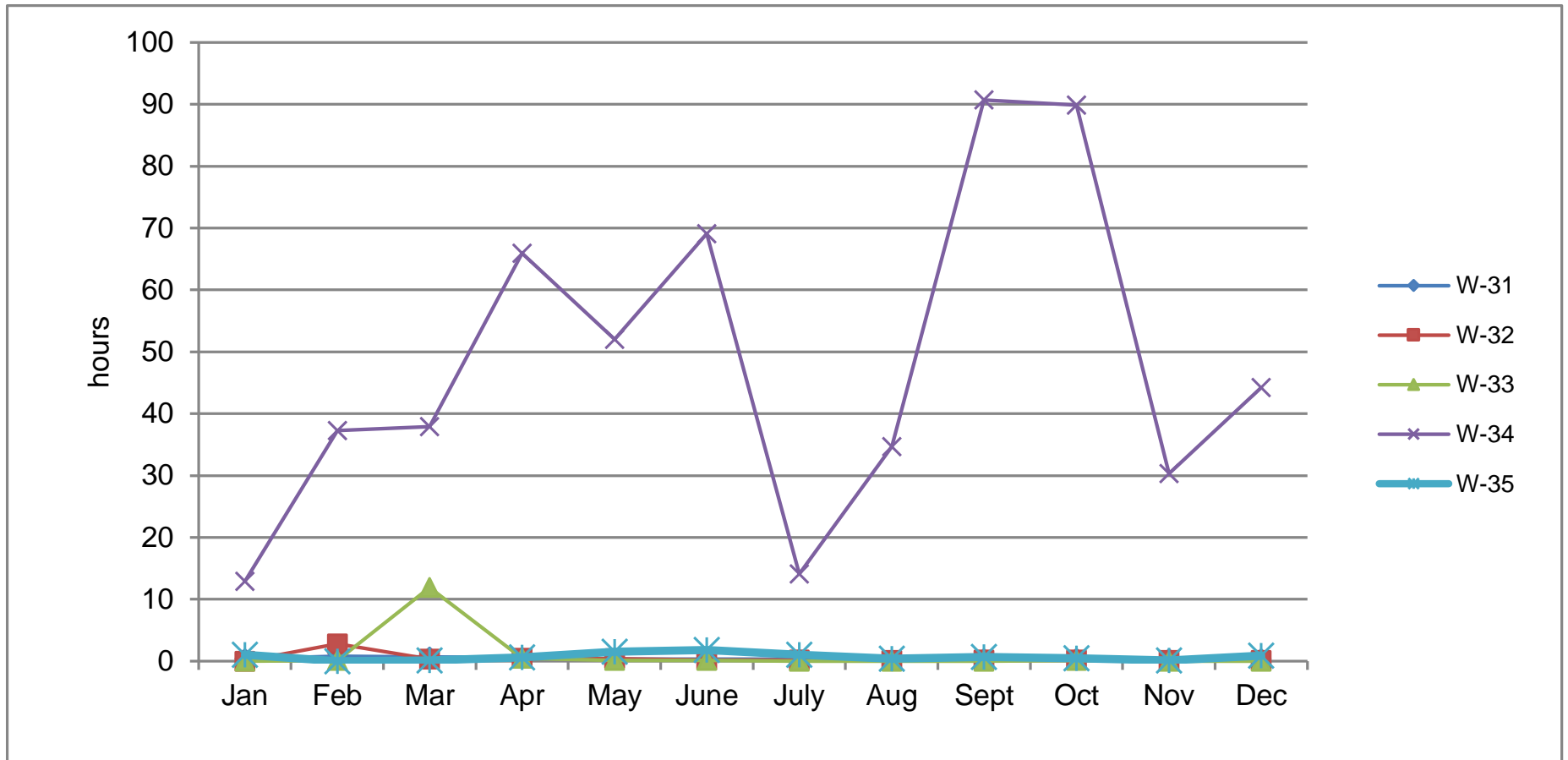
Sample ID	W-06A-16-4	W-21A-16-4	W-24A-16-4	W-28-16-4	W-29-16-4	W-30-16-4	W-43-16-4	W-47-16-4	TripBlank			
Collection Date	10/3/2016	10/4/2016	10/4/2016	Not Sampled	10/4/2016	10/4/2016	10/4/2016	10/4/2016	10/4/2016			
Laboratory ID	531844J	531844DD	531844FF	Dry	531844EE	531844BB	531844GG	5031844N	5031844NN			
Duplicate Parent												
Monitoring Objective	Remediation Progress	Remediation Progress	Remediation Progress	Remediation Progress	Remediation Progress	Remediation Progress	Remediation Progress	Remediation Progress	Remediation Progress			
Hydrogeologic Unit	Glacial Drift	Shallow Dolomite	Shallow Dolomite	Shallow Dolomite	Shallow Dolomite	Deep Dolomite	Glacial Drift	Glacial Drift				
Dilution	500	50				10		100	1			
Parameter	PAL	ES	Units									
Propionitrile	-	-	µg/L	<950	<95	<19	<19	<19	<190	<1.9		
Isobutanol	-	-	µg/L	<3900	<390	<78	<78	<78	<780	<7.8		
Methylacrylonitrile	-	-	µg/L	<230	<23	<4.6	<4.6	<4.6	<46	<0.46		
Acenitrile	-	-	µg/L	<460	<46	<9.2	<9.2	<9.2	<92	<0.92		
Acetone	1,800	9,000	µg/L	<2950	<295	<59	<59	<59	<590	<5.9		
Allyl Chloride	-	-	µg/L	<415	<41.5	<8.3	<8.3	<8.3	<83	<0.83		
Benzene	0.5	5	µg/L	<220	1,010	<4.4	<4.4	3.4	4.5	J	89	<0.44
Bromodichloromethane	0.06	0.6	µg/L	<230	<23	<4.6	<4.6	<4.6	<46	<0.46		
Bromofom	0.44	4.4	µg/L	<230	<23	<4.6	<4.6	<4.6	<46	<0.46		
Bromomethane	1	10	µg/L	<1600	<160	<32	<32	<32	<320	<3.2		
Carbon disulfide	200	1,000	µg/L	<500	<50	<10	<10	<10	<100	<1		
Carbon tetrachloride	0.5	5	µg/L	<255	<25.5	<5.1	<5.1	<5.1	<51	<0.51		
Chlorobenzene	20	100	µg/L	<230	<23	<4.6	<4.6	<4.6	<46	<0.46		
Chloroethane	90	400	µg/L	<325	<32.5	<6.5	<6.5	<6.5	<65	<0.65		
Chloroform	0.6	6	µg/L	<215	<21.5	<4.3	<4.3	<4.3	<43	<0.43		
Chloromethane	3	30	µg/L	<950	<95	<19	<19	<19	<190	<1.9		
Chloroprene	-	-	µg/L	<285	<28.5	<5.7	<5.7	<5.7	<57	<0.57		
1,2-Dibromo-3-chloropropane	0.02	0.2	µg/L	<700	<70	<14	<14	<14	<140	<1.4		
Dibromochloromethane	6	60	µg/L	<225	<22.5	<4.5	<4.5	<4.5	<45	<0.45		
Dibromomethane	-	-	µg/L	<240	<24	<4.8	<4.8	<4.8	<48	<0.48		
1,4-Dichlorobenzene	15	75	µg/L	<245	<24.5	<4.9	<4.9	<4.9	<49	<0.49		
1,3-Dichlorobenzene	120	600	µg/L	<260	<26	<5.2	<5.2	<5.2	<52	<0.52		
1,2-Dichlorobenzene	60	600	µg/L	<230	<23	<4.6	<4.6	<4.6	<46	<0.46		
Dichlorodifluoromethane	200	1000	µg/L	<435	<43.5	<8.7	<8.7	<8.7	<87	<0.87		
1,2-Dichloroethane	0.5	5	µg/L	<240	<24	<4.8	<4.8	<4.8	<48	<0.48		
1,1-Dichloroethane	85	850	µg/L	<550	<55	<11	<11	<11	<110	<1.1		
1,1-Dichloroethene	0.7	7	µg/L	<325	<32.5	<6.5	<6.5	<6.5	<65	<0.65		
cis-1,2-Dichloroethene	7	70	µg/L	<225	29.5	J	87	88	<4.5	53	J	<0.45
trans-1,2-Dichloroethene	20	100	µg/L	<270	<27	<5.4	<5.4	<5.4	<54	<0.54		
1,2-Dichloropropane	0.5	5	µg/L	<215	<21.5	<4.3	<4.3	<4.3	<43	<0.43		
trans-1,3-Dichloropropene	0.04	0.4	µg/L	<245	<24.5	<4.9	<4.9	<4.9	<49	<0.49		
cis-1,3-Dichloropropene	0.04	0.4	µg/L	<210	<21	<4.2	<4.2	<4.2	<42	<0.42		
1,4-Dioxane	0.3	3	µg/L	<4450	<445	<89	<89	22.7	<89	<890	<8.9	
1,2-Dibromoethane (EDB)	0.005	0.05	µg/L	<315	<31.5	<6.3	<6.3	<6.3	<63	<0.63		
Ethyl Methacrylate	-	-	µg/L	<300	<30	<6.0	<6.0	<6.0	<60	<0.6		
Ethylbenzene	140	700	µg/L	22,200	13,900	<7.1	<7.1	430	<71	3,600	<0.71	
Hexachlorbutadiene	-	-	µg/L	<1100	<110	<22	<22	<22	<220	<2.2		
2-Hexanone	-	-	µg/L	<2150	<215	<43	<43	<43	<430	<4.3		
Iodomethane	-	-	µg/L	<1100	<110	<22	<22	<22	<220	<2.2		
Methyl ethyl ketone (MEK)	800	4,000	µg/L	<2000	<200	<40	<40	<40	<400	<4		
Methyl isobutyl ketone (MIBK)	50	500	µg/L	<2100	<210	<42	<42	<42	<420	<4.2		
Methyl Methacrylate	-	-	µg/L	<3200	<320	<64	<64	<64	<640	<6.4		
Methylene Chloride	0.5	5	µg/L	<950	<95	<19	<19	<19	<190	<1.9		
Styrene	10	100	µg/L	<400	<40	<8	<8	<8	<80	<0.8		
1,1,2,2-Tetrachloroethane	0.02	0.2	µg/L	<260	<26	<5.2	<5.2	<5.2	<52	<0.52		
1,1,1,2-Tetrachloroethane	7	70	µg/L	<240	<24	<4.8	<4.8	<4.8	<48	<0.48		
Tetrachloroethane (PCE)	0.5	5	µg/L	<245	<24.5	<4.9	<4.9	<4.9	<49	<0.49		
Toluene	160	800	µg/L	37,000	350	<4.4	<4.4	<4.4	1,230	<0.44		
trans-1,4-Dichloro-2-butene	-	-	µg/L	<1300	<130	<26	<26	<26	<260	<2.6		
1,2,4-Trichlorobenzene	14	70	µg/L	<850	<85	<17	<17	<17	<170	<1.7		
1,1,1-Trichloroethane	40	200	µg/L	<420	<42	<8.4	<8.4	<8.4	<84	<0.84		
1,1,2-Trichloroethane	0.5	5	µg/L	<240	<24	<4.8	<4.8	<4.8	<48	<0.48		
Trichloroethane (TCE)	0.5	5	µg/L	<235	<23.5	<4.7	<4.7	<4.7	<47	<0.47		
Trichlorofluoromethane	-	-	µg/L	<435	<43.5	<8.7	<8.7	1.66	<8.7	<87	<0.87	
1,2,3-Trichloropropane	12	60	µg/L	<440	<44	<8.8	<8.8	<8.8	<88	<0.88		
Vinyl Acetate	-	-	µg/L	<485	<48.5	<9.7	<9.7	<9.7	<97	<0.97		
Vinyl Chloride	0.02	0.2	µg/L	<85	42	19.9	2.0	J	0.22	J	<1.7	<0.17
m,p-Xylene	400	2,000	µg/L	73,000	5,400	<22	<22	<22	118	<22	27,200	<2.2
o-Xylene	-	-	µg/L	23,800	770	<8	<8	<8	<8	<8	3,200	<0.8
Total VOCs			µg/L	156,083	21,501.5	106.9	90.9	28.0	552.5	35,972	0.0	
Previous Results			µg/L	169,720	8,760	297.06	1.91	302.5	1.31	247	24,735	
Date				Oct-15	Oct-14	Oct-15	Oct-15	Oct-15	Oct-15	Oct-15	Oct-15	
Dissolved Oxygen			mg/L	2.81		5.13		4.70	1.87	NS	1.80	
pH				7.07		7.28		7.23	7.40	NS	6.89	
Conductivity			mS/cm	0.733		0.808		0.808	0.711	NS	1.289	
Temperature			°C	17.39		13.74		17.54	10.85	NS	17.29	
Oxidation-Reduction Potential			mV	-127.3		-60.2		-7.0	-25.0	NS	-121.2	

Indicates concentration in exceedance of Wisconsin Administrative Code Chapter NR140 Preventive Action Limit (PAL)  
 Indicates concentration in exceedance of Wisconsin Administrative Code Chapter NR140 Enforcement Standard (ES)  
 J - Results reported between the Method Detection Limit (MDL) and the Limit of Quantitation (LOQ) are less certain than results at or above the LOQ.  
 VOC - volatile organic compound  
 NS - Not Sampled  
 µg/L - micrograms per liter  
 mg/L - milligrams per liter  
 mS/cm - millisiemens per centimeter  
 °C - degrees Celsius  
 mV - millivolts

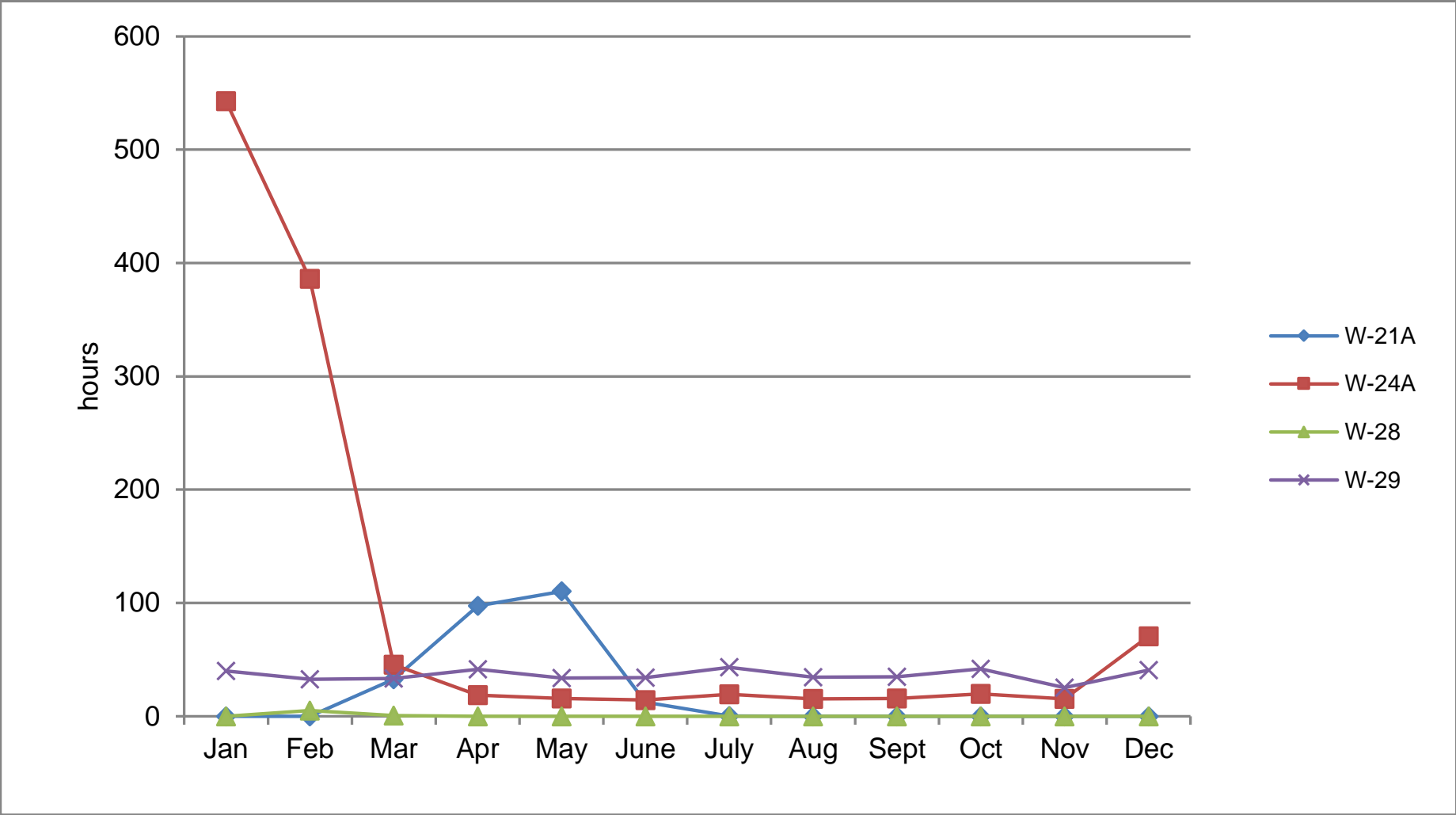
## **APPENDIX B**

PUMP RUN TIME TRENDS: 1992 - 2016

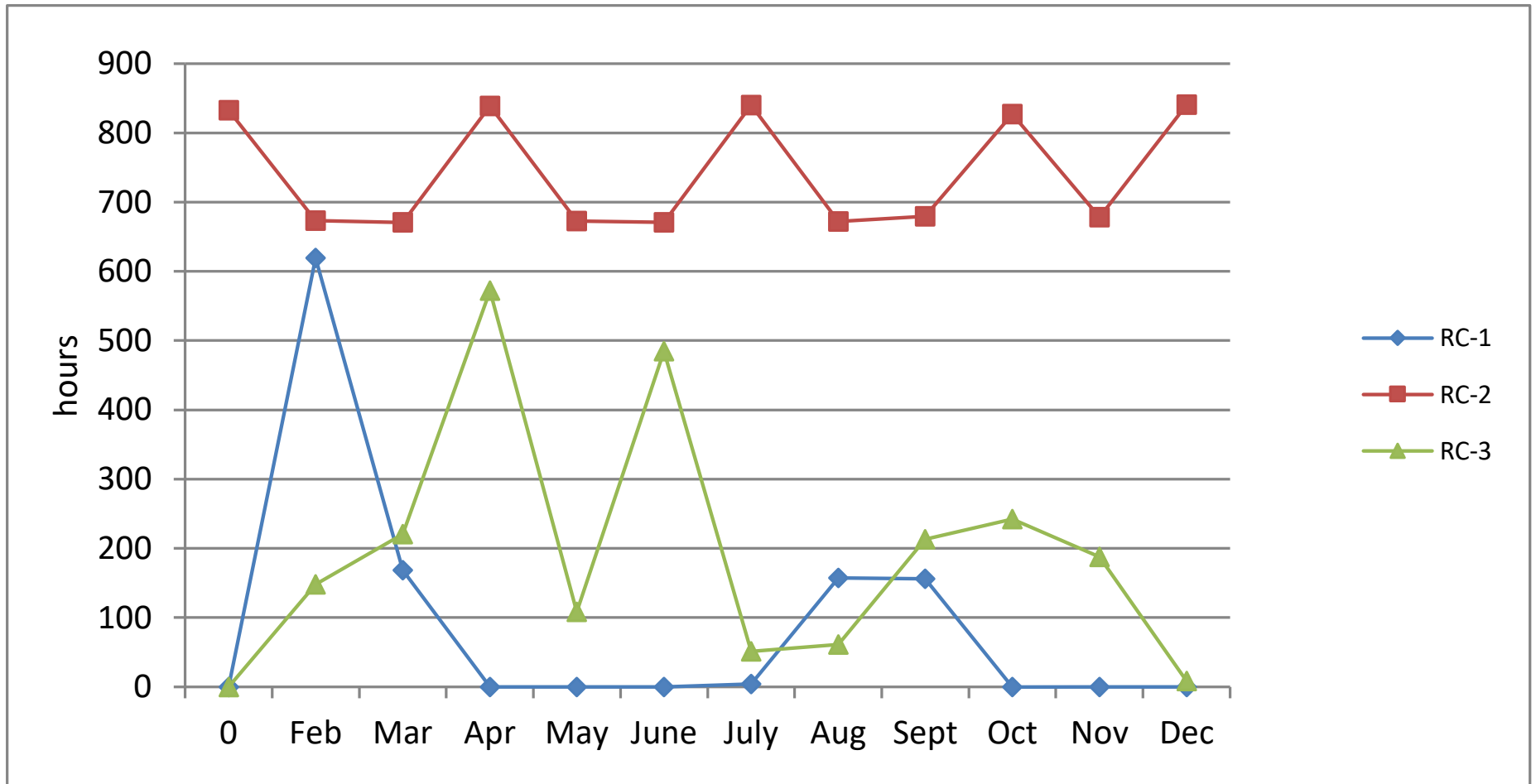
Glacial Extraction Wells  
2016 Pump Run Times  
Arkema Coating Resins  
Saukville, Wisconsin



Shallow Dolomite Extraction Wells  
2016 Pump Run Times  
Arkema Coating Resins  
Saukville, Wisconsin

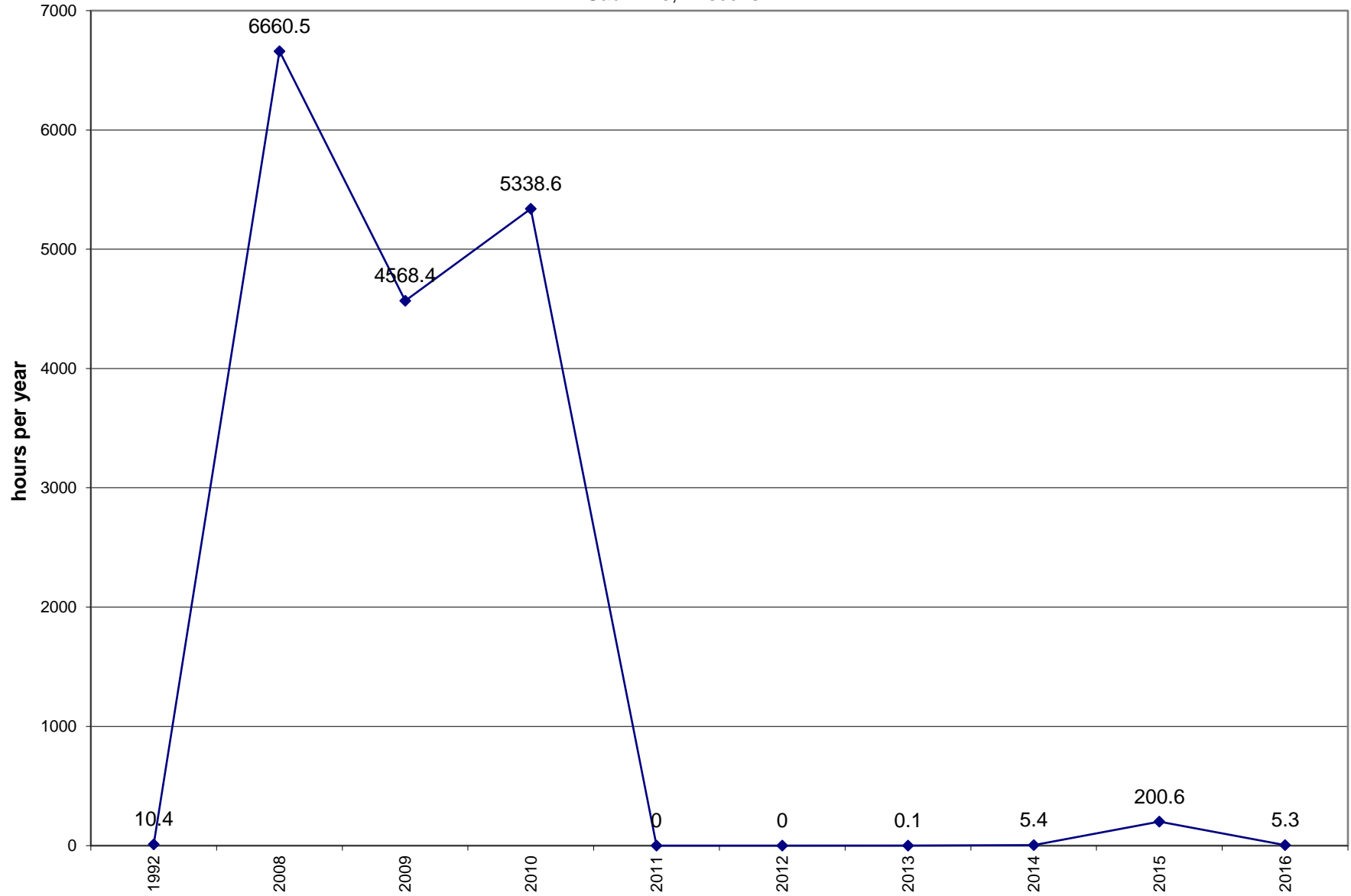


Ranney Collectors  
2016 Pump Run Times  
Arkema Coating Resins  
Saukville, Wisconsin

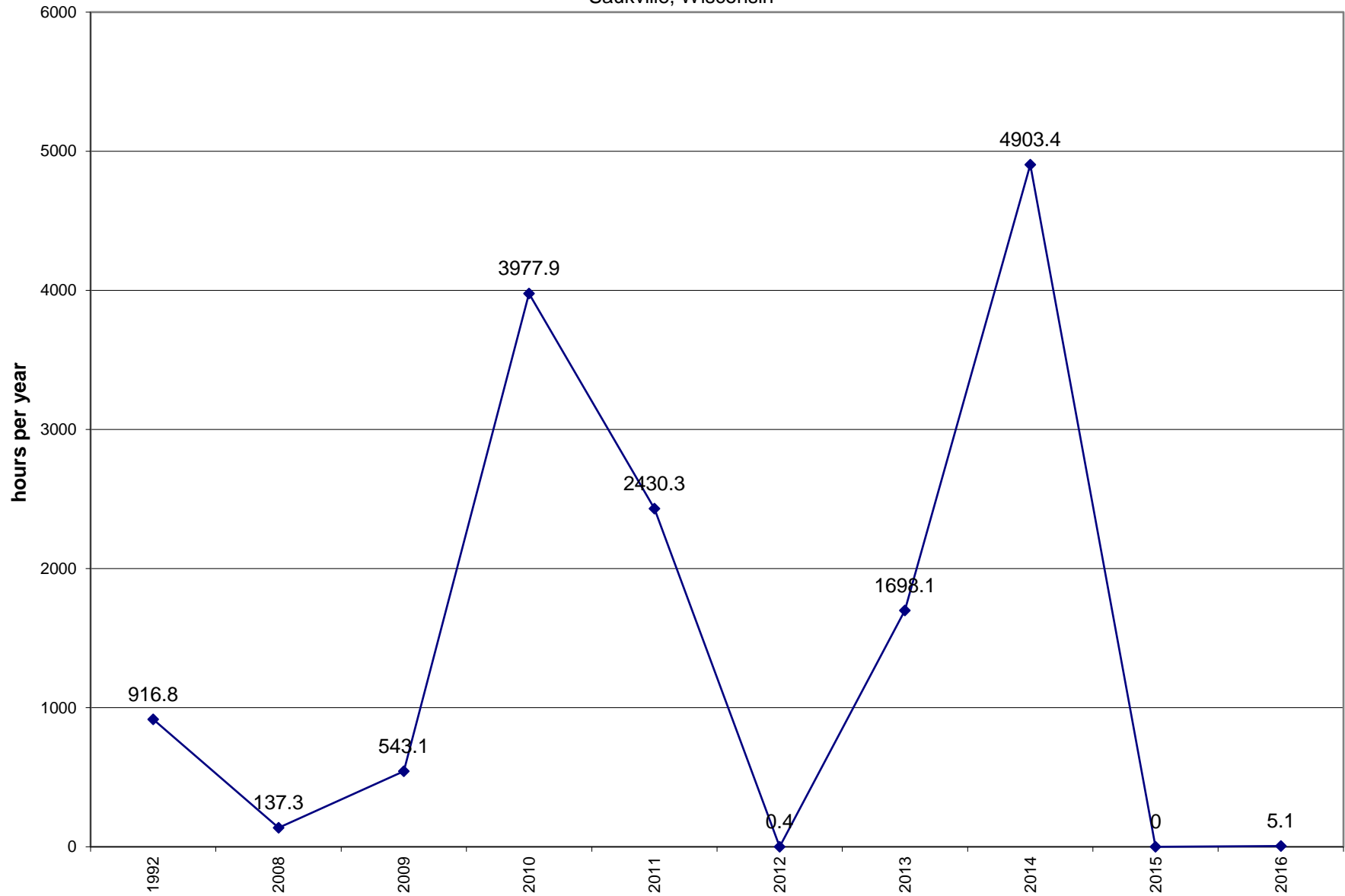




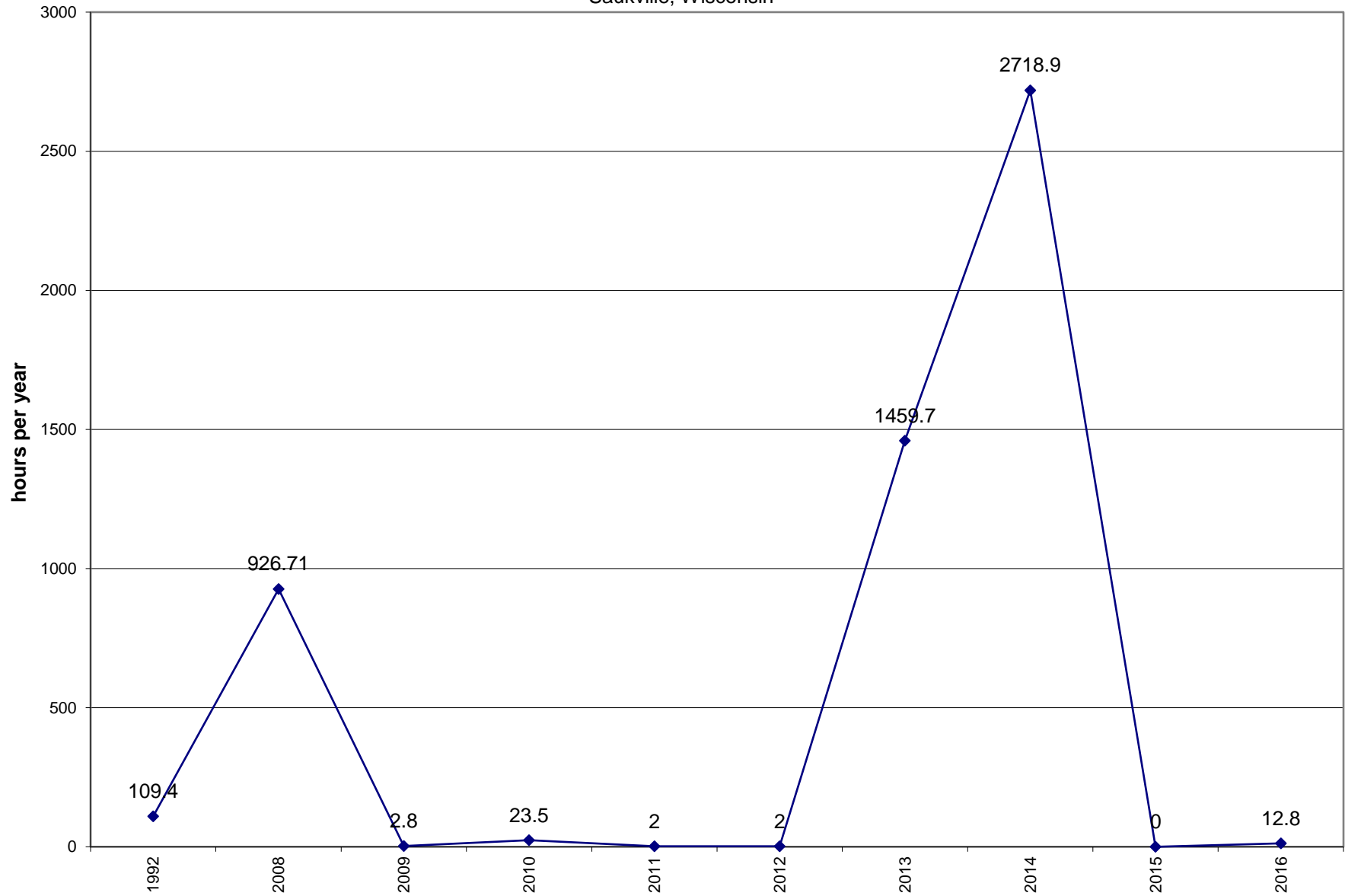
Historical Pump Run Trends  
Glacial Drift Well W-31  
Arkema Coating Resins  
Saukville, Wisconsin



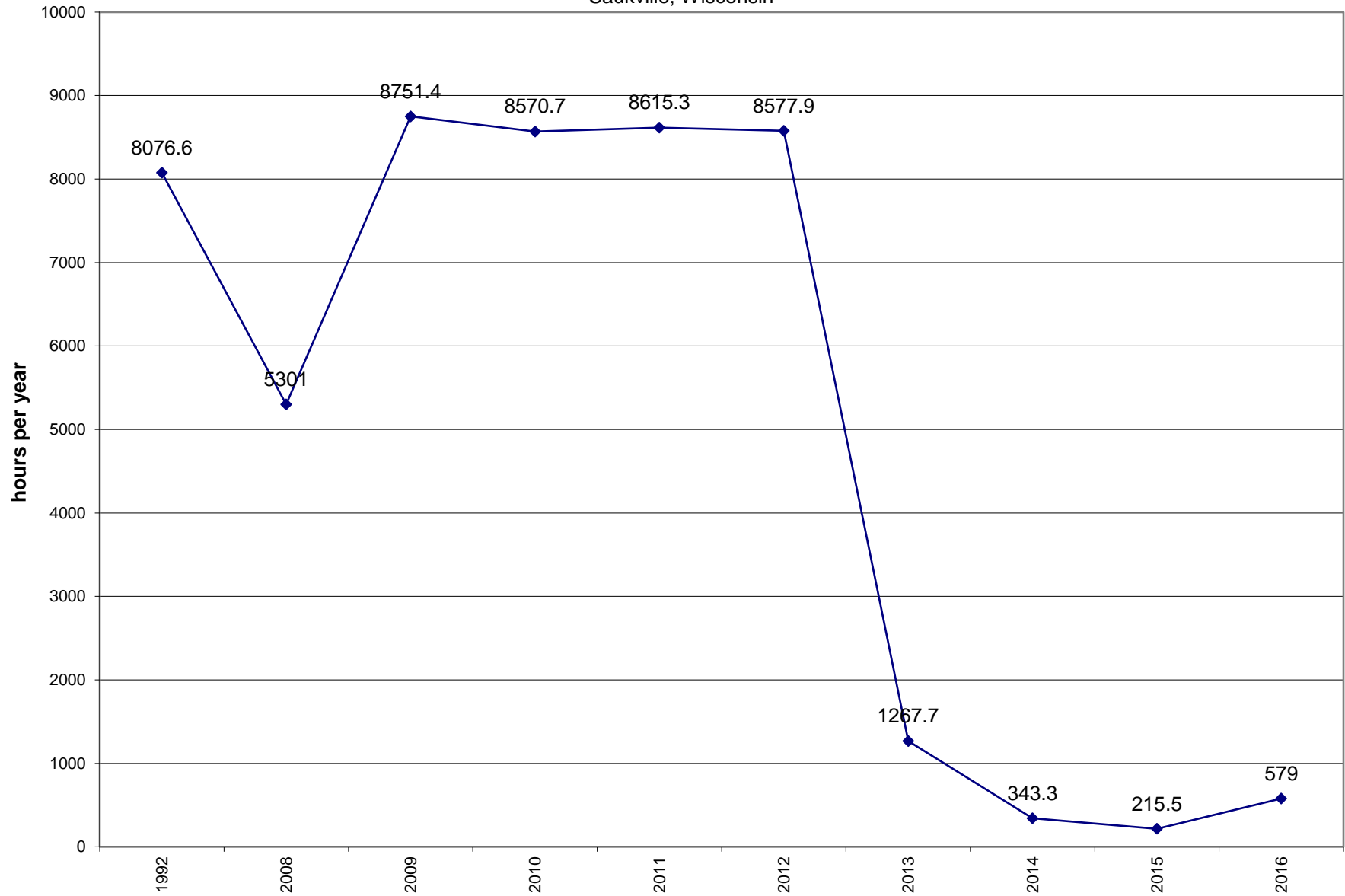
Historical Pump Run Trends  
Glacial Drift Well W-32  
Arkema Coating Resins  
Saukville, Wisconsin



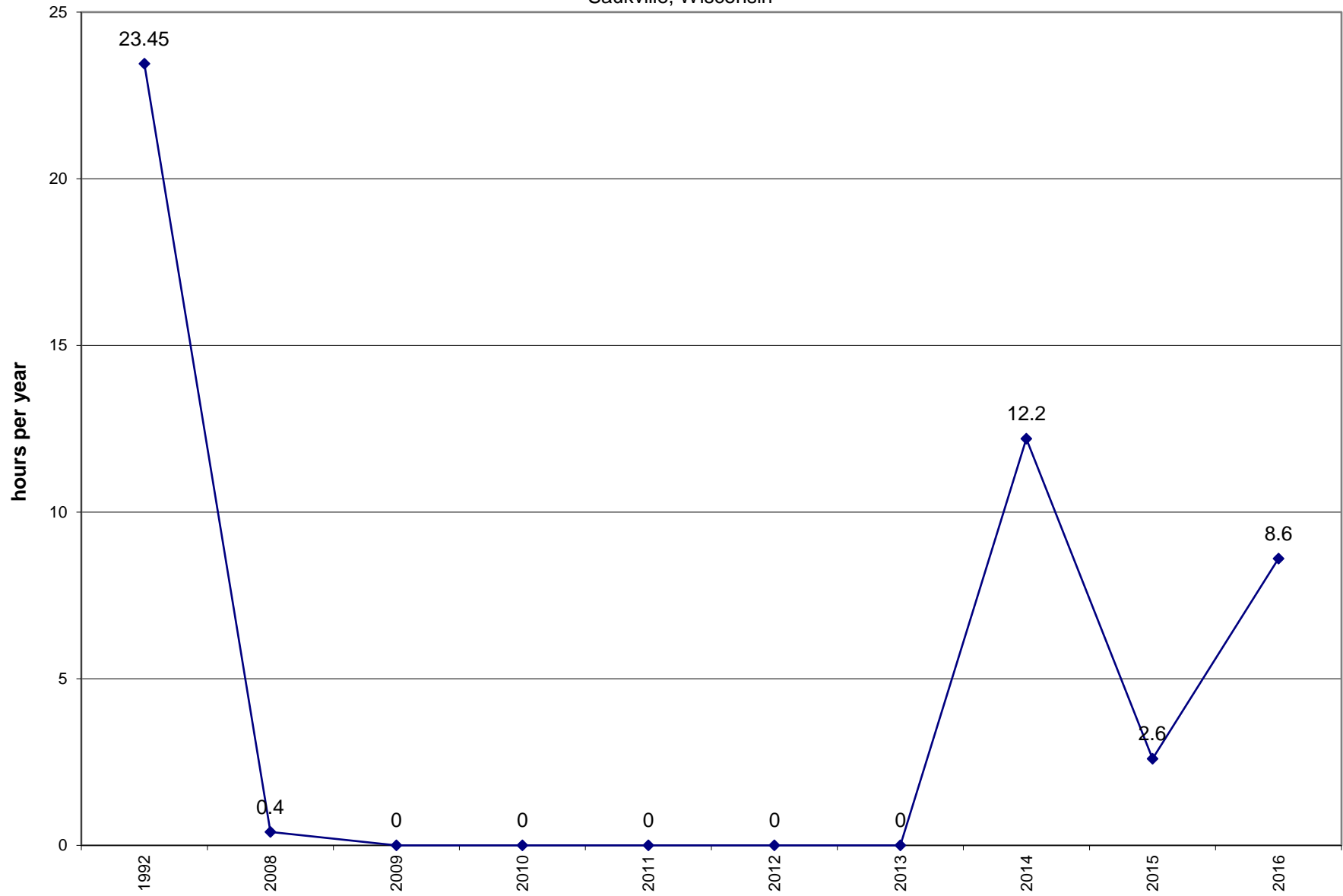
Historical Pump Run Trends  
Glacial Drift Well W-33  
Arkema Coating Resins  
Saukville, Wisconsin



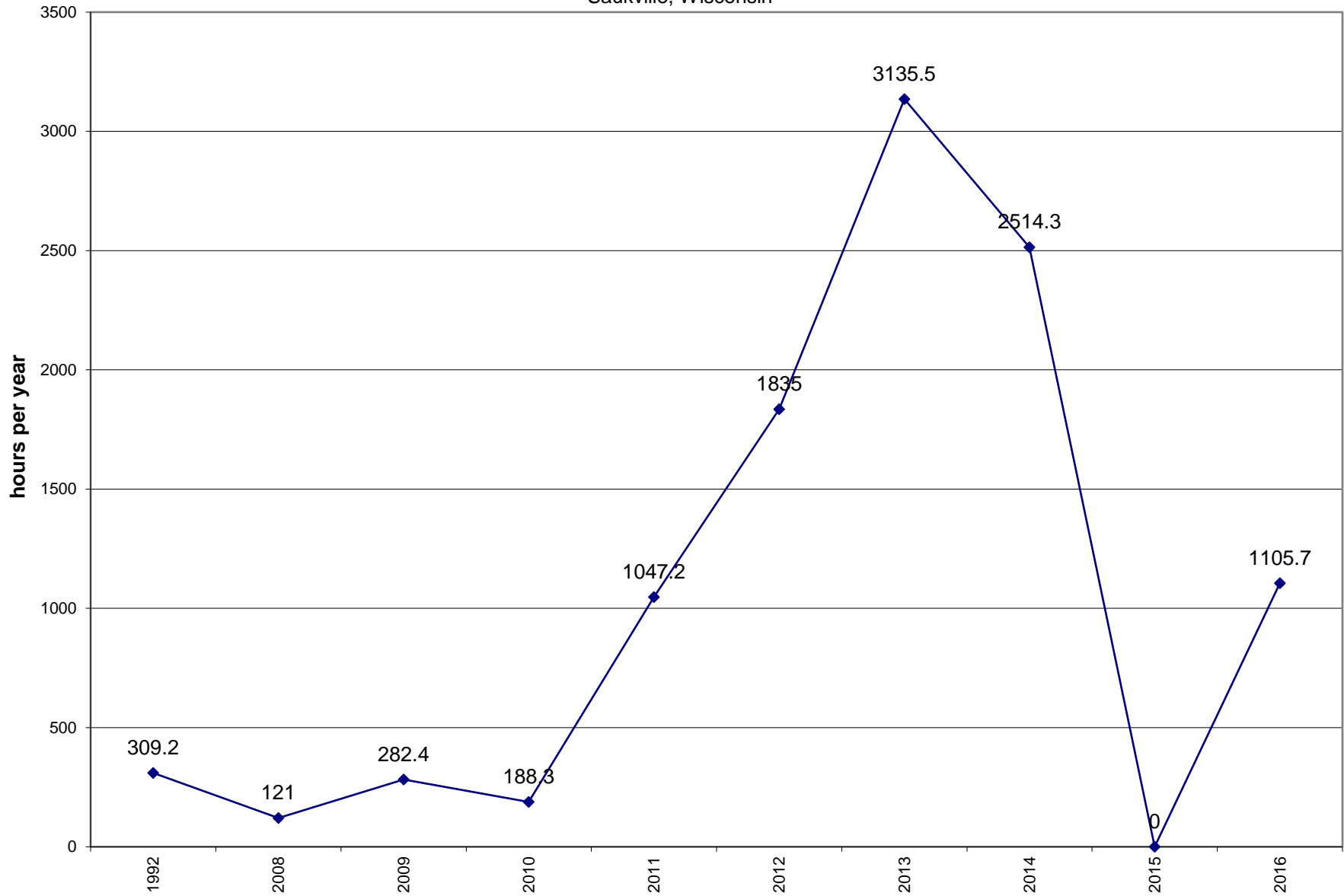
Historical Pump Run Trends  
Glacial Drift Well W-34  
Arkema Coating Resins  
Saukville, Wisconsin



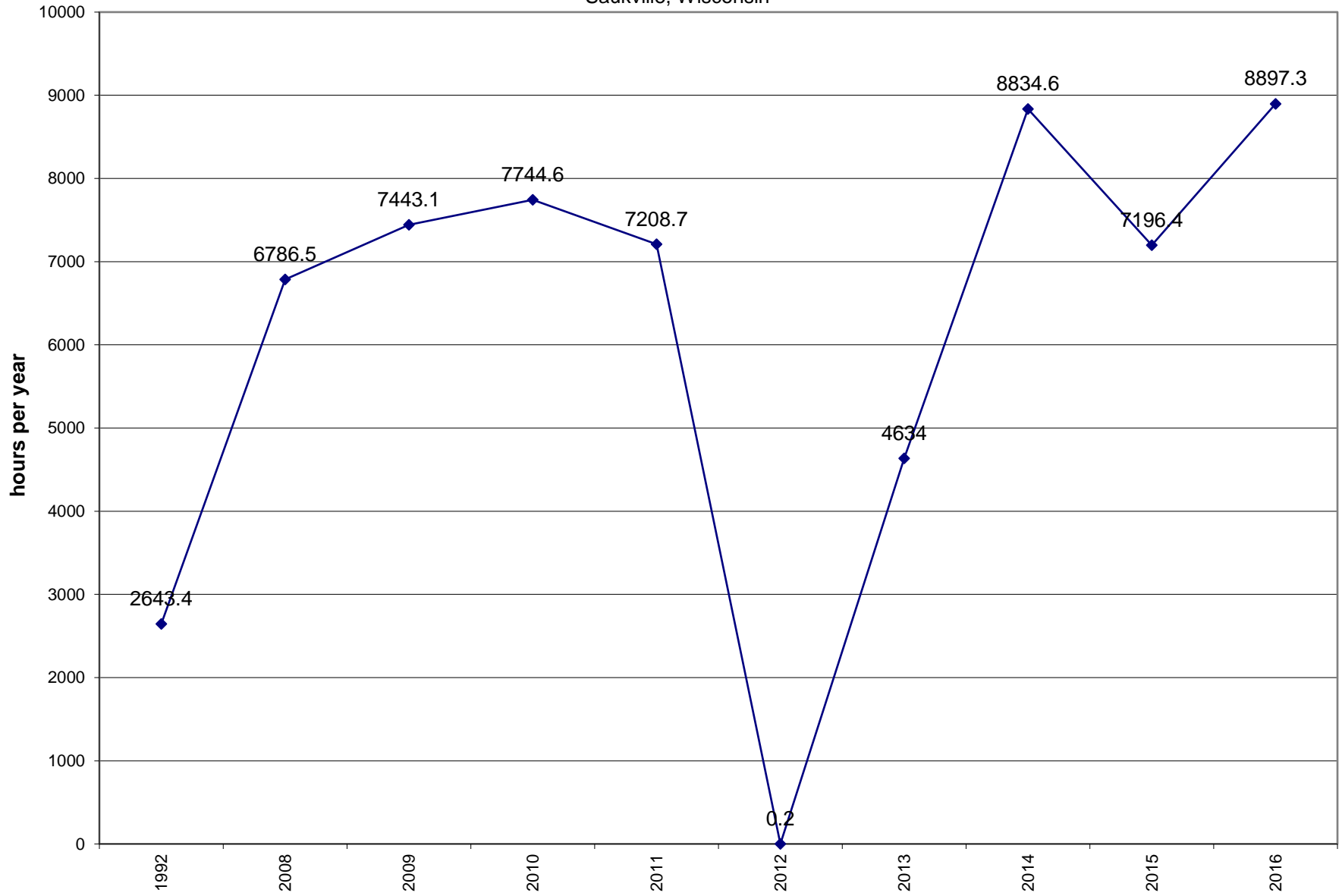
Historical Pump Run Trends  
Glacial Drift Well W-35  
Arkema Coating Resins  
Saukville, Wisconsin



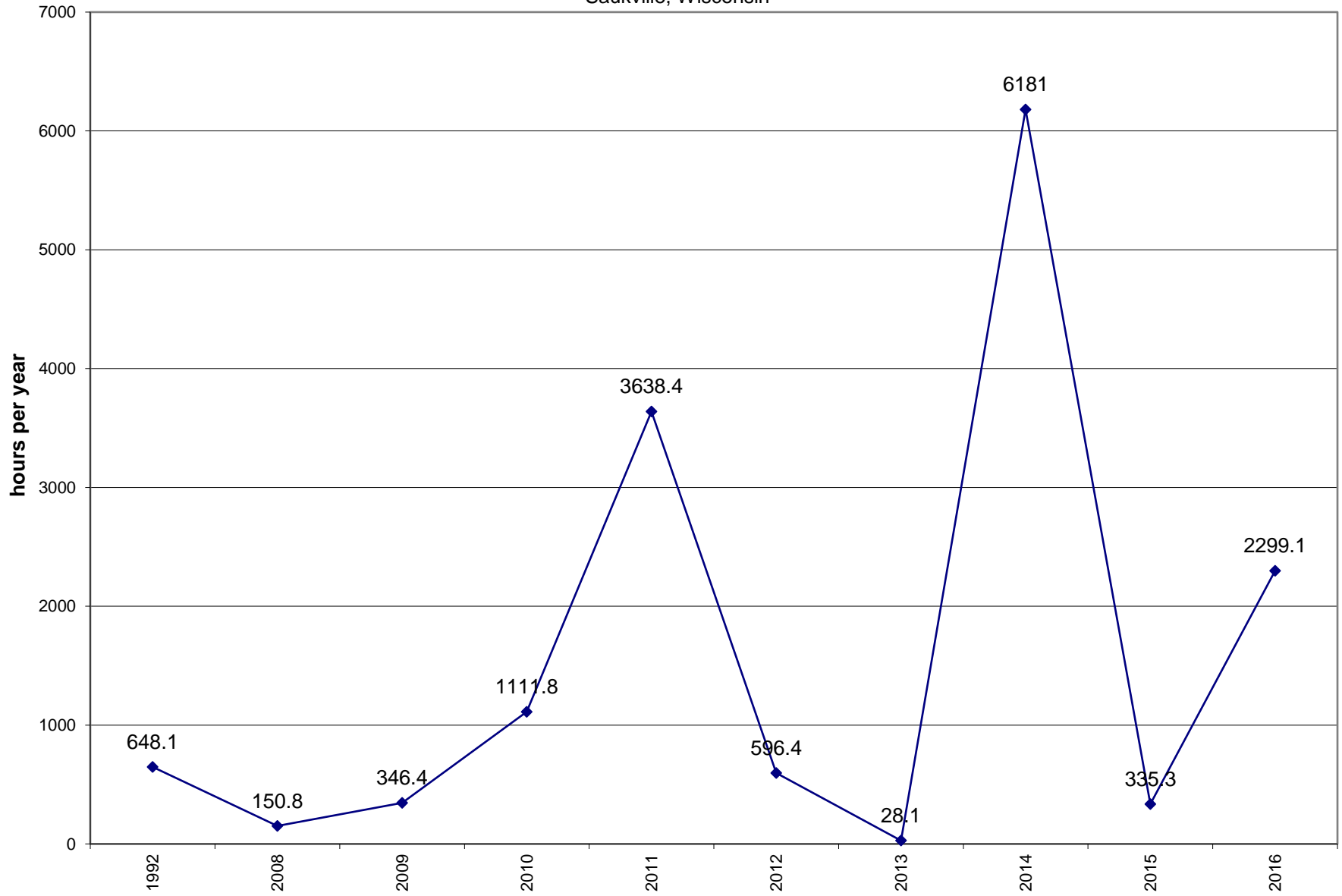
Historical Pump Run Trends  
Raney Collector RC-1  
Arkema Coating Resins  
Saukville, Wisconsin



Historical Pump Run Trends  
Raney Collector RC-2  
Arkema Coating Resins  
Saukville, Wisconsin

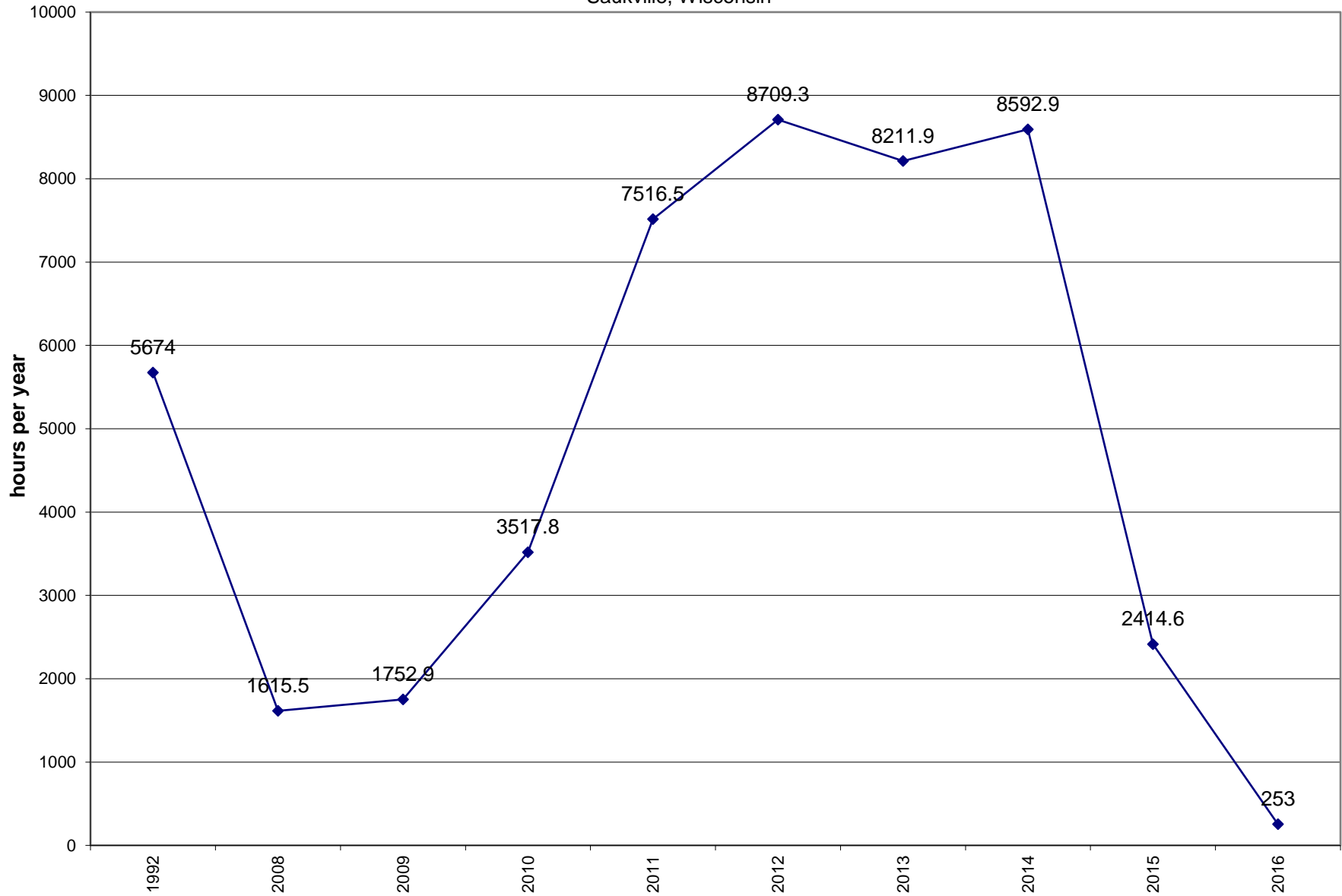


Historical Pump Run Trends  
Ranney Collector RC-3  
Arkema Coating Resins  
Saukville, Wisconsin

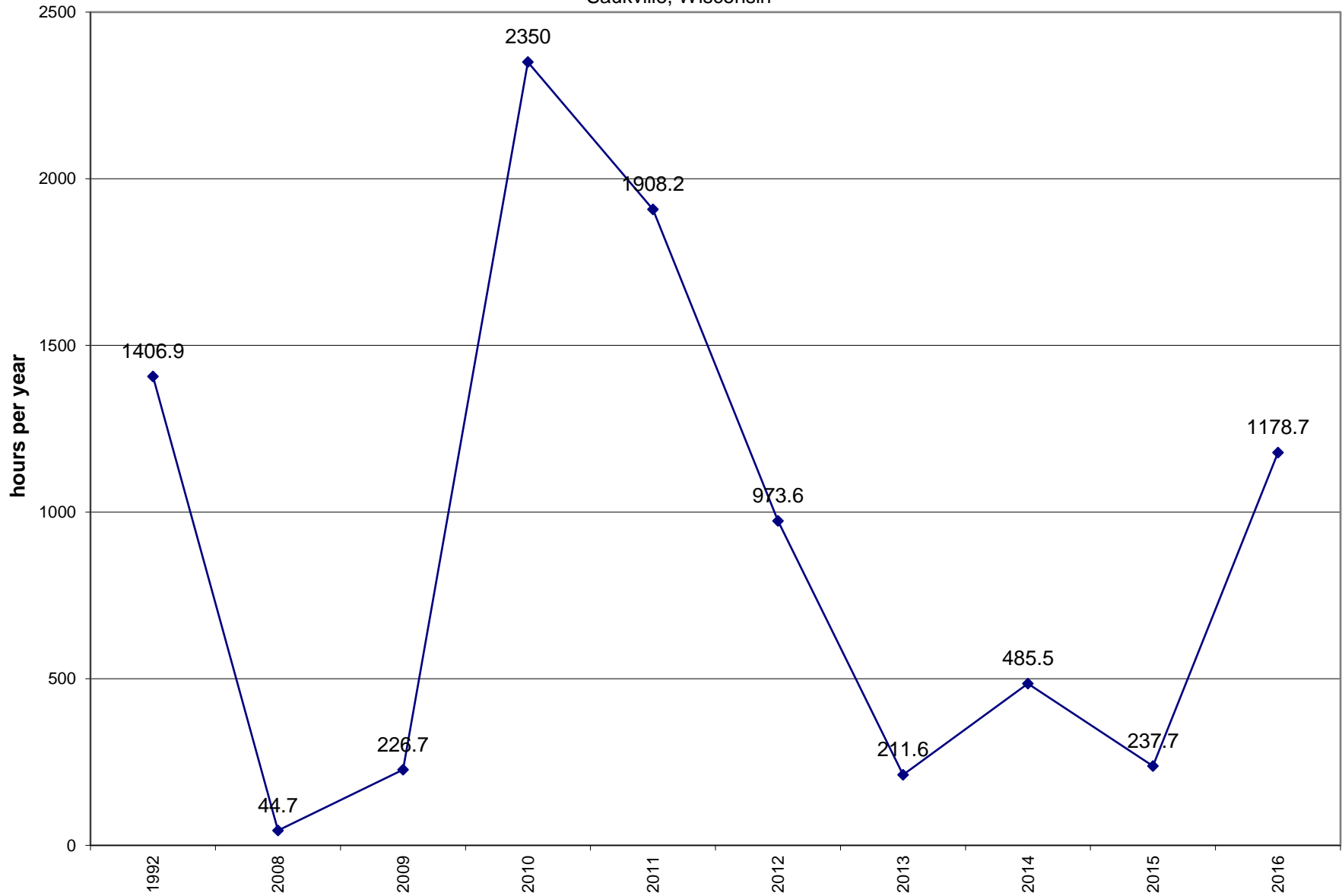




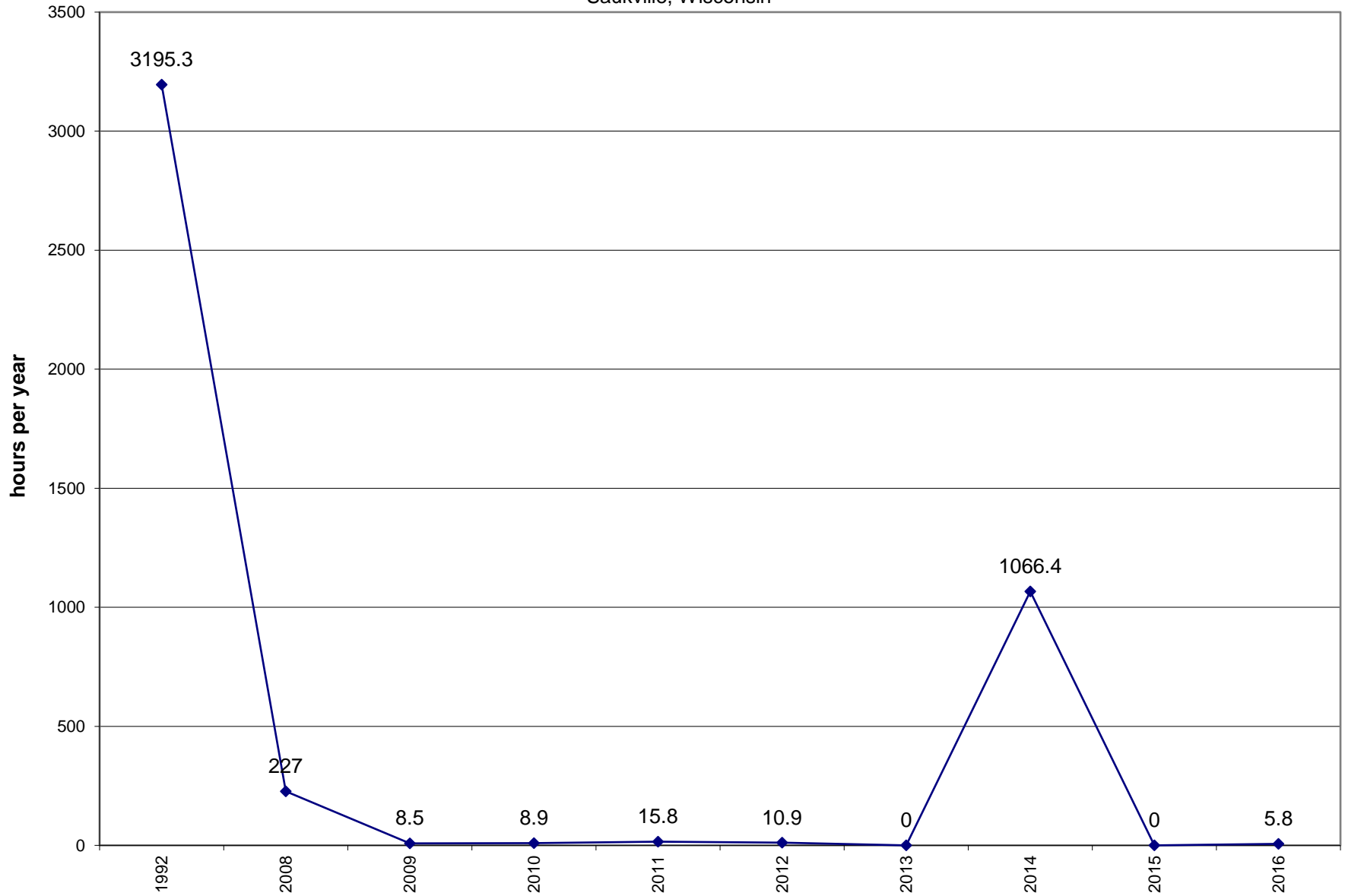
Historical Pump Run Trends  
Shallow Dolomite Well W-21A  
Arkema Coating Resins  
Saukville, Wisconsin



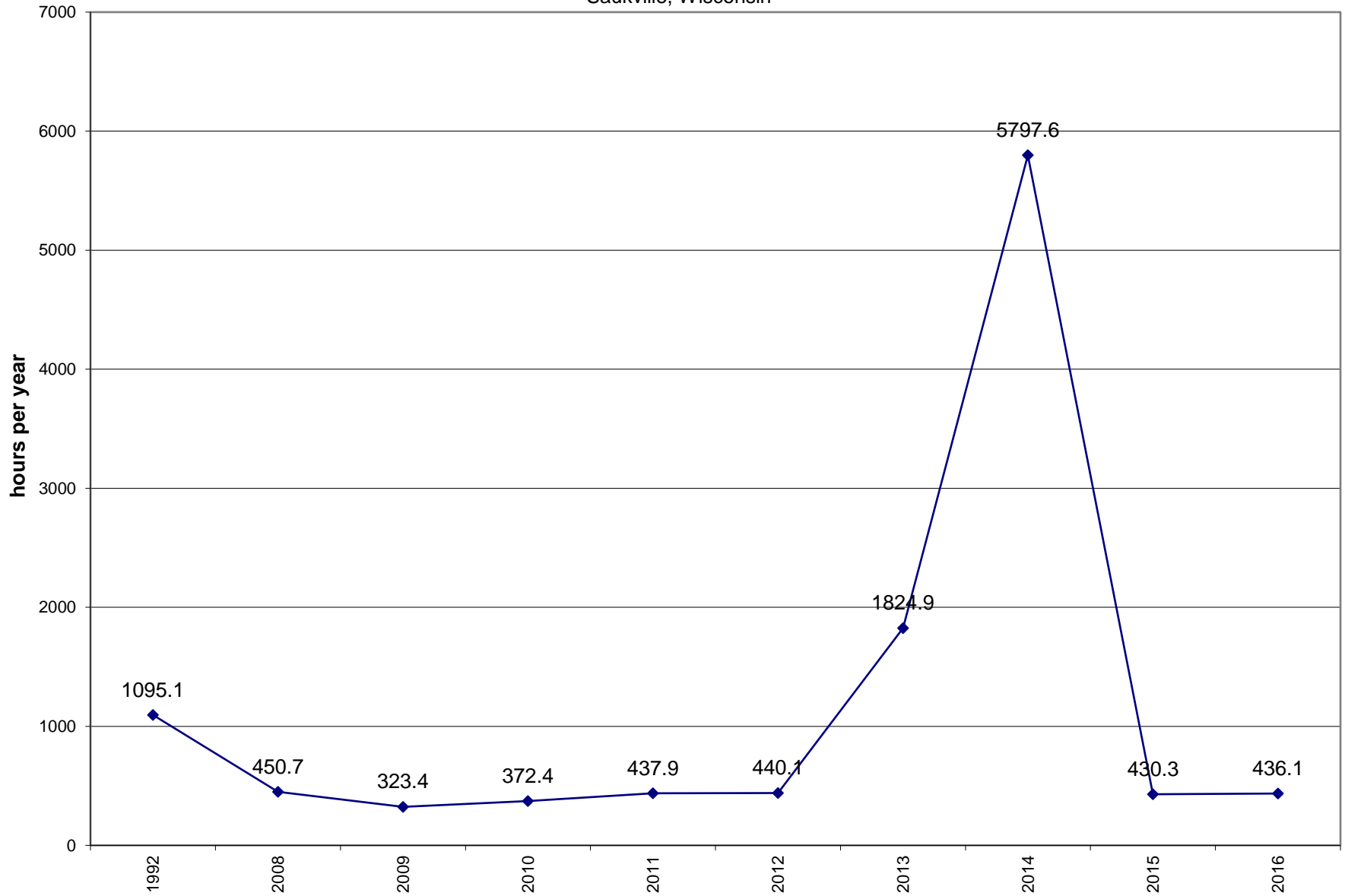
Historical Pump Run Trends  
Shallow Dolomite Well W-24A  
Arkema Coating Resins  
Saukville, Wisconsin



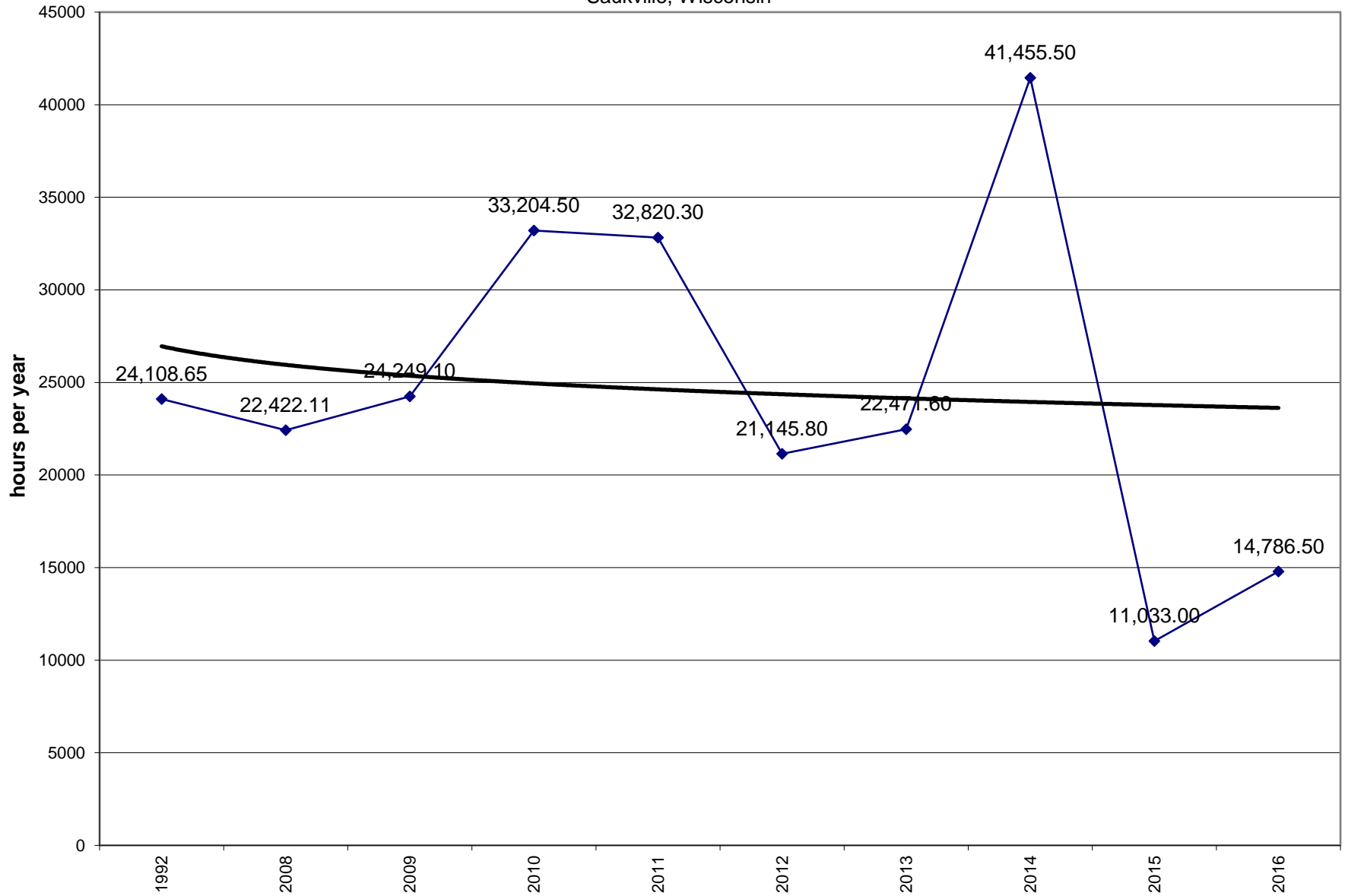
Historical Pump Run Trends  
Shallow Dolomite Well W-28  
Arkema Coating Resins  
Saukville, Wisconsin



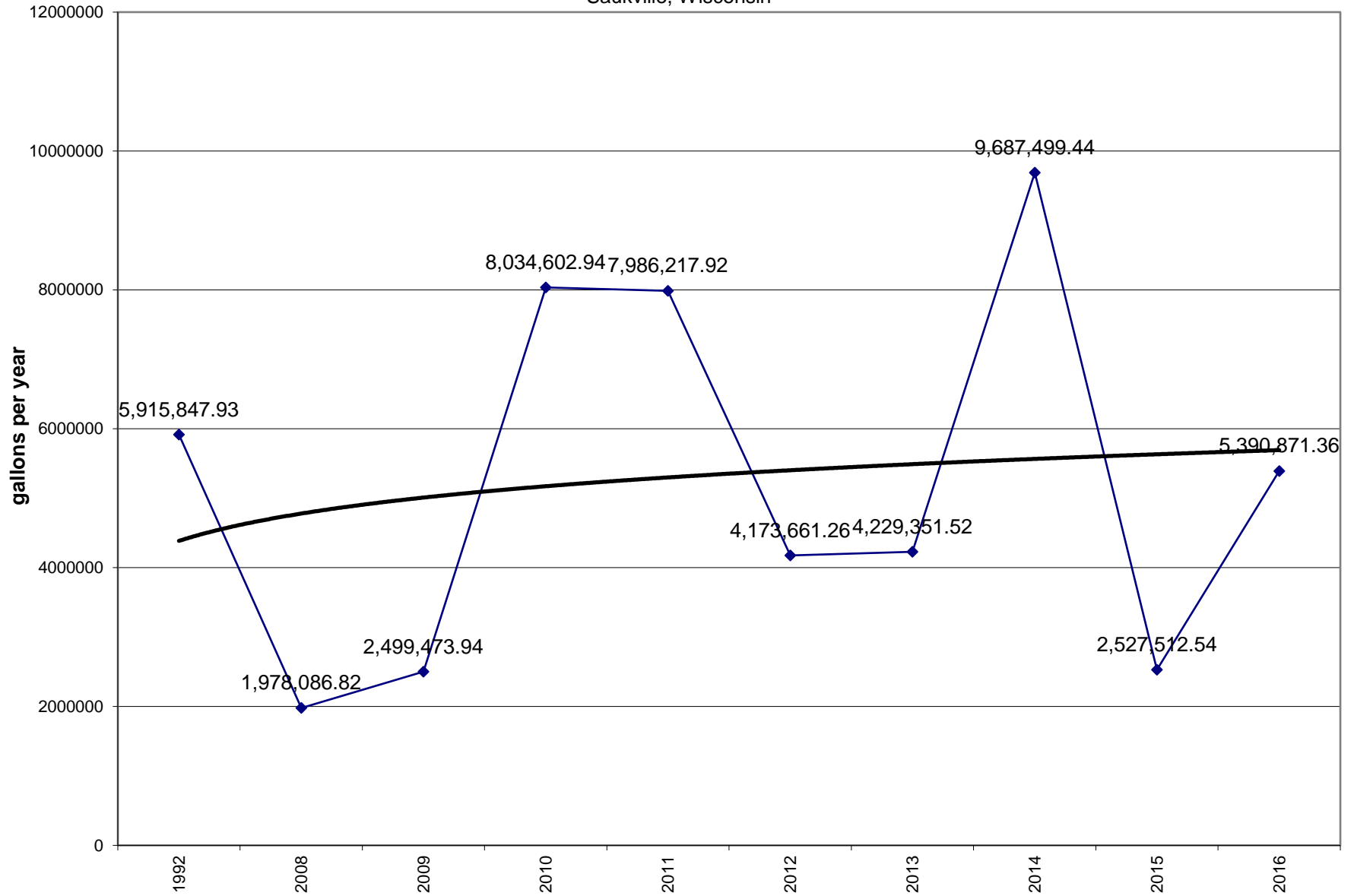
Historical Pump Run Trends  
Shallow Dolomite Well W-29  
Arkema Coating Resins  
Saukville, Wisconsin



Historical Pump Run Trends  
Total Pumping  
Arkema Coating Resins  
Saukville, Wisconsin



Historical Pump Run Trends  
Total Pumping  
Arkema Coating Resins  
Saukville, Wisconsin



## **APPENDIX C**

### HYDROGEOLOGIC CALCULATIONS

**Hydrogeological Calculations  
Fall 2016  
Arkema Coating Resins  
Saukville, Wisconsin**

**Horizontal Gradient**

**Glacial Drift Unit**

$$i = \frac{dH}{dL} = \frac{765-745}{778} = 0.032 \text{ (eastward)}$$

**Shallow and Deep Dolomite Units**

$$i = \frac{dH}{dL} = \frac{740-680}{259} = 0.772$$

convergent on W-30

$$i = \frac{dH}{dL} = \frac{740-680}{178} = 1.124$$

**Vertical Gradient**

Between glacial drift unit and shallow dolomite unit

**W-18A/W-22**      Fall 2016 Water Level Data

$$\text{Center D} = (772.53-66) + 0.5(40) = 726.53$$

$$i_v = \frac{WLS - WLD}{WLS - \text{Center D}} \quad \begin{array}{l} WLS = 768.01 \\ WLD = 761.76 \end{array} \quad \begin{array}{l} W-18A \\ W-22 \end{array} \quad 0.15 \text{ (downward)}$$

**W-43/W-38**      Fall 2016 Water Level Data

$$\text{Center D} = (770.98-49.00) + 0.5(16.8) = 730.38$$

$$i_v = \frac{WLS - WLD}{WLS - \text{Center D}} \quad \begin{array}{l} WLS = 764.37 \\ WLD = 753.95 \end{array} \quad \begin{array}{l} W-43 \\ W-38 \end{array} \quad 0.31 \text{ (downward)}$$

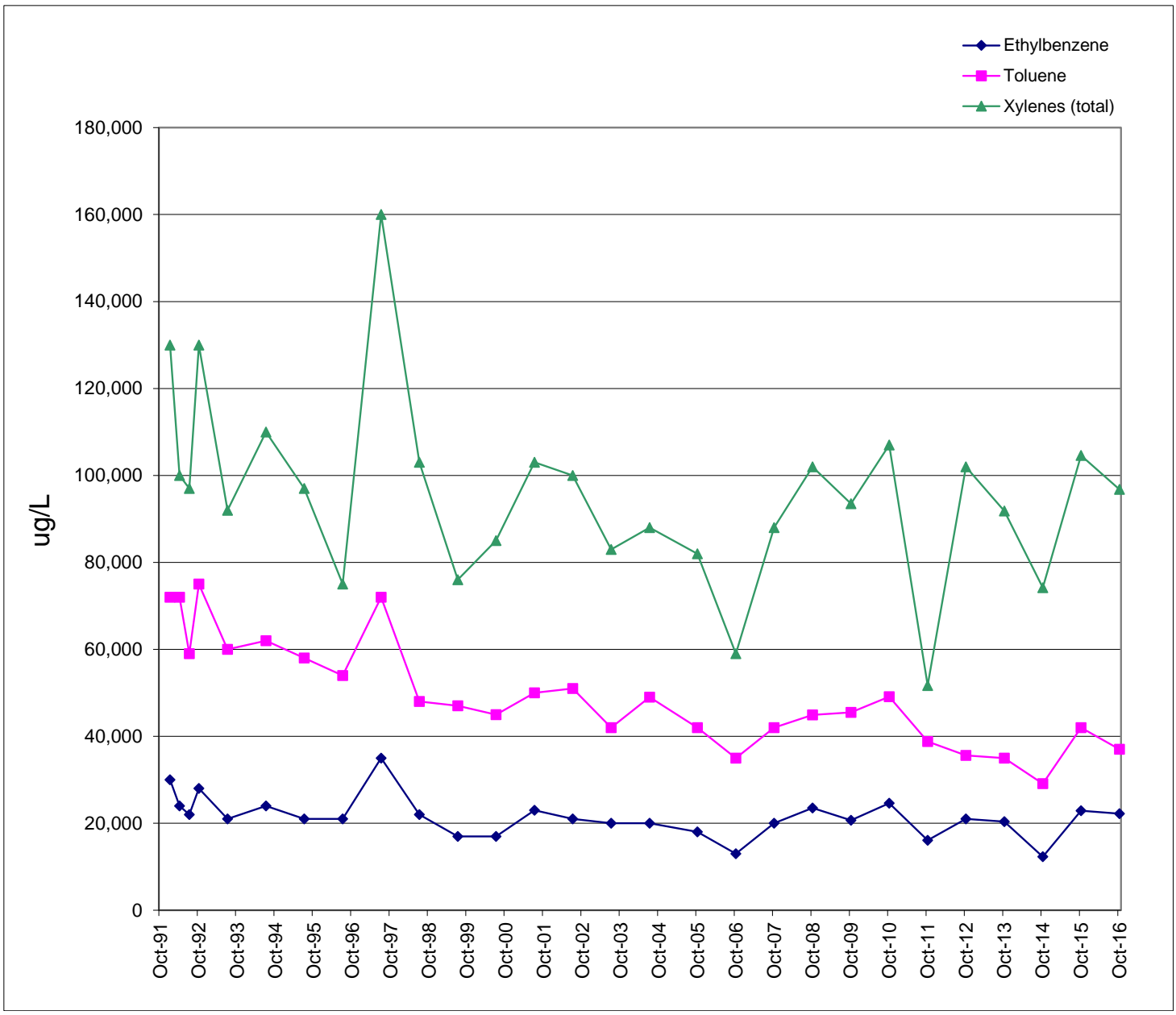


**APPENDIX D**

INDIVIDUAL CONTAMINANT TRENDS: 1992-2016

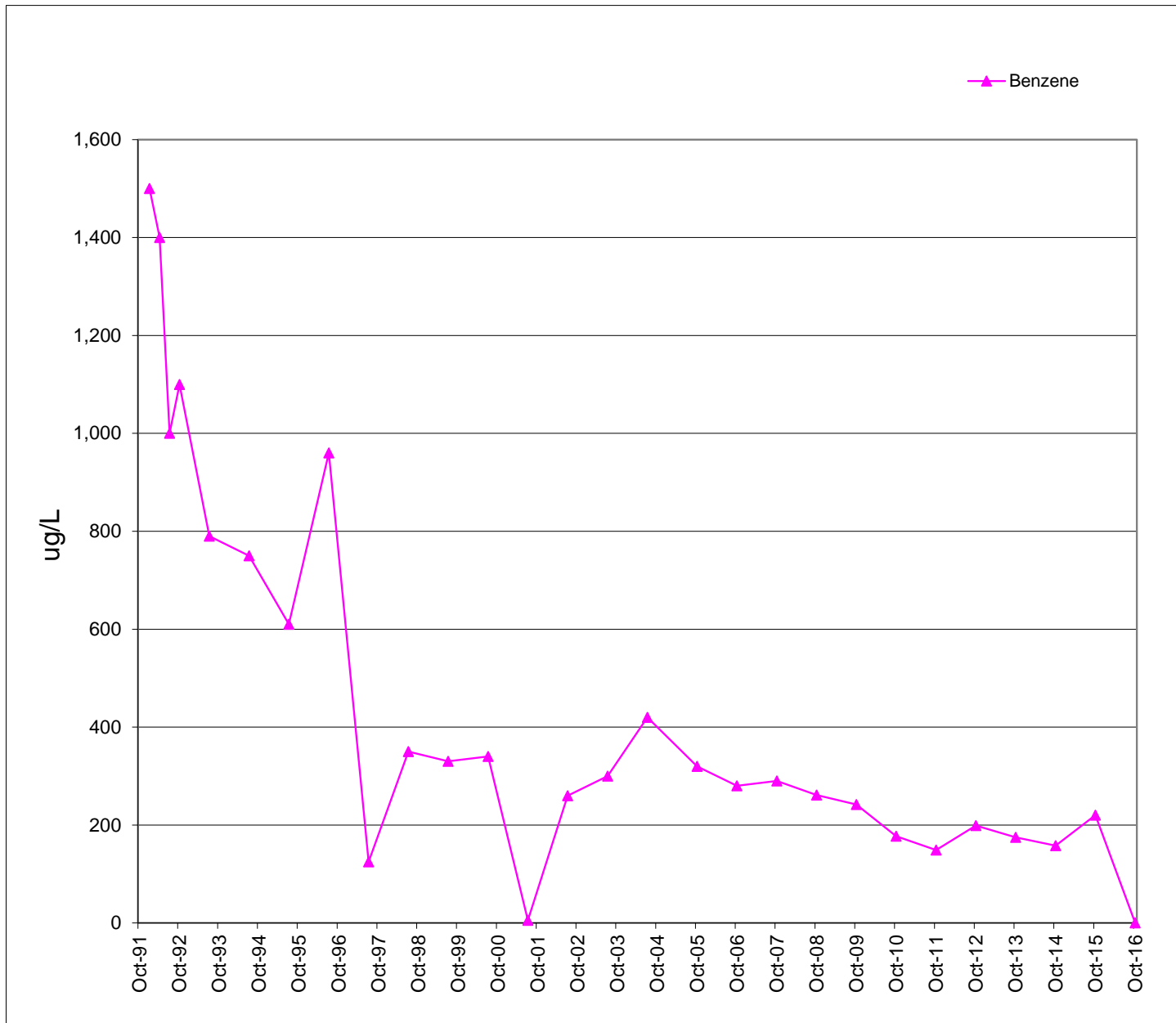
# W-06A VOC

## Remediation Progress - Glacial Drift



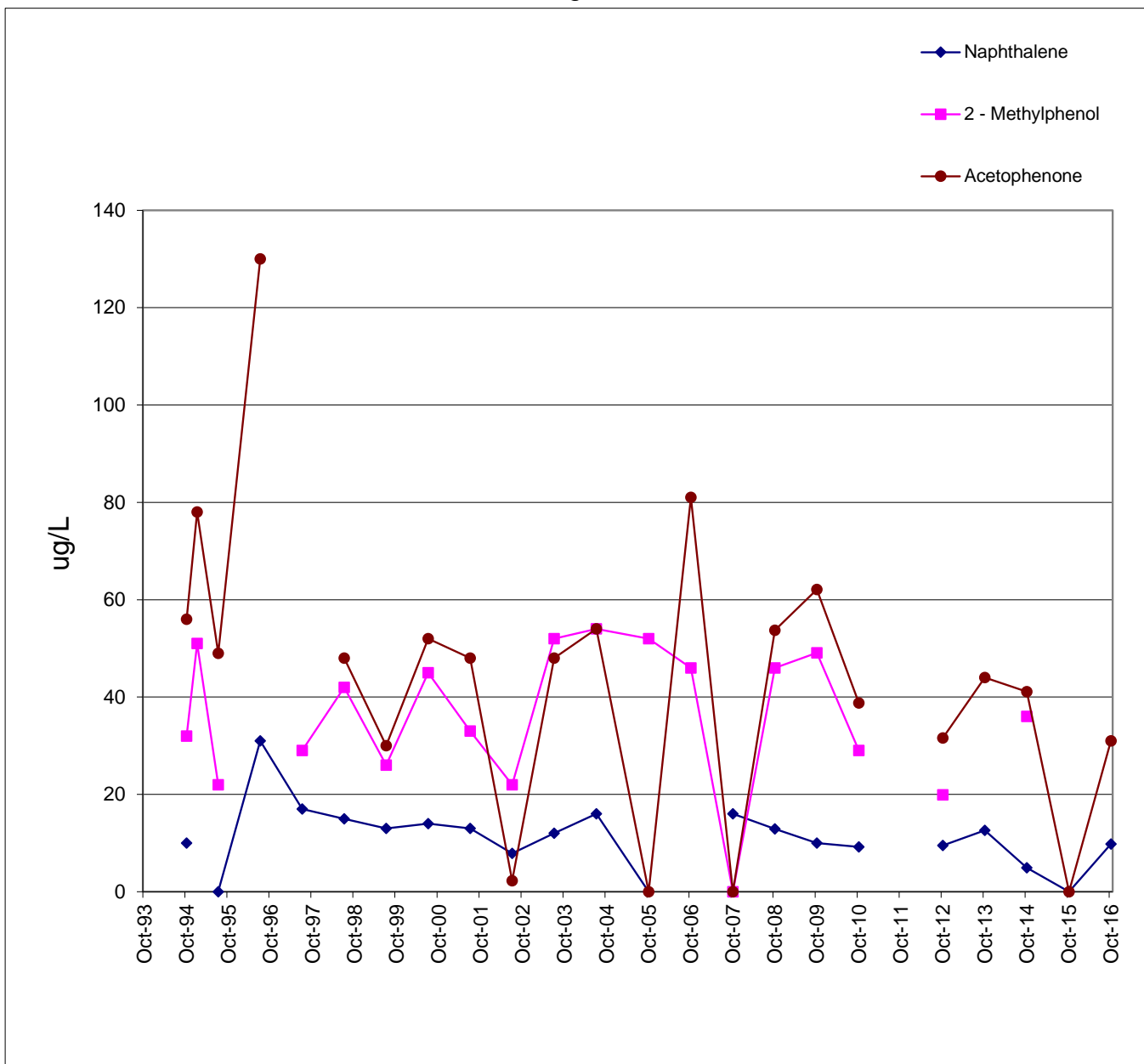
# W-06A VOC

## Remediation Progress - Glacial Drift



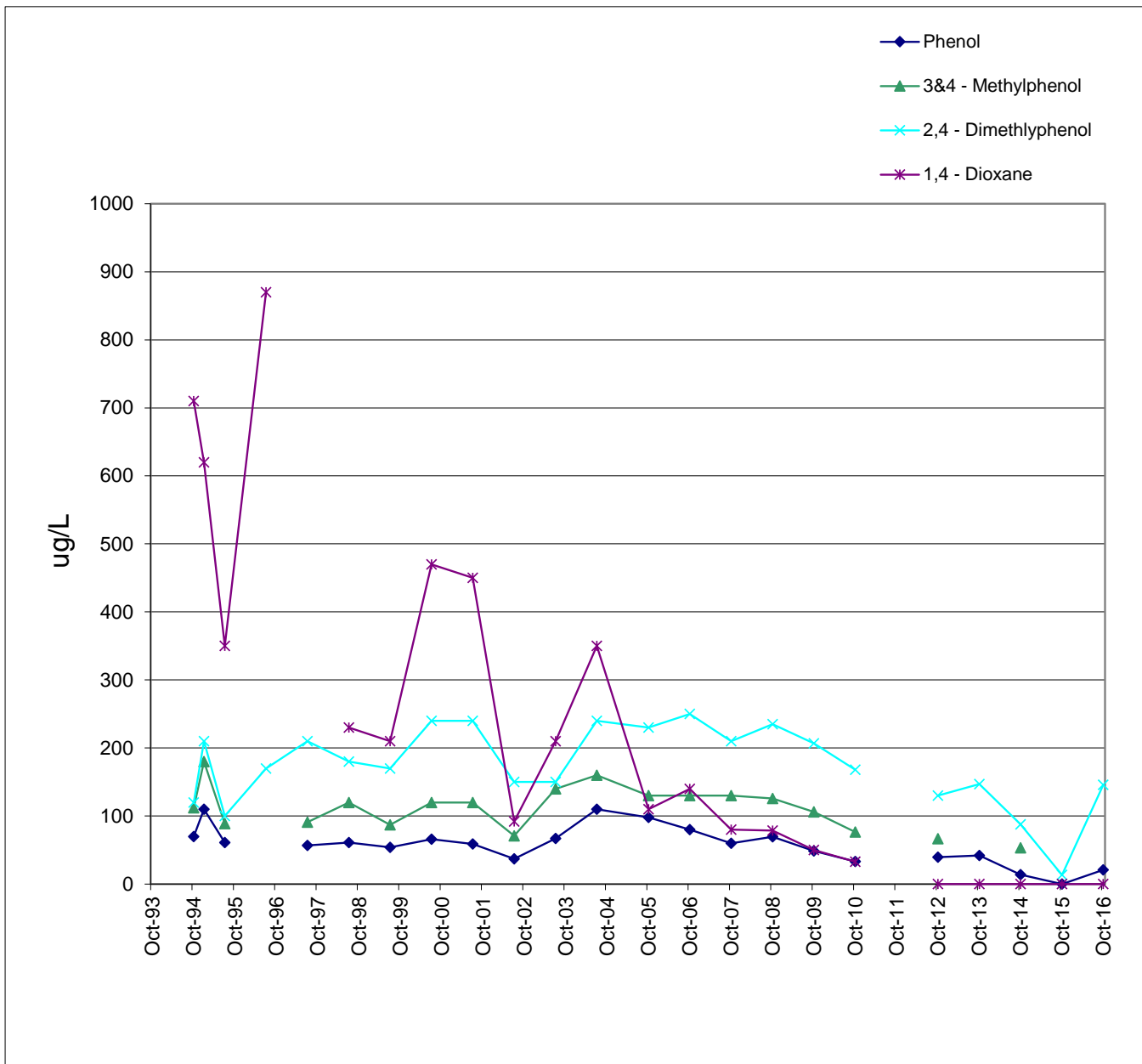
# W-06A SVOC

## Remediation Progress - Glacial Drift



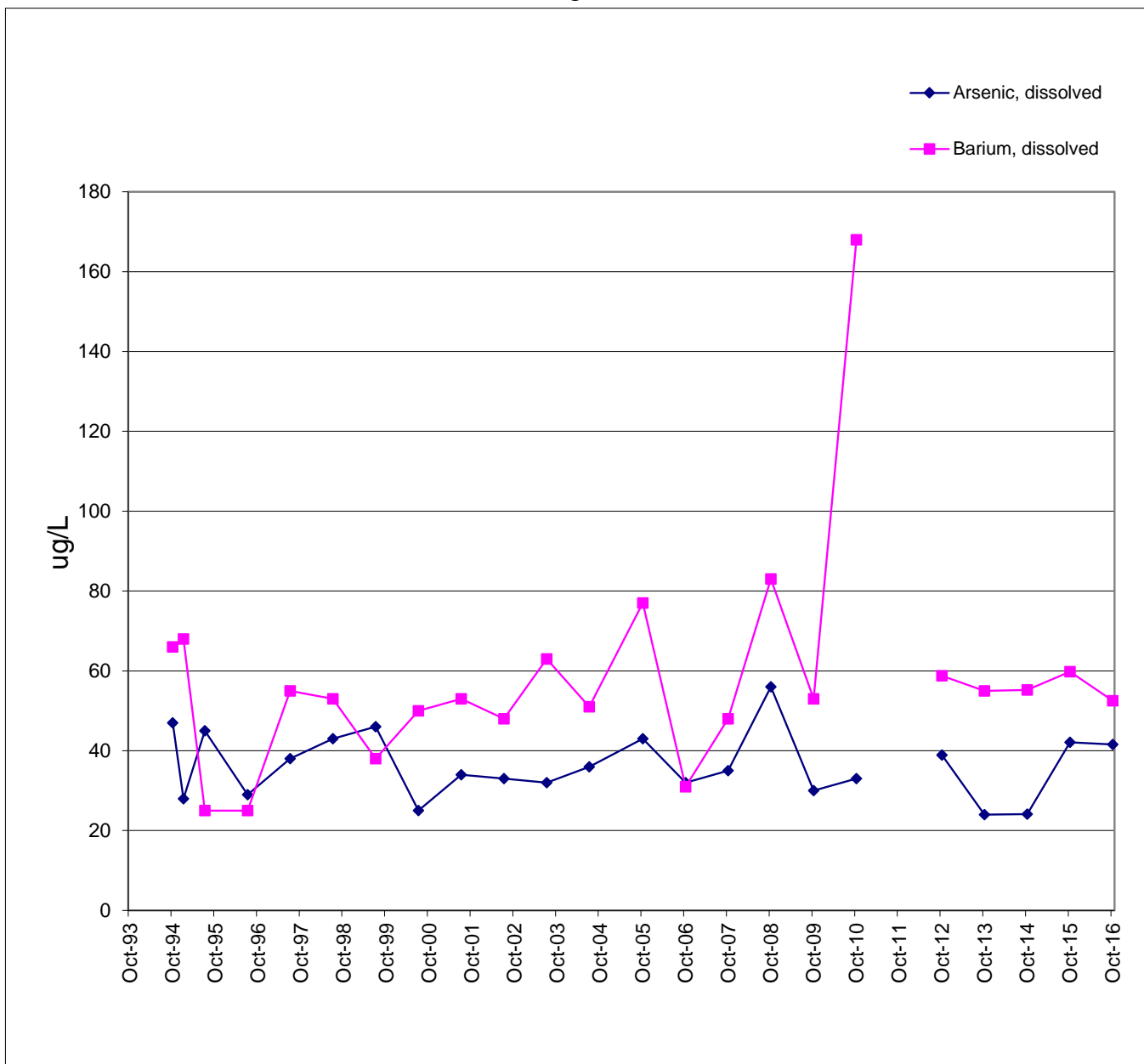
# W-06A SVOC

## Remediation Progress - Glacial Drift

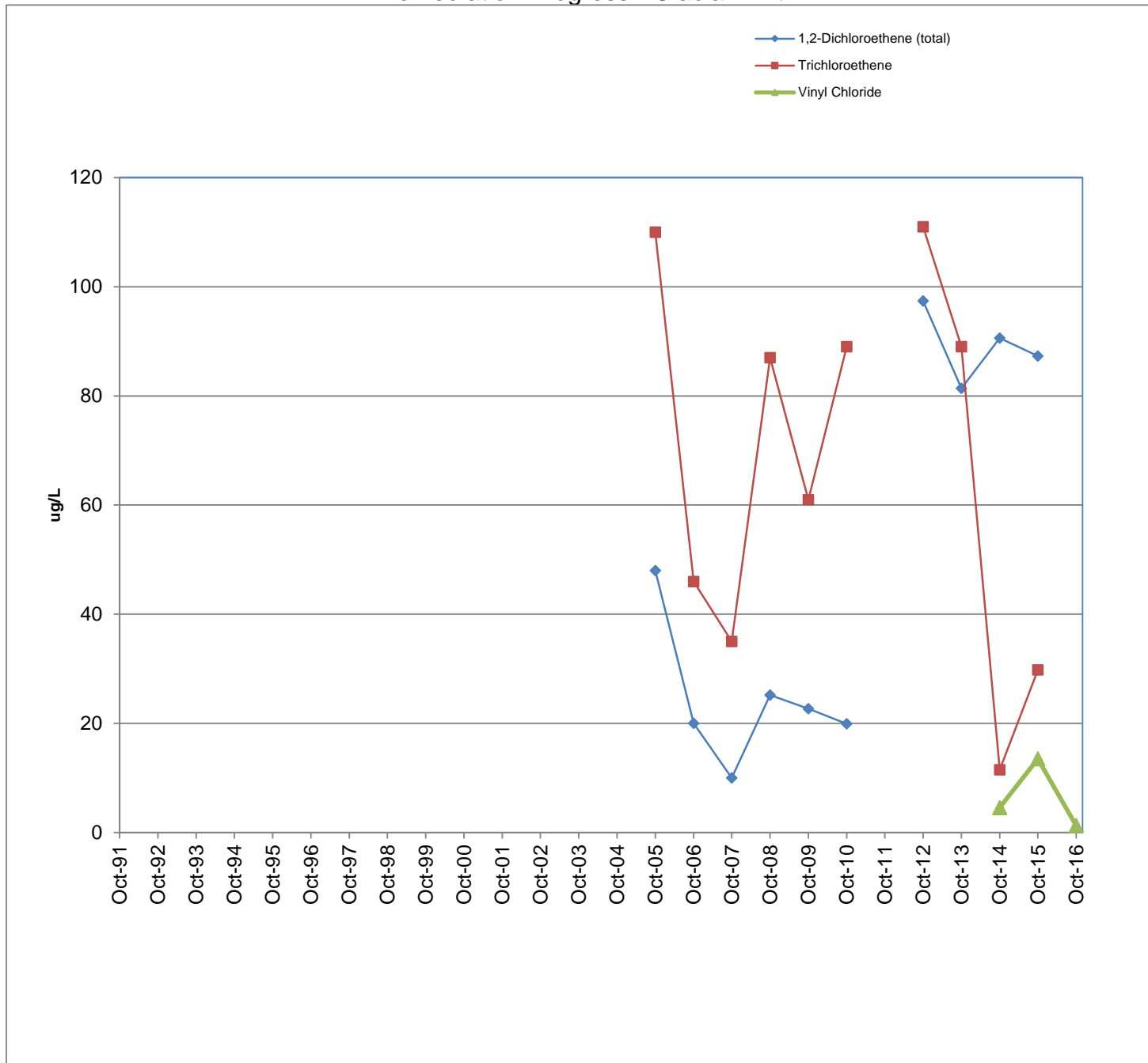


# W-06A Metals

## Remediation Progress - Glacial Drift

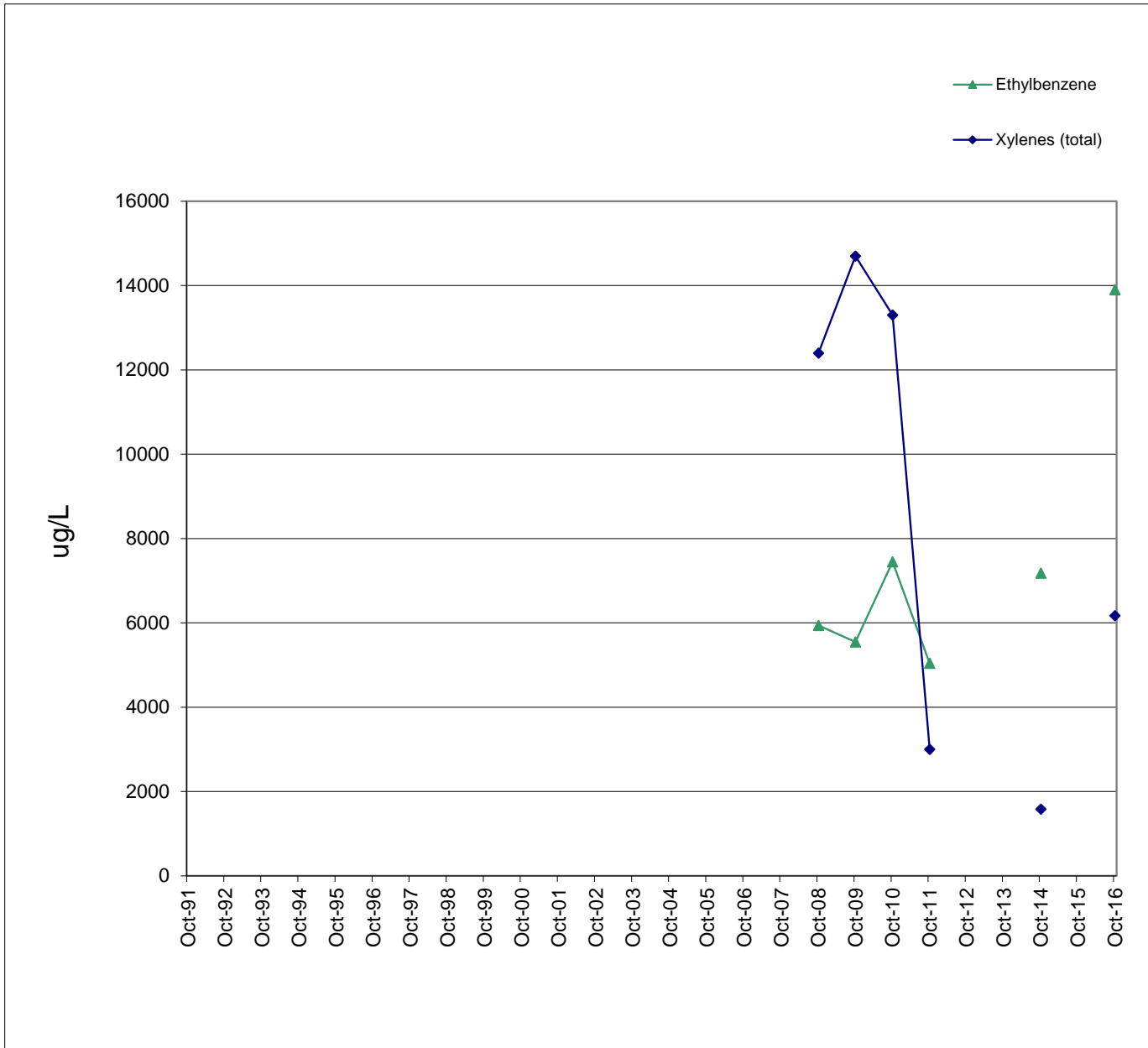


# W-19A VOC Remediation Progress - Glacial Drift



# W-21A VOC

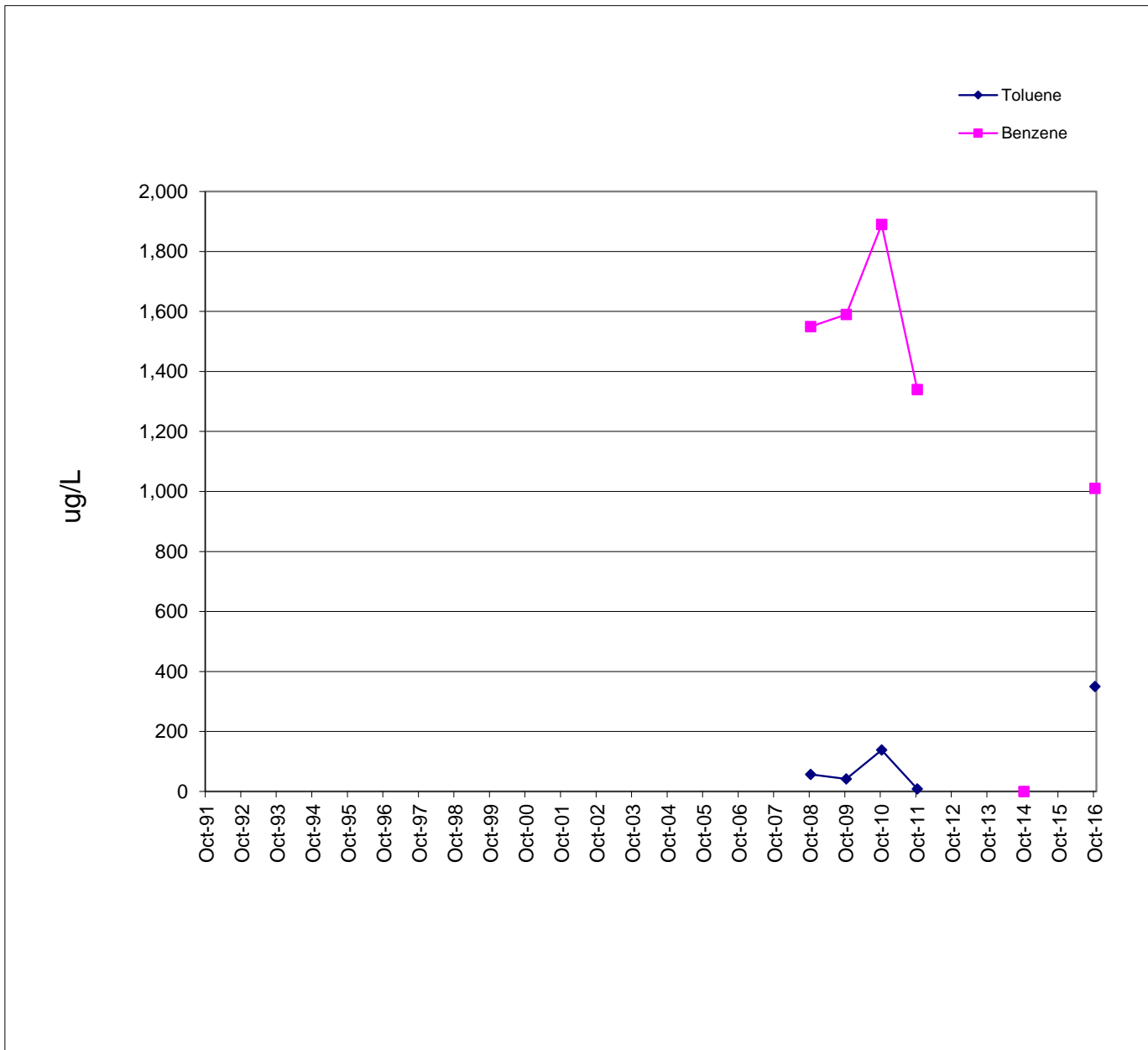
## Remediation Progress - Shallow Dolomite





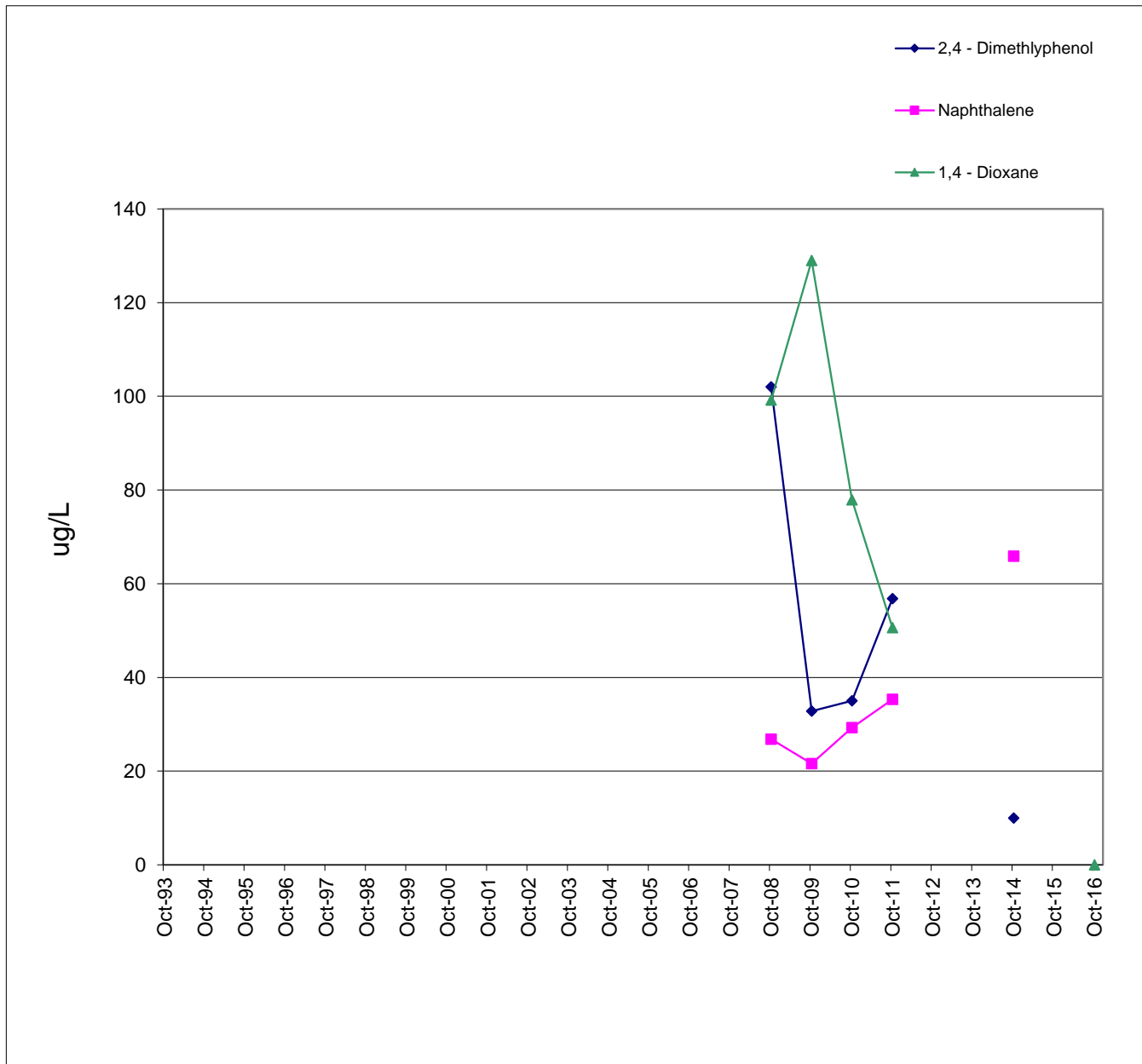
# W-21A VOC

## Remediation Progress - Shallow Dolomite



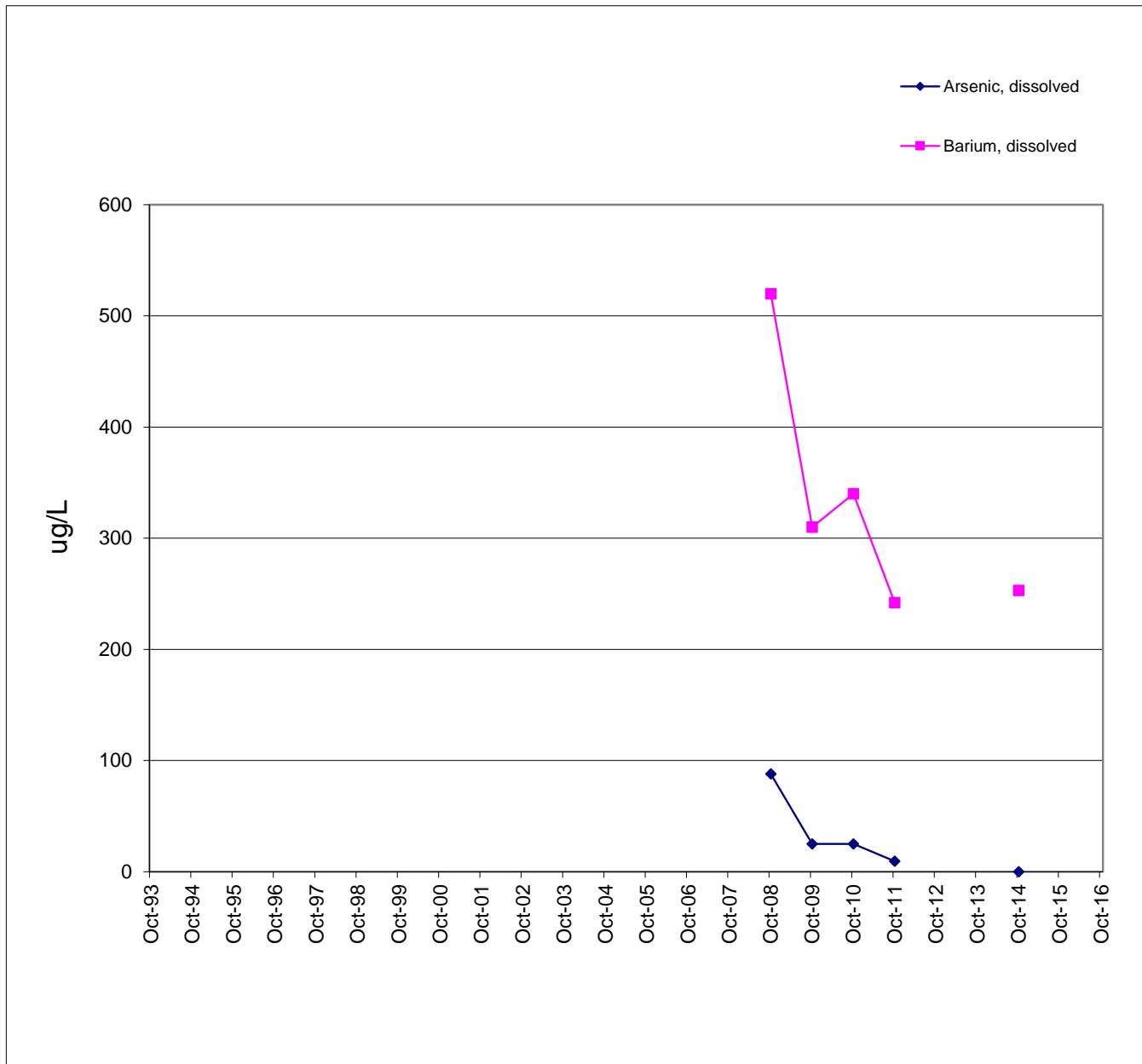
# W-21A SVOC

## Remediation Progress - Shallow Dolomite



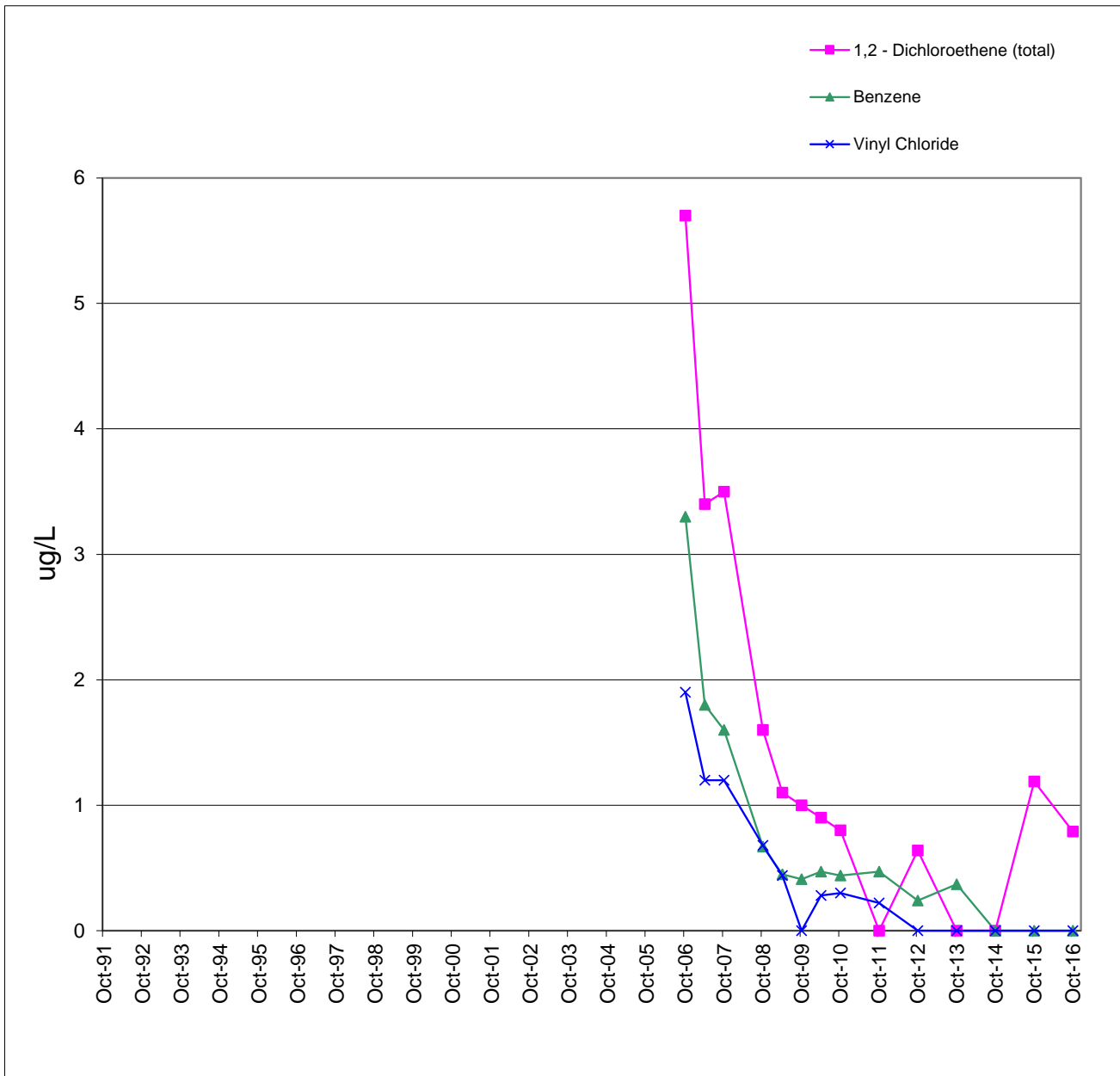
# W-21A Metals

## Remediation Progress - Shallow Dolomite



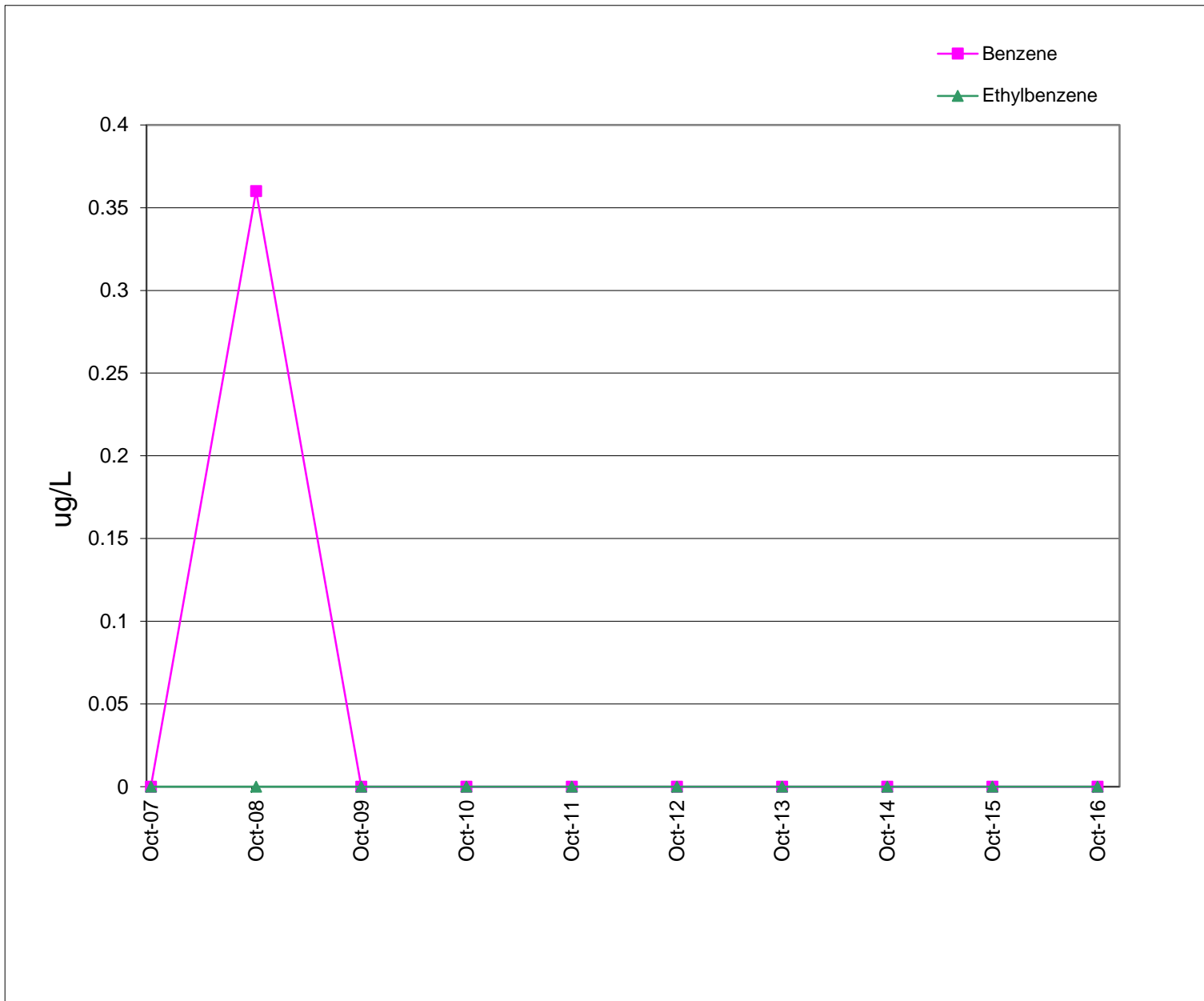
# W-23 VOC

## Perimeter - Shallow Dolomite



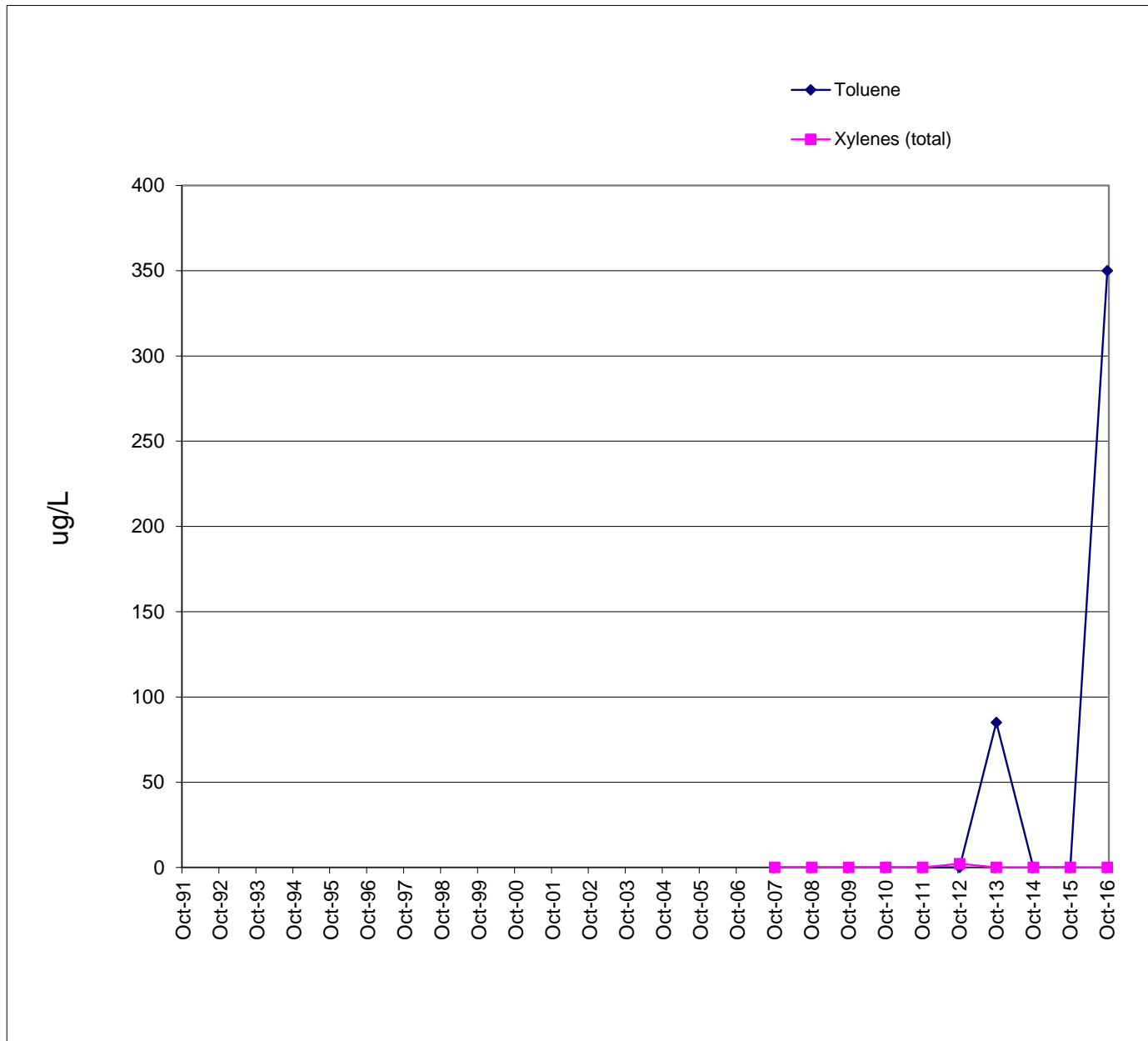
# W-24A VOC

## Remediation Progress - Shallow Dolomite



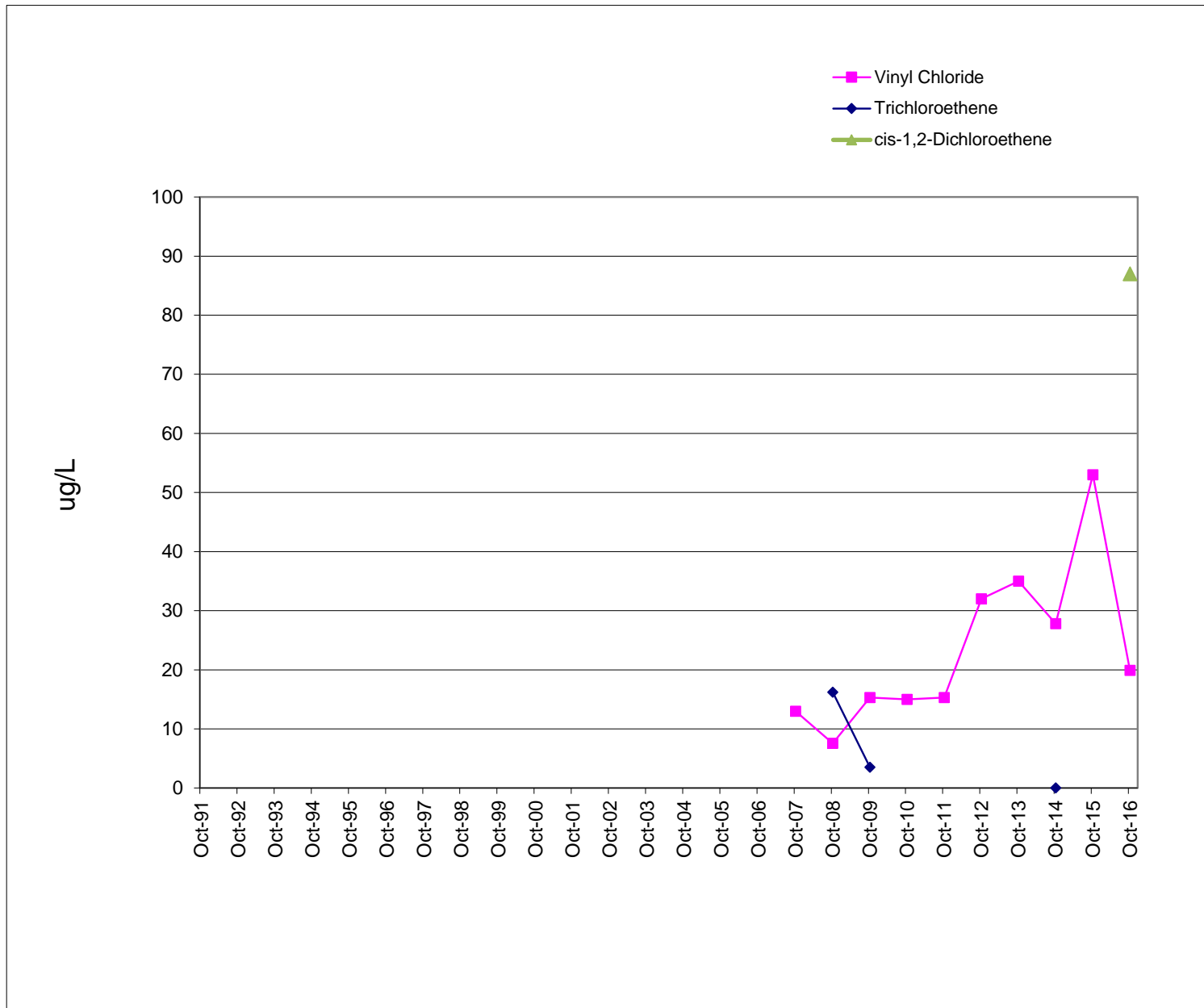
# W-24A VOC

## Remediation Progress - Shallow Dolomite



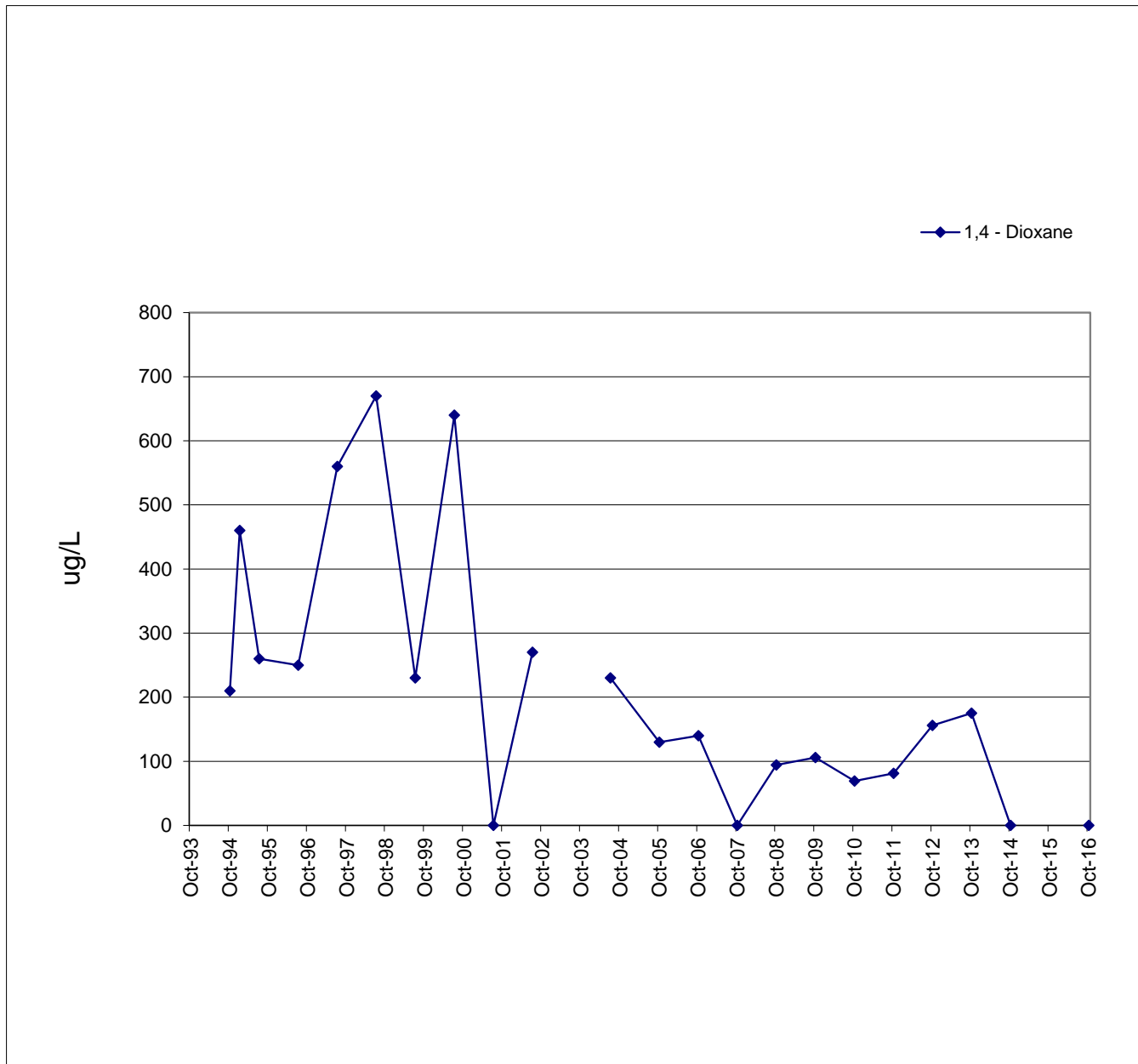
# W-24A VOC

## Remediation Progress - Shallow Dolomite



# W-24 SVOC

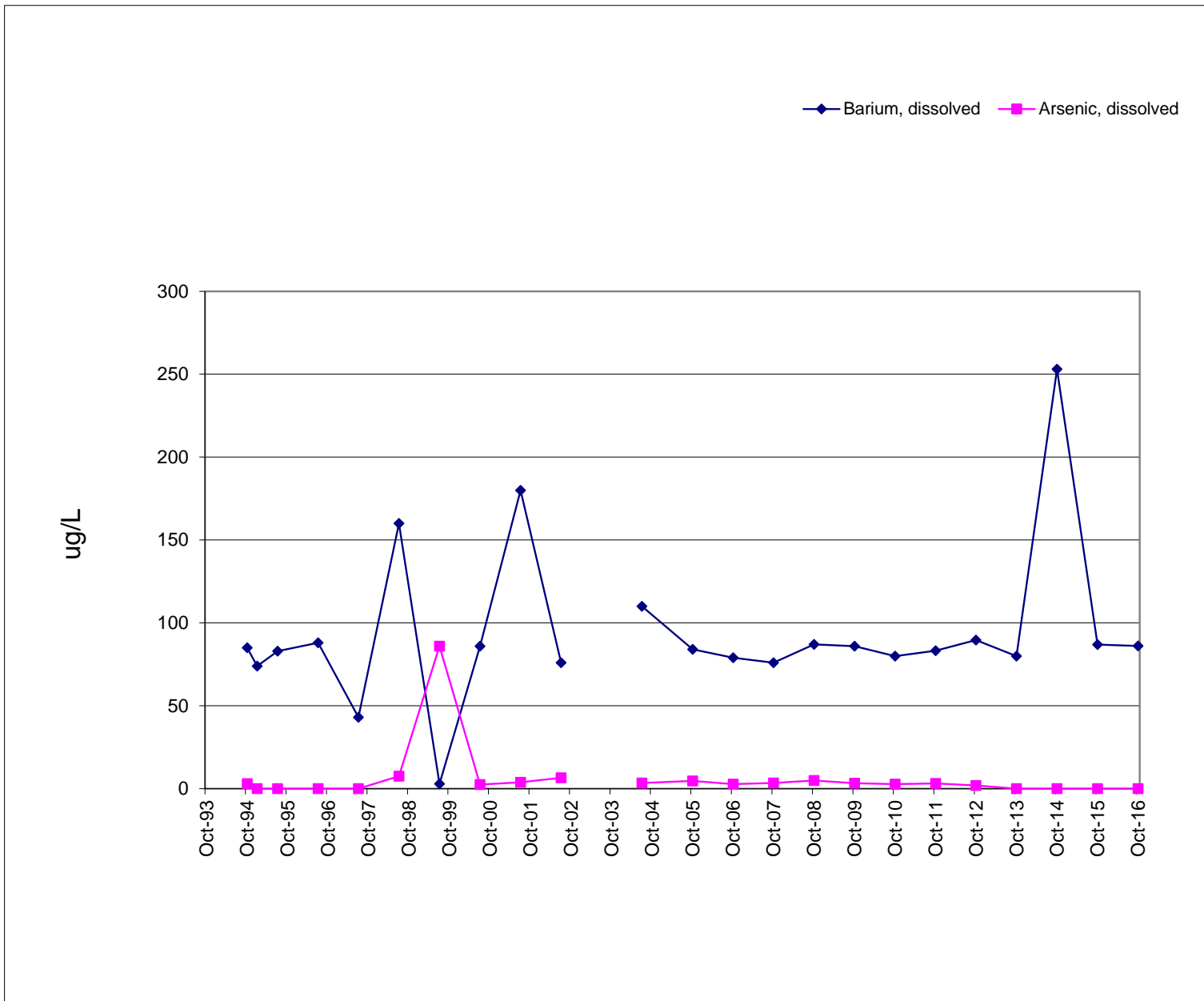
## Remediation Progress - Shallow Dolomite





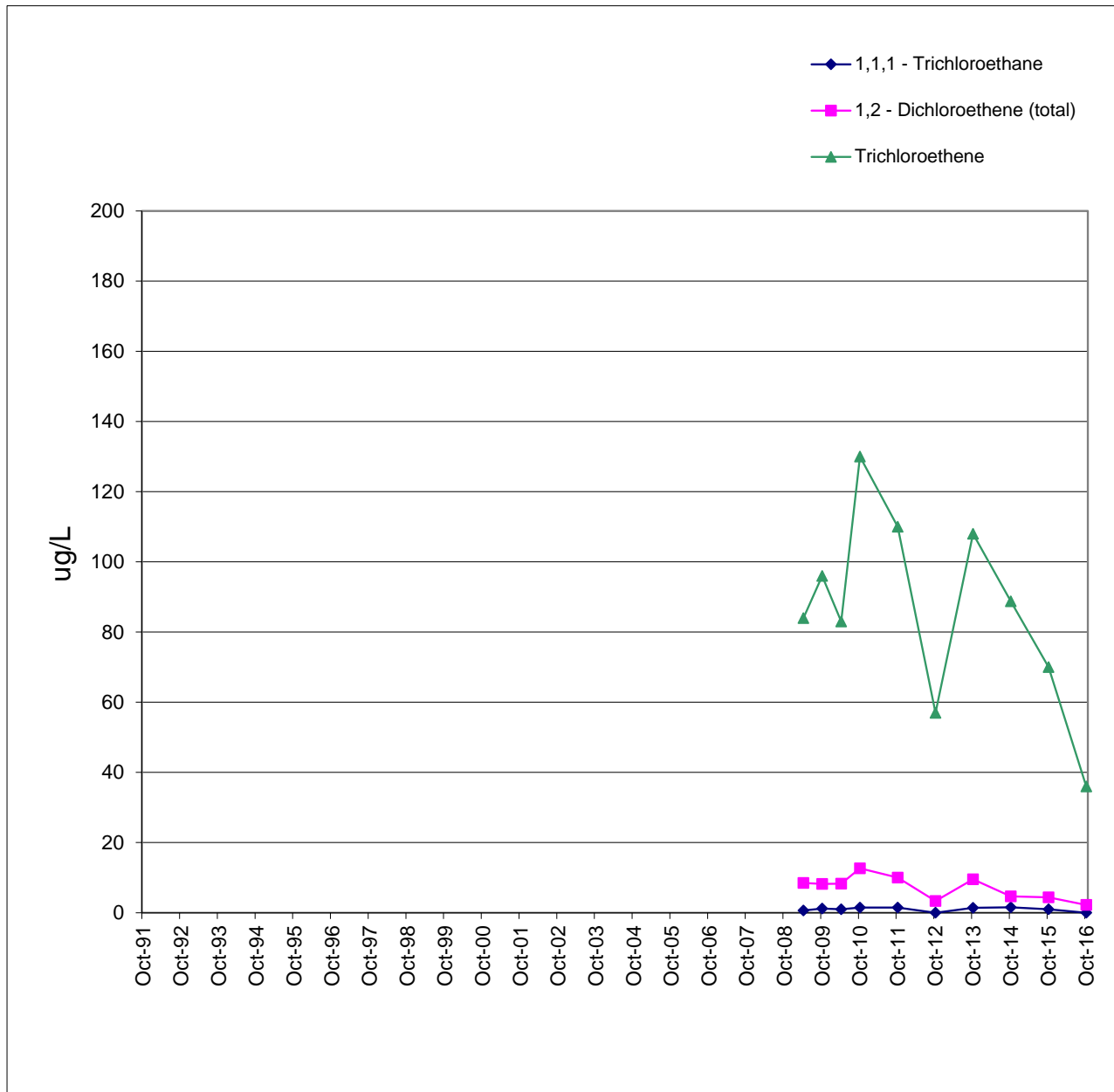
# W-24 Metals

## Remediation Progress - Shallow Dolomite



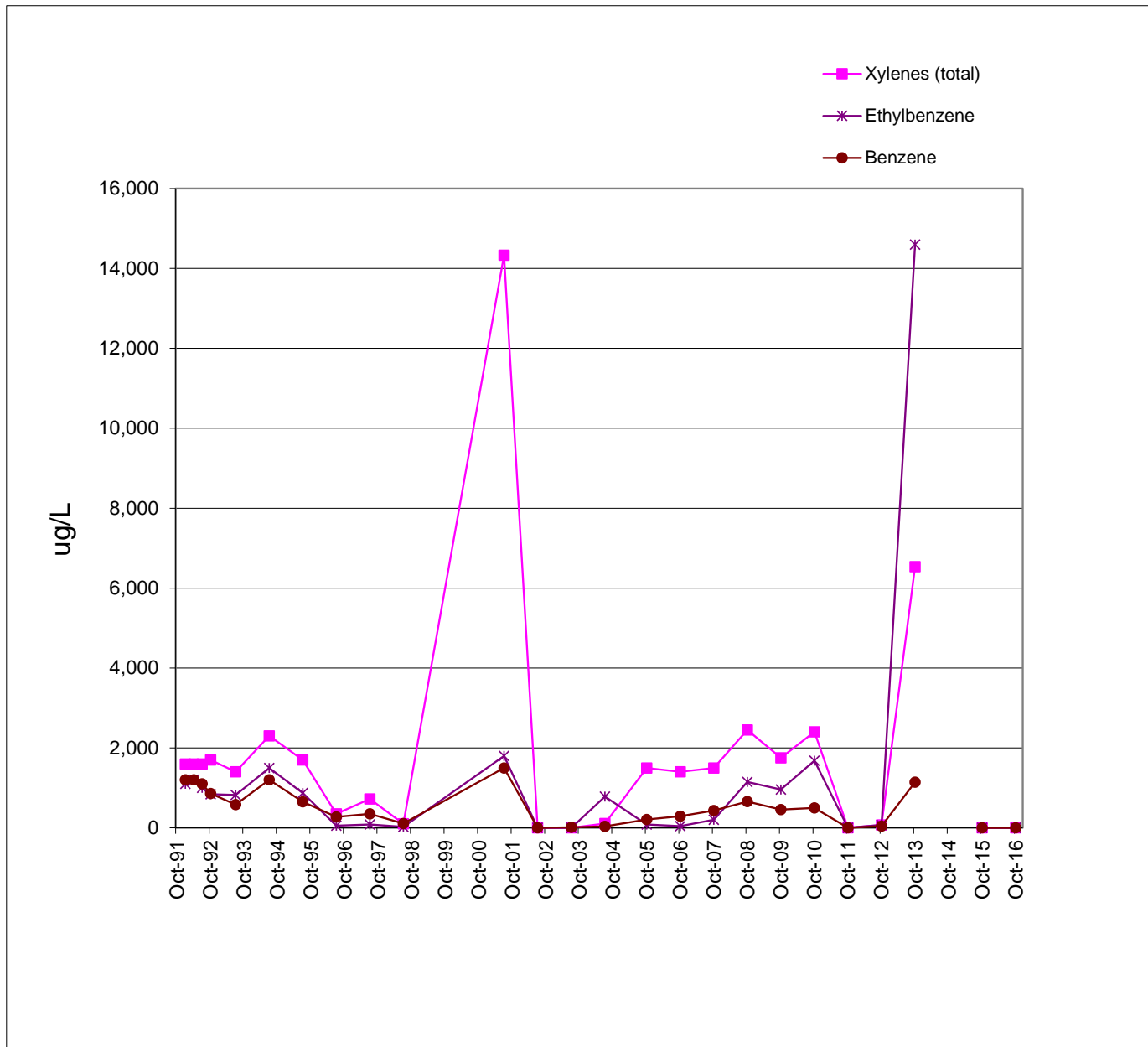
# W-27 VOC

## Perimeter - Glacial Drift



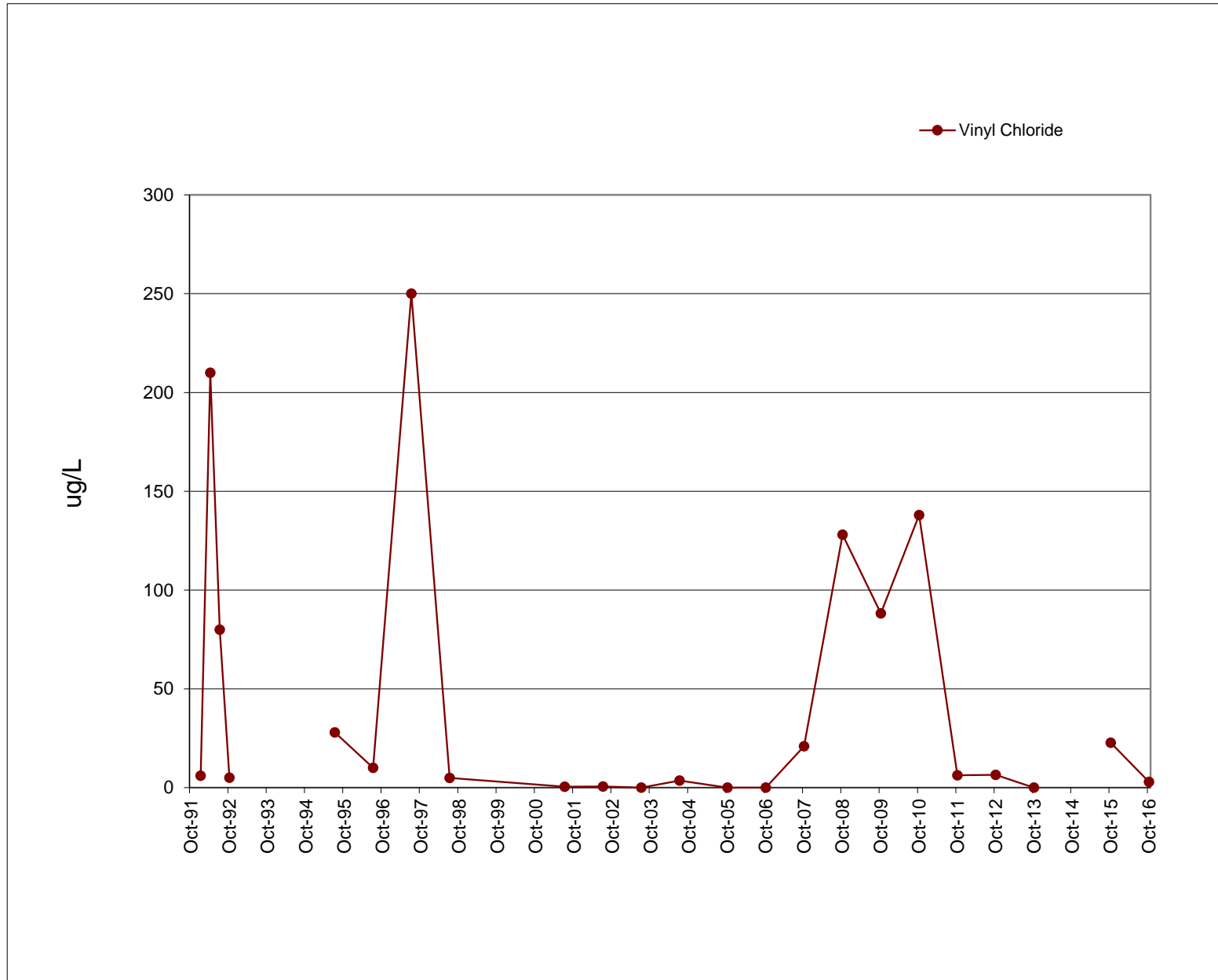
# W-29 VOC

## Remediation Progress - Shallow Dolomite



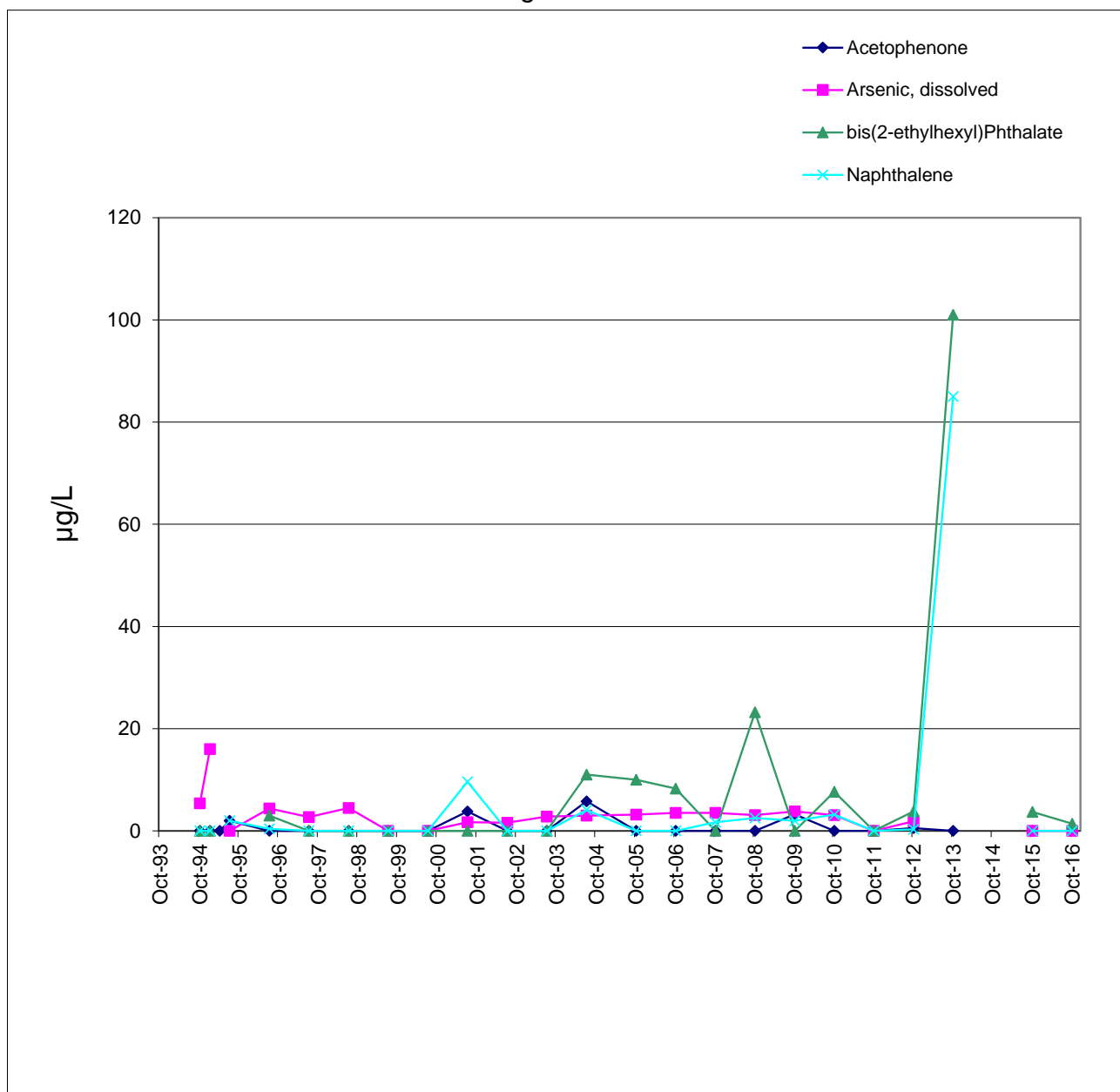
# W-29 VOC

## Remediation Progress - Shallow Dolomite



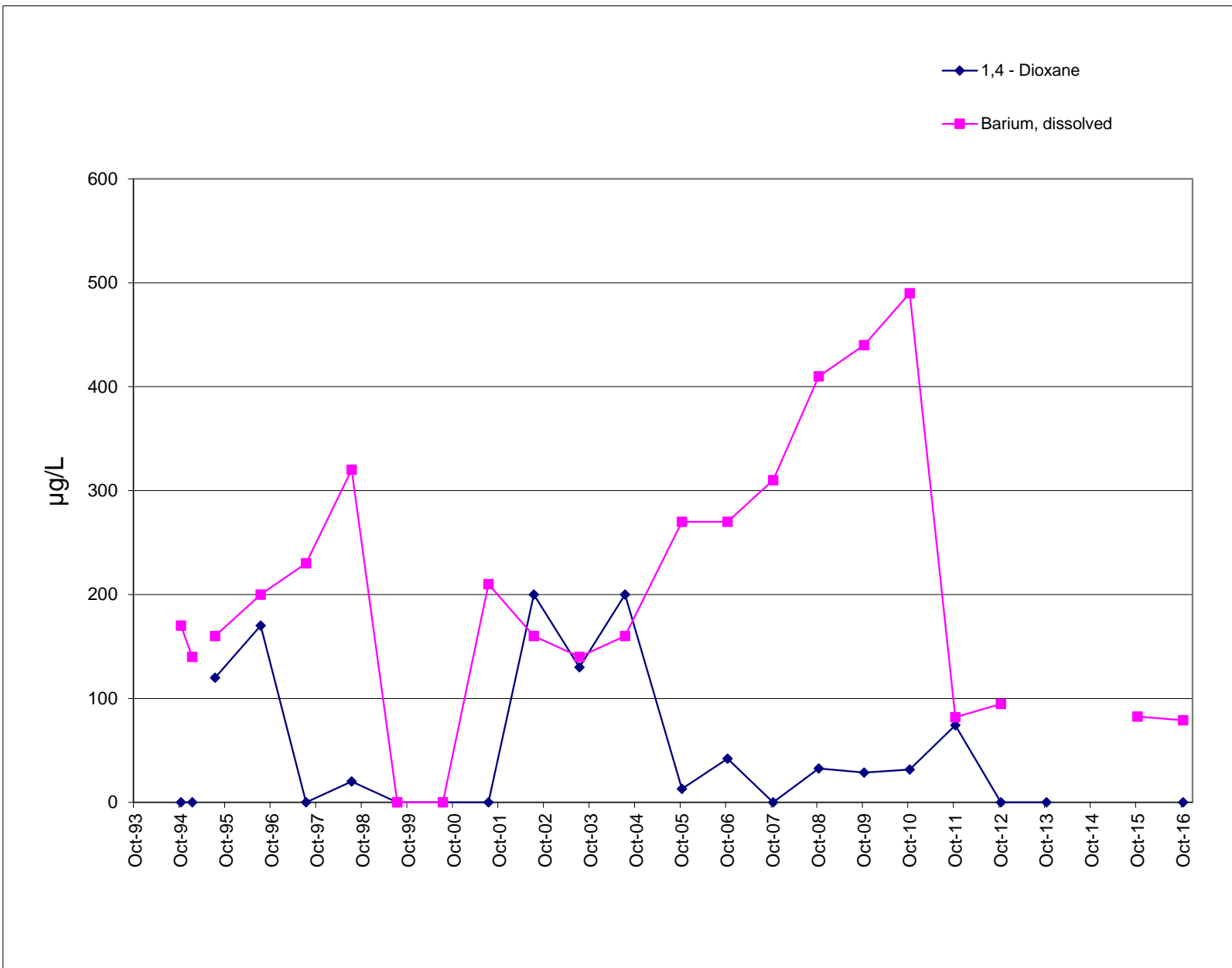
# W-29 SVOC and Arsenic

## Remediation Progress - Shallow Dolomite



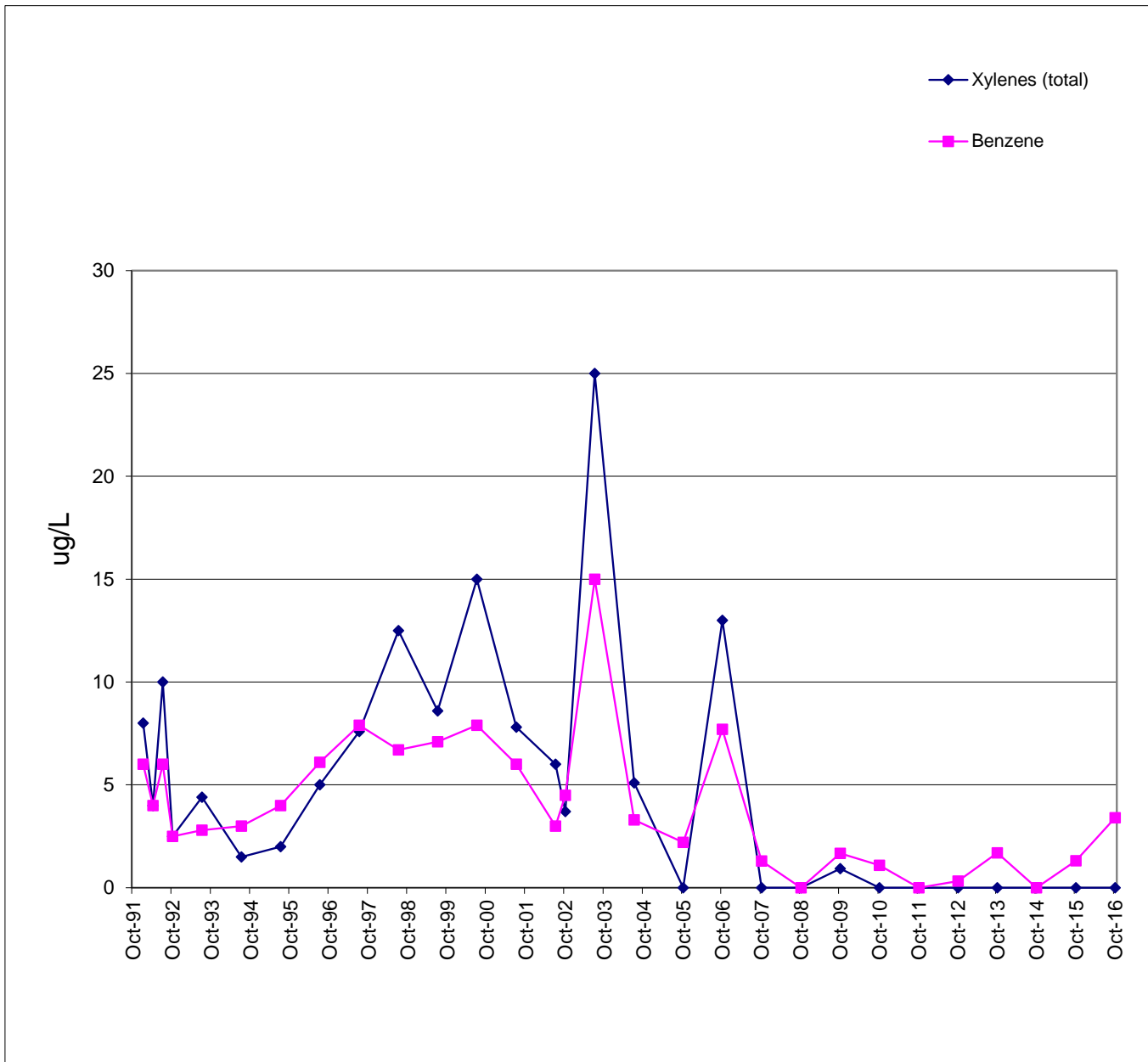
# W-29 SVOC and Barium

## Remediation Progress - Shallow Dolomite



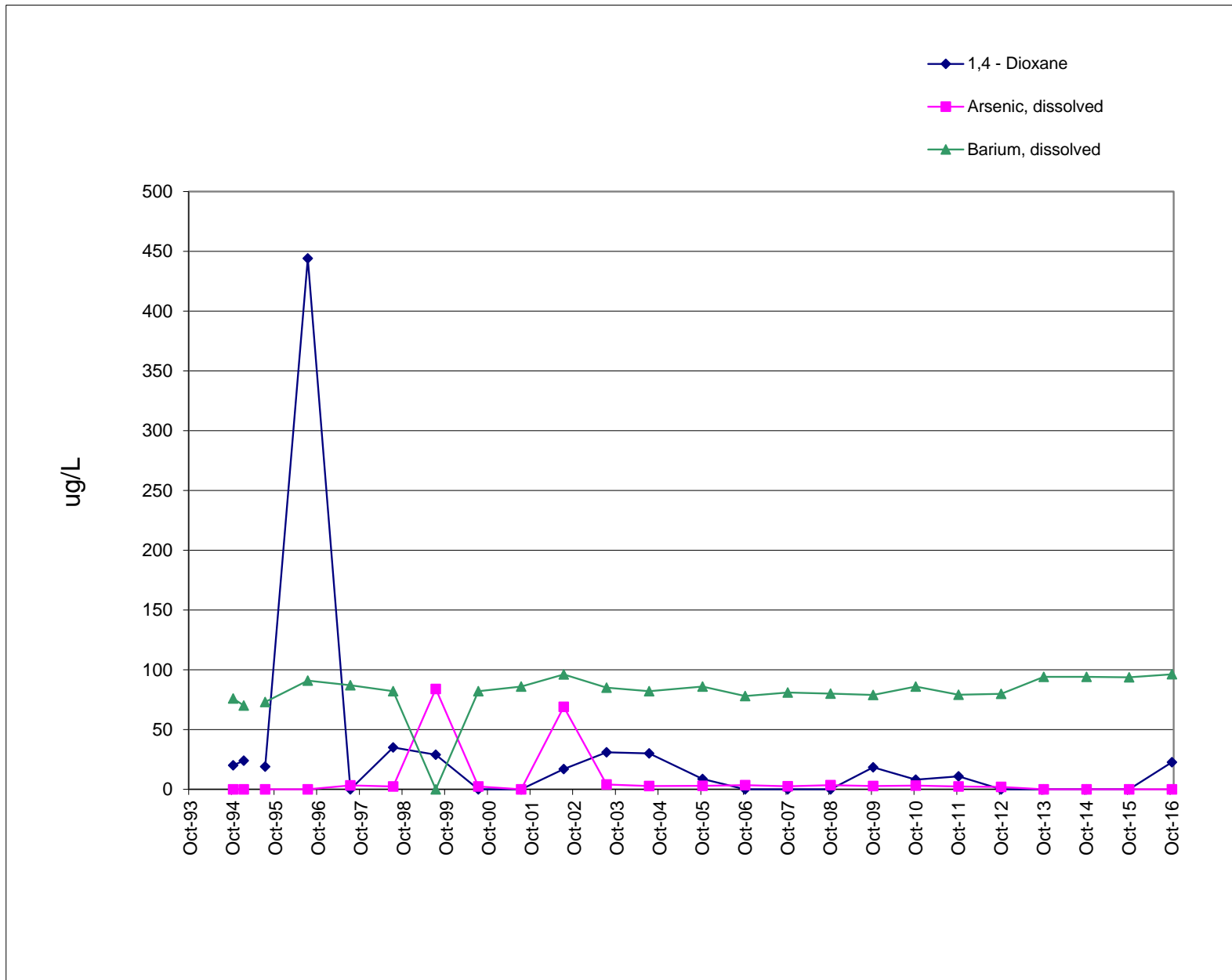
# W-30 VOC

## Remediation Progress - Deep Dolomite



# W-30 SVOC and Metals

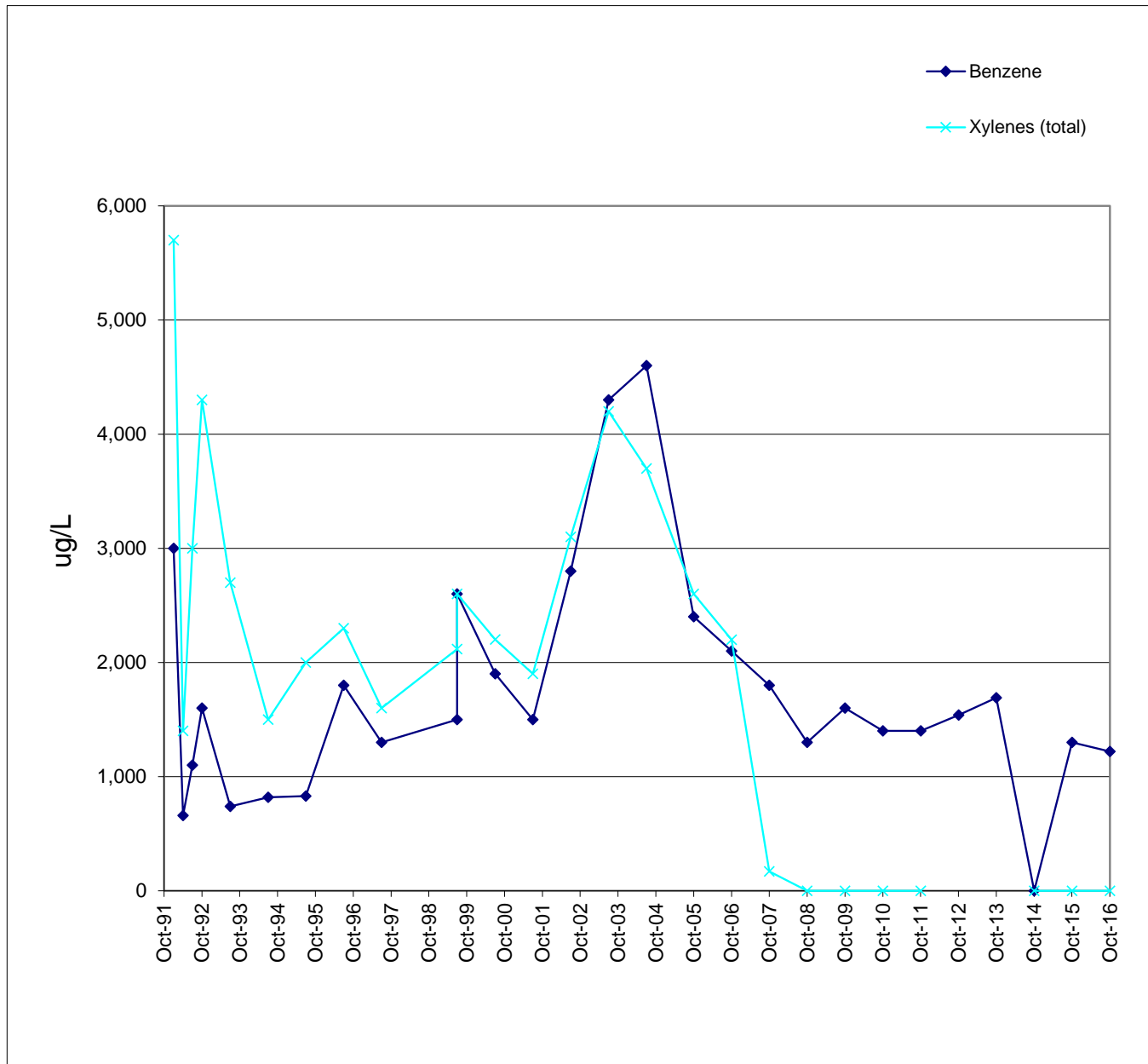
## Remediation Progress - Deep Dolomite





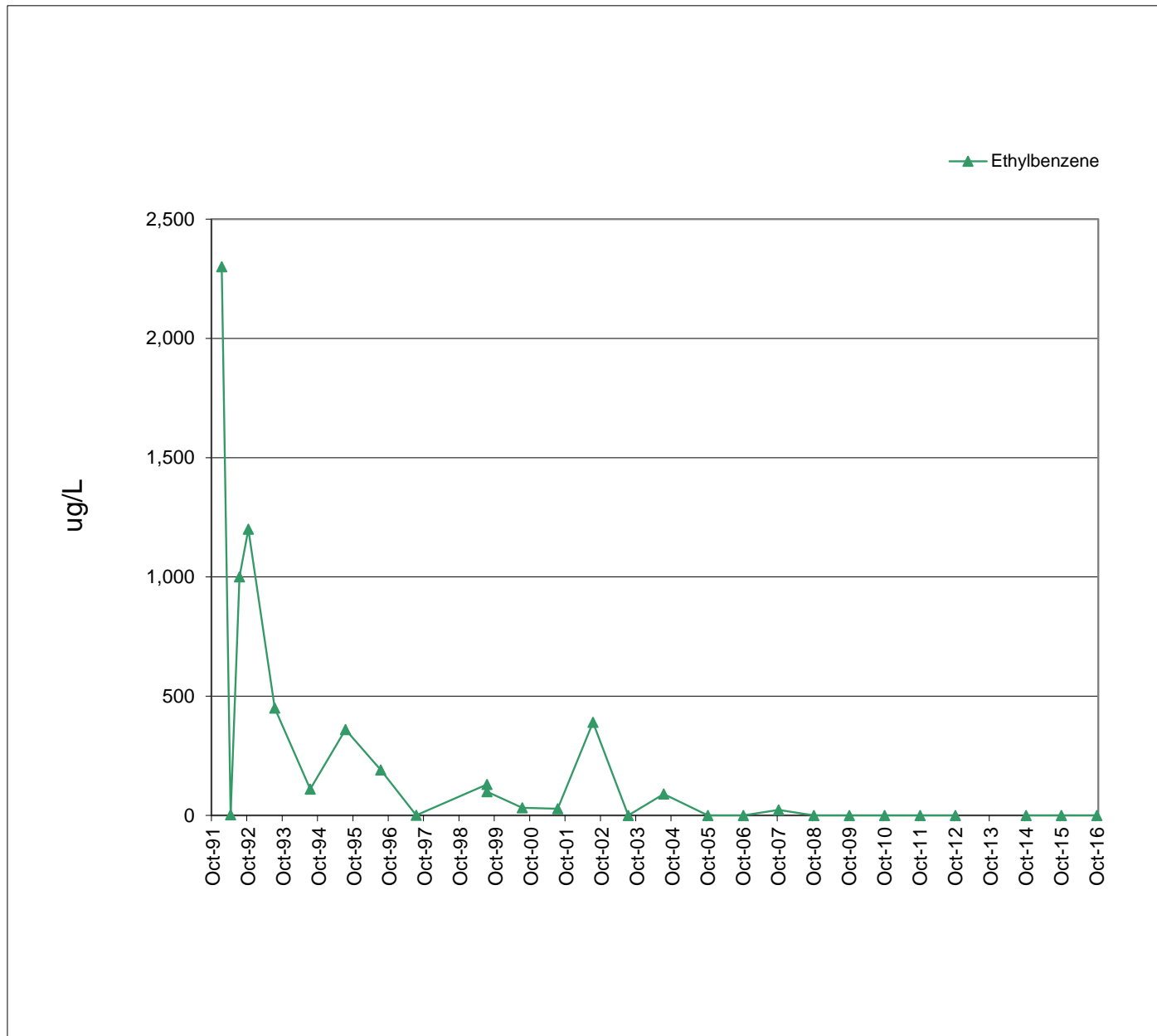
# W-38 VOC

## Remediation Progress - Shallow Dolomite



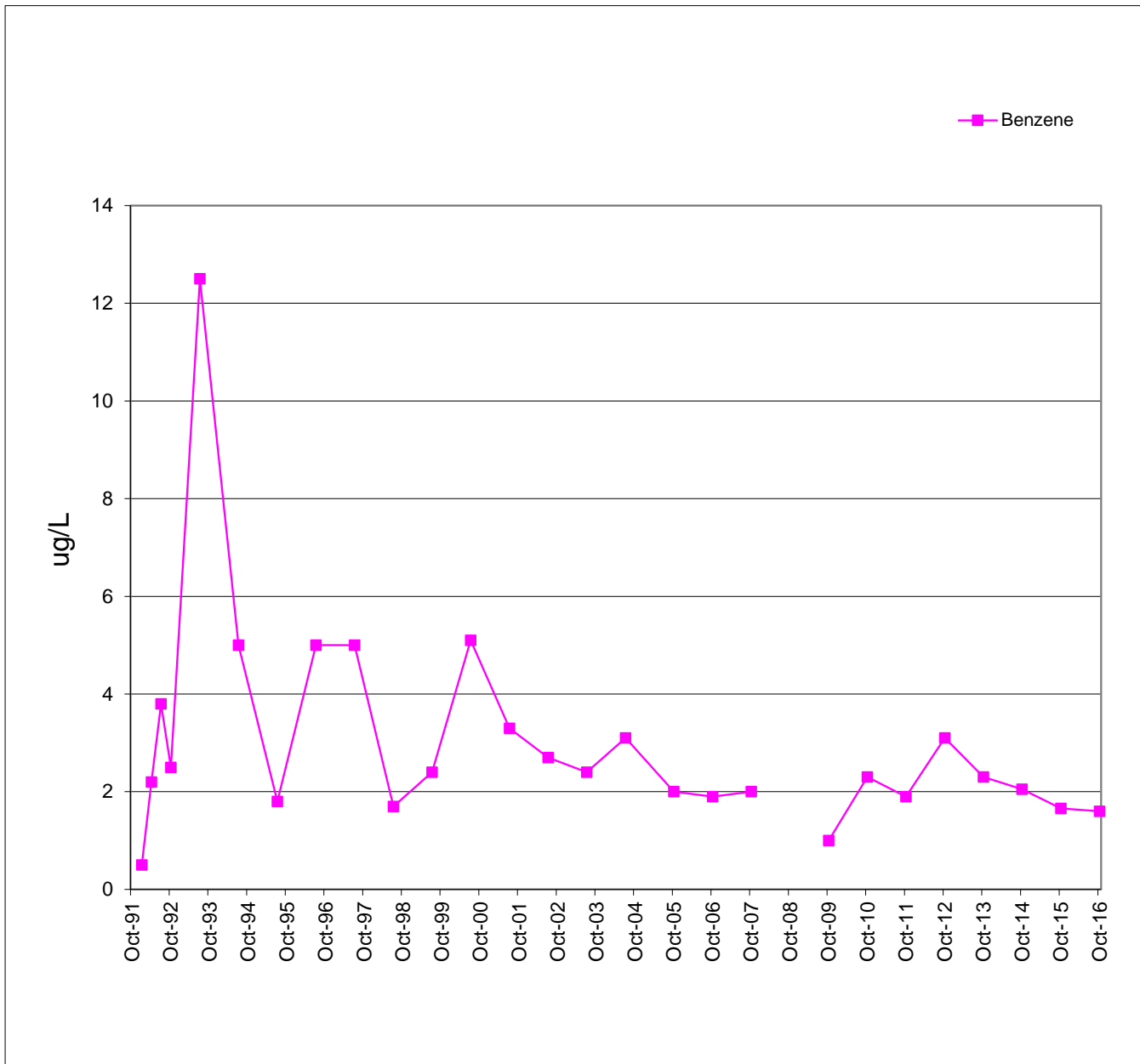
# W-38 VOC

## Remediation Progress - Shallow Dolomite



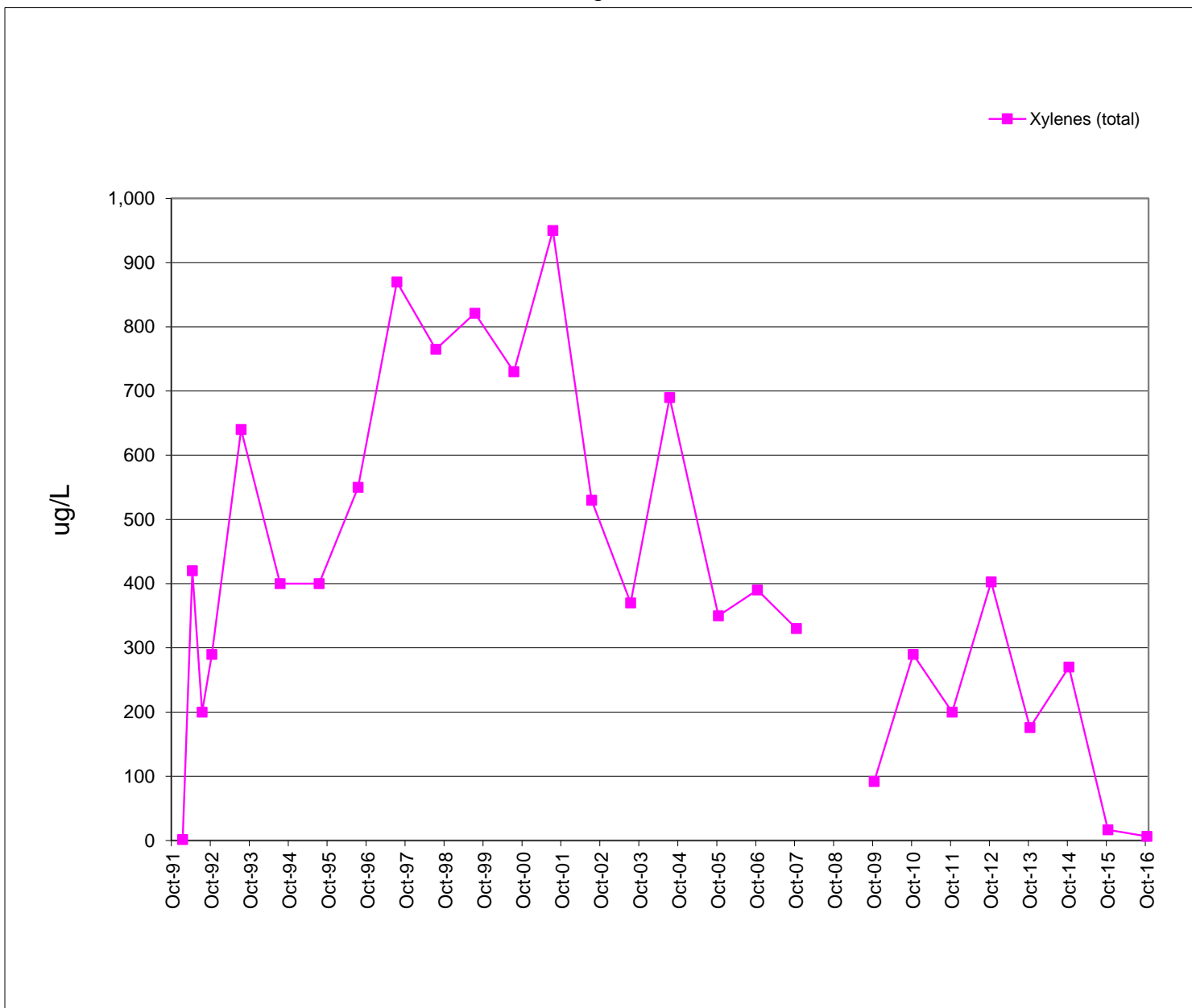
# W-41 VOC

## Remediation Progress - Glacial Drift



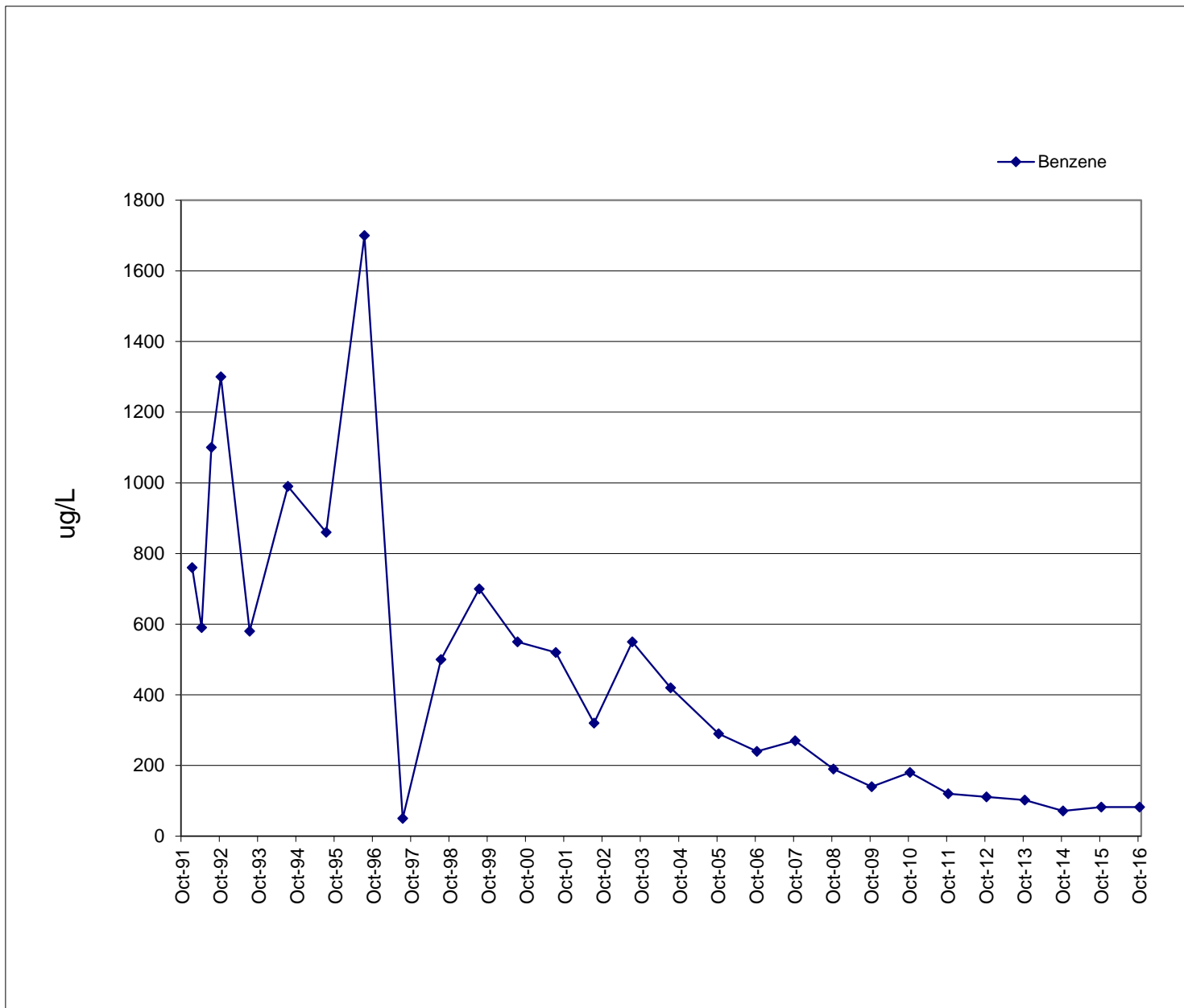
# W-41 VOC

## Remediation Progress - Glacial Drift



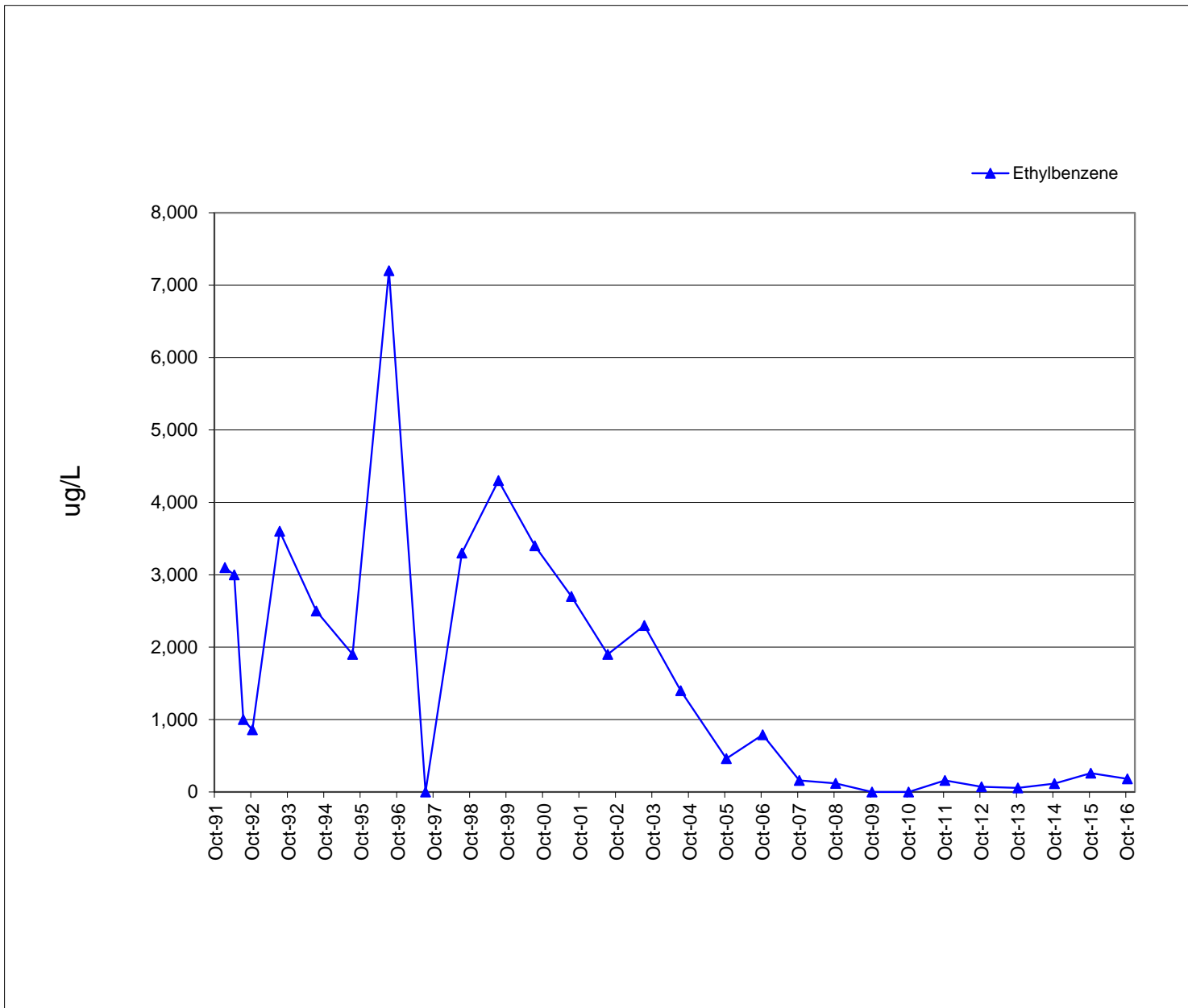
# W-42 VOC

## Remediation Progress - Glacial Drift



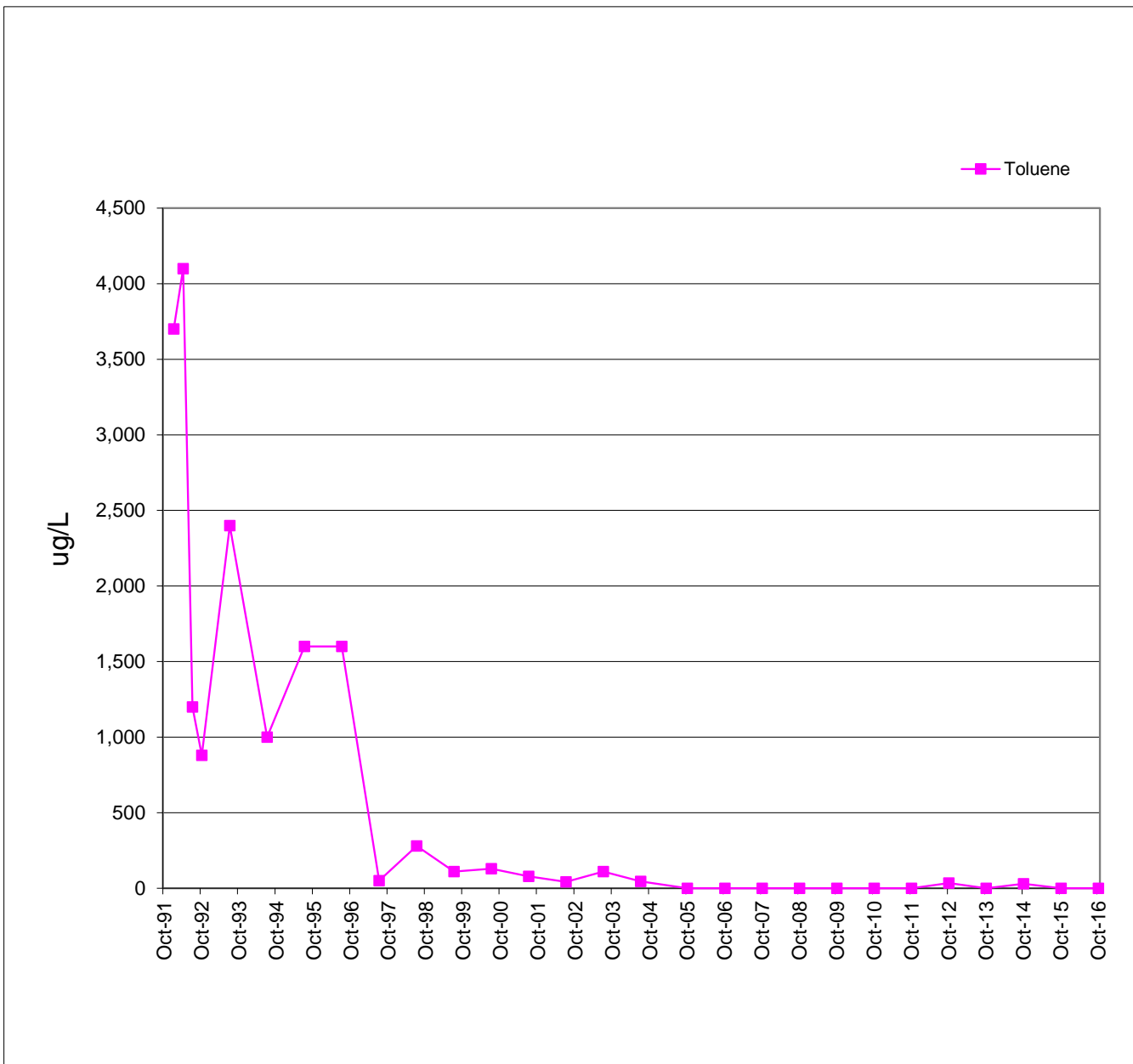
# W-42 VOC

## Remediation Progress - Glacial Drift



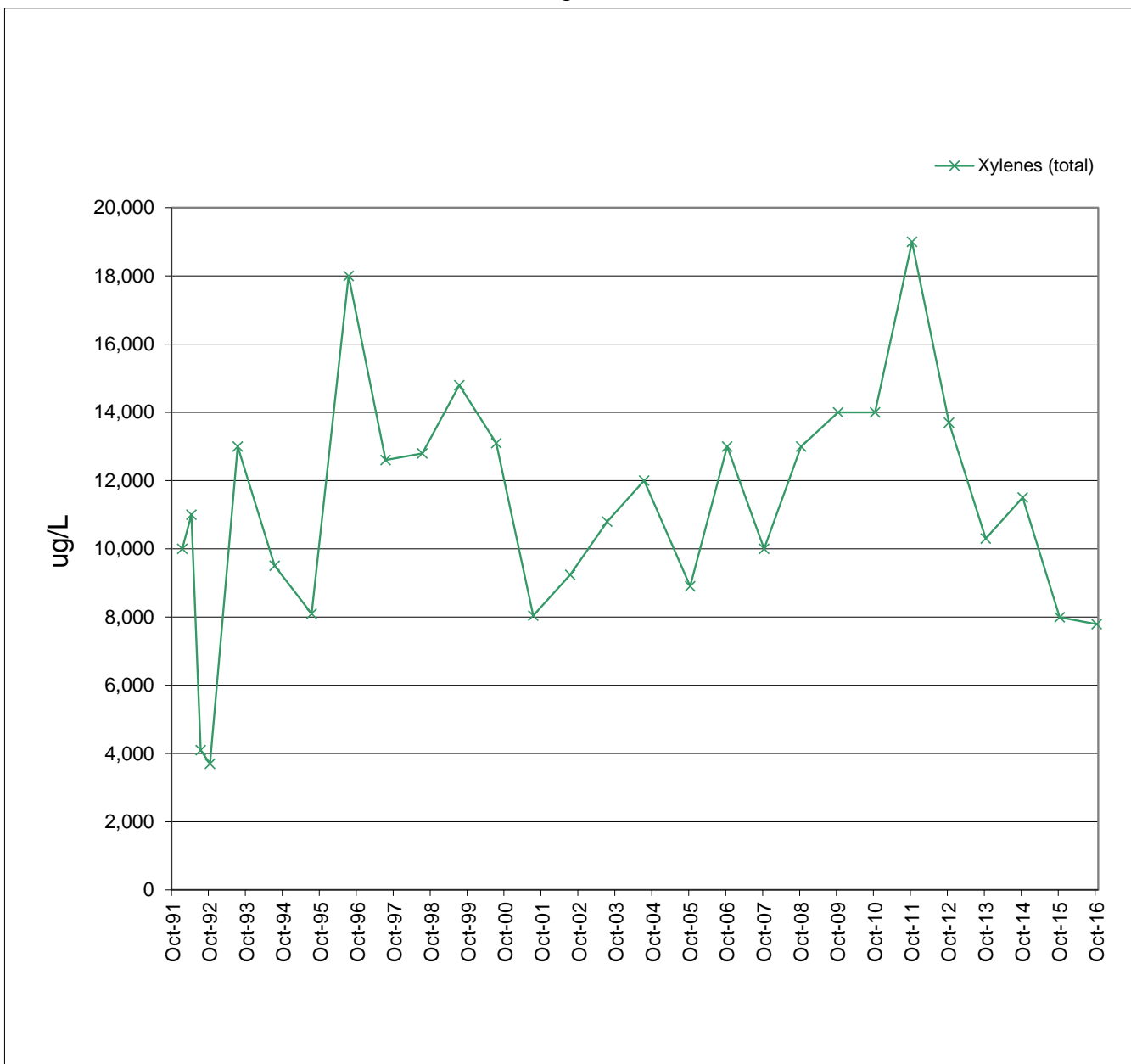
# W-42 VOC

## Remediation Progress - Glacial Drift



# W-42 VOC

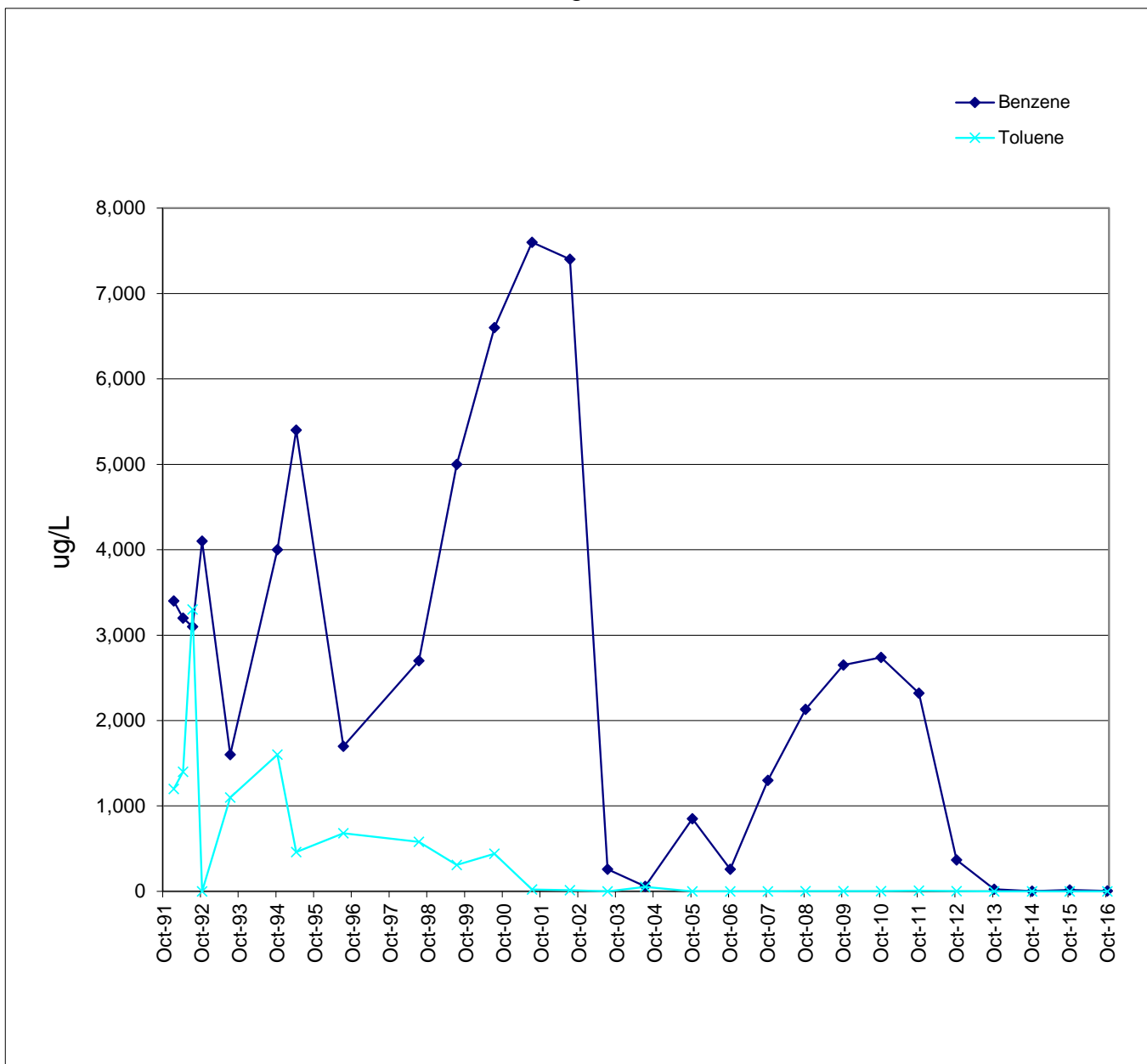
## Remediation Progress - Glacial Drift





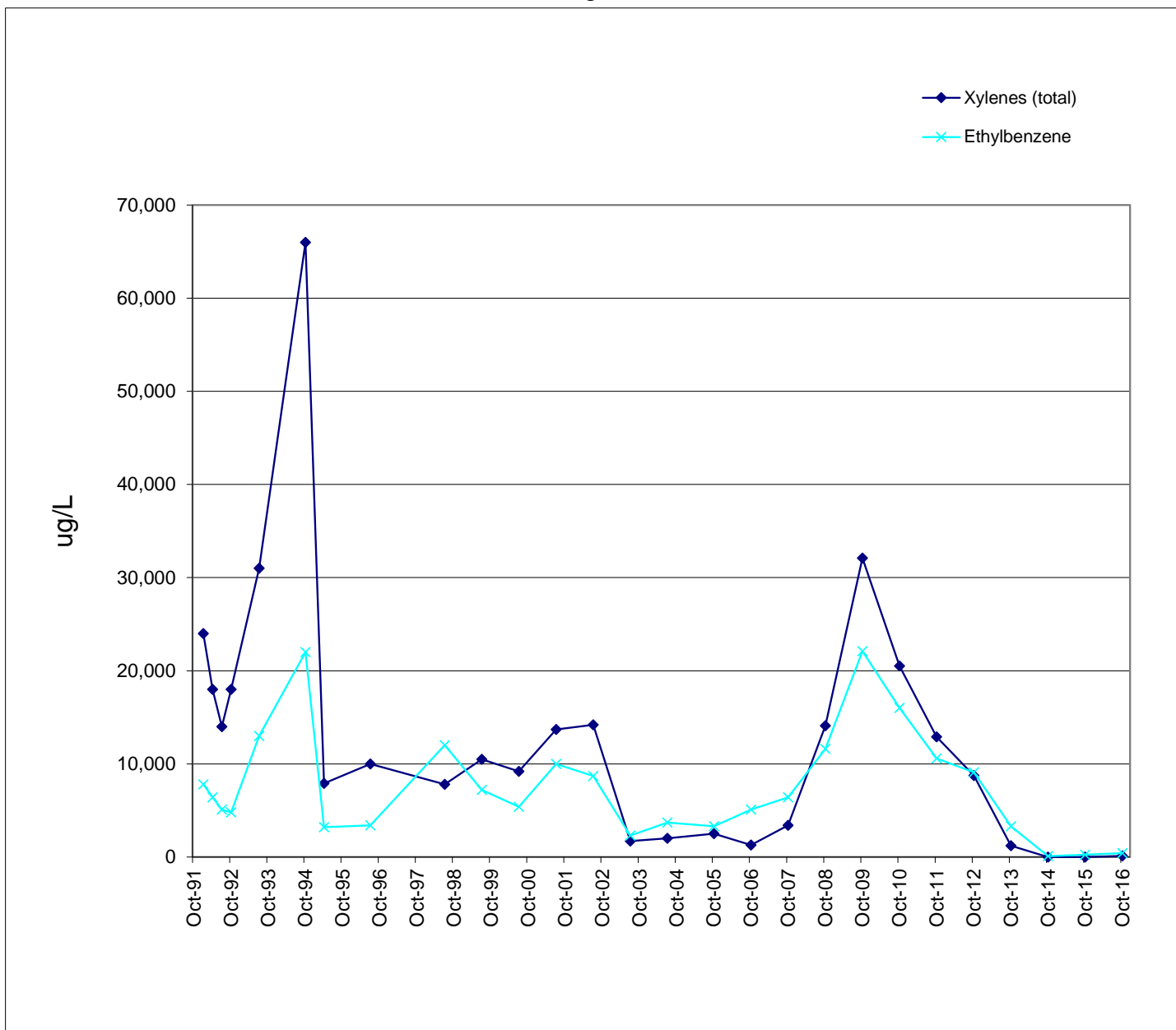
# W-43 VOC

## Remediation Progress - Glacial Drift



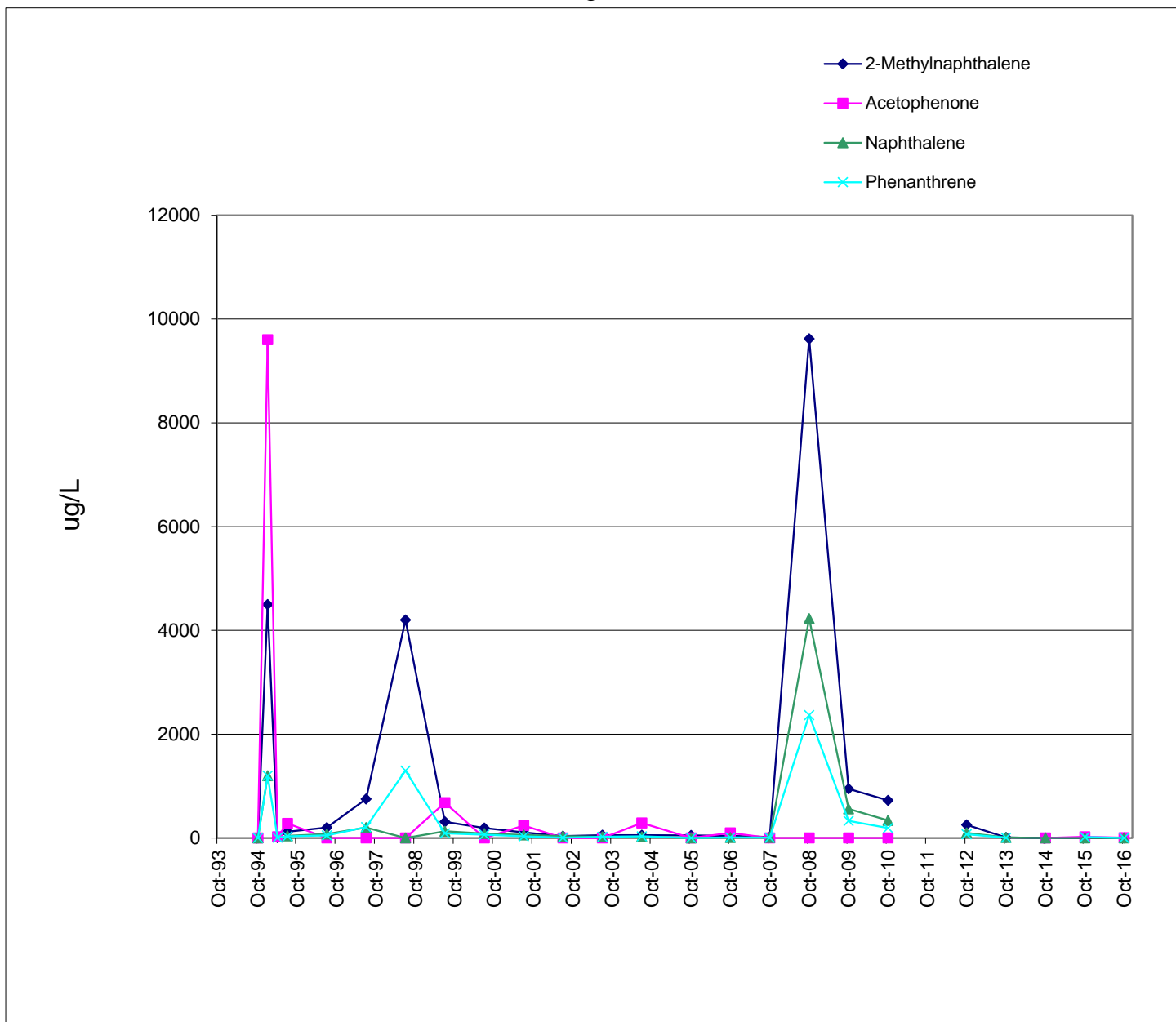
# W-43 VOC

## Remediation Progress - Glacial Drift



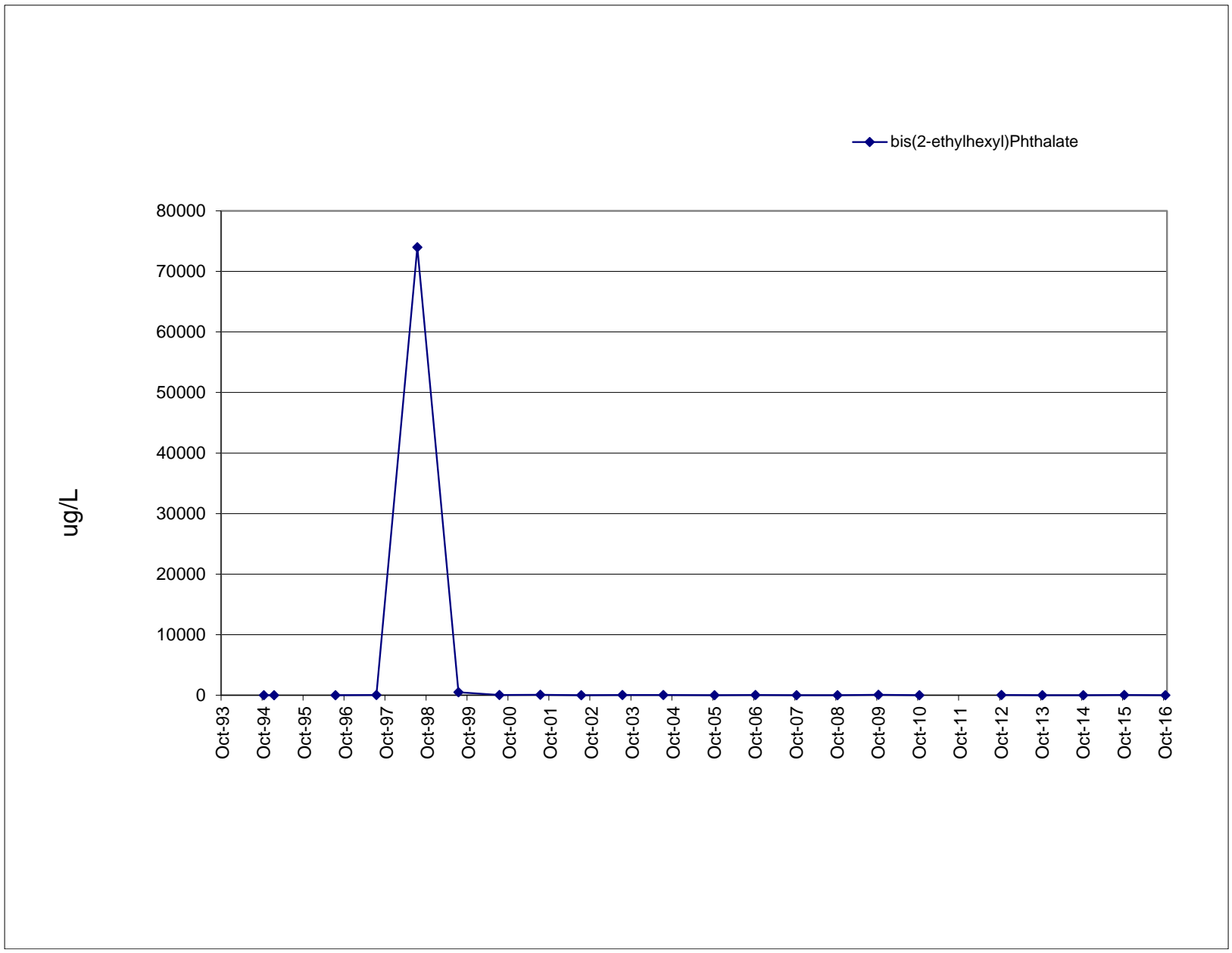
# W-43 SVOC

## Remediation Progress - Glacial Drift



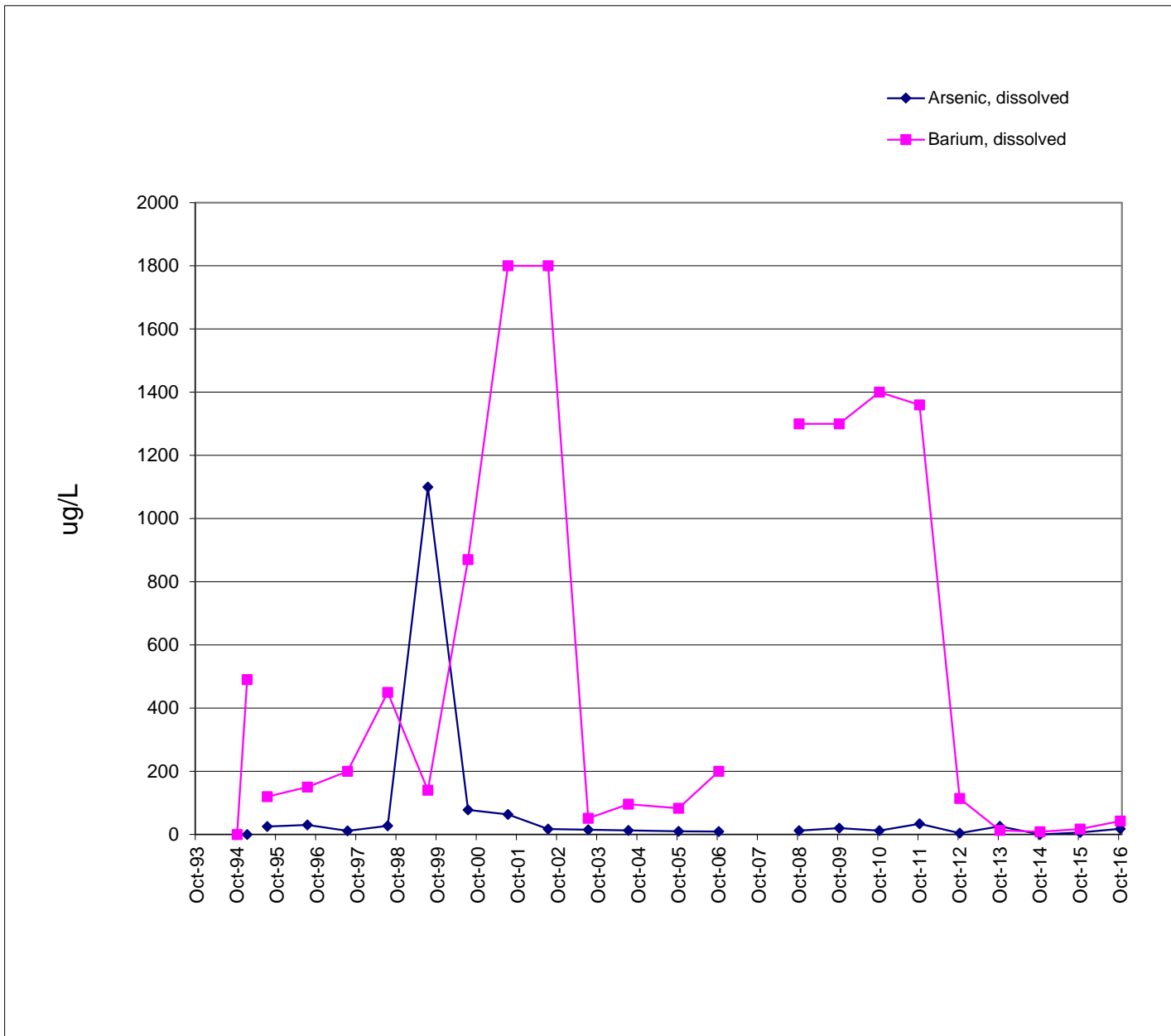
# W-43 SVOC

## Remediation Progress - Glacial Drift



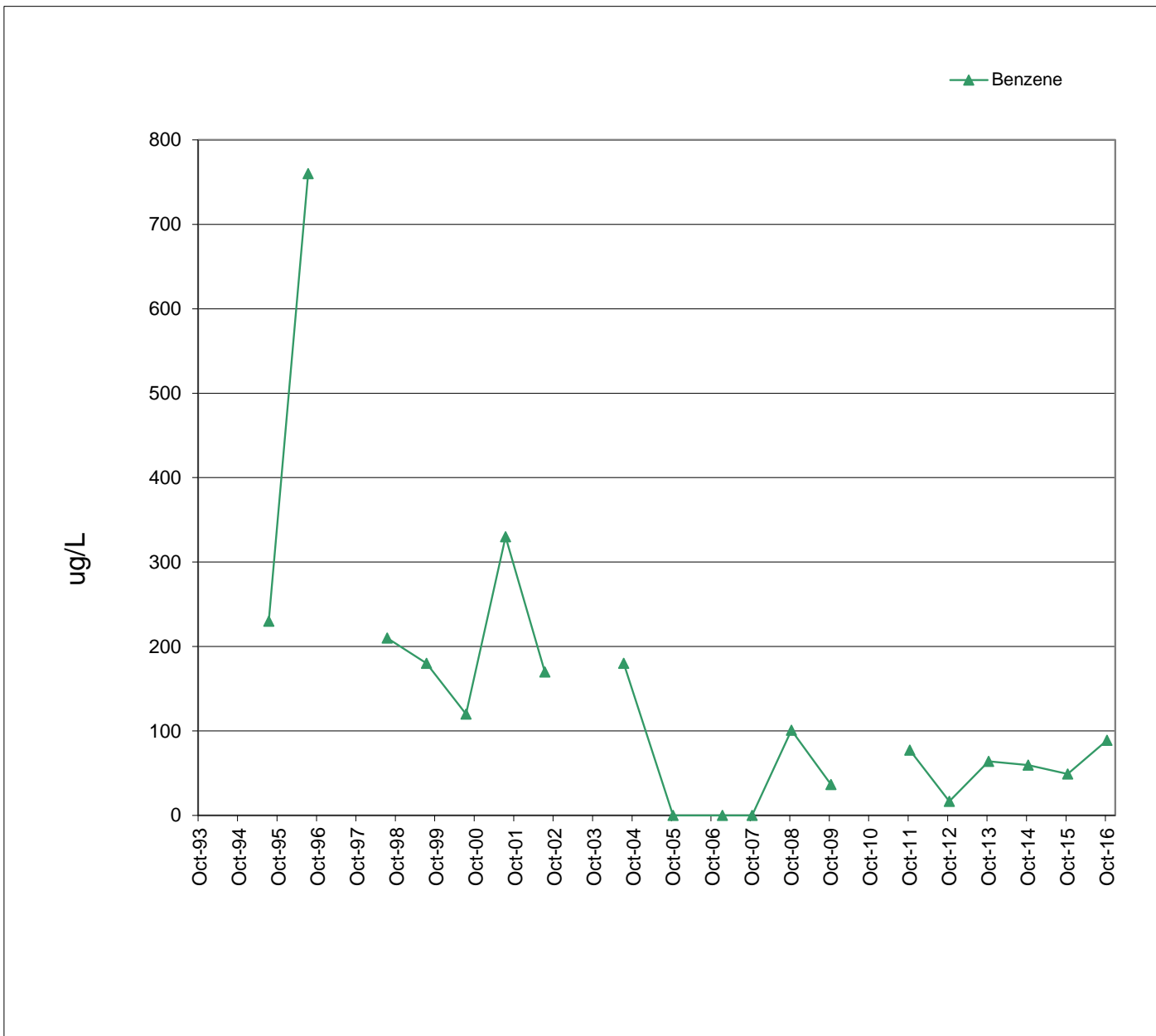
# W-43 Metals

## Remediation Progress - Glacial Drift



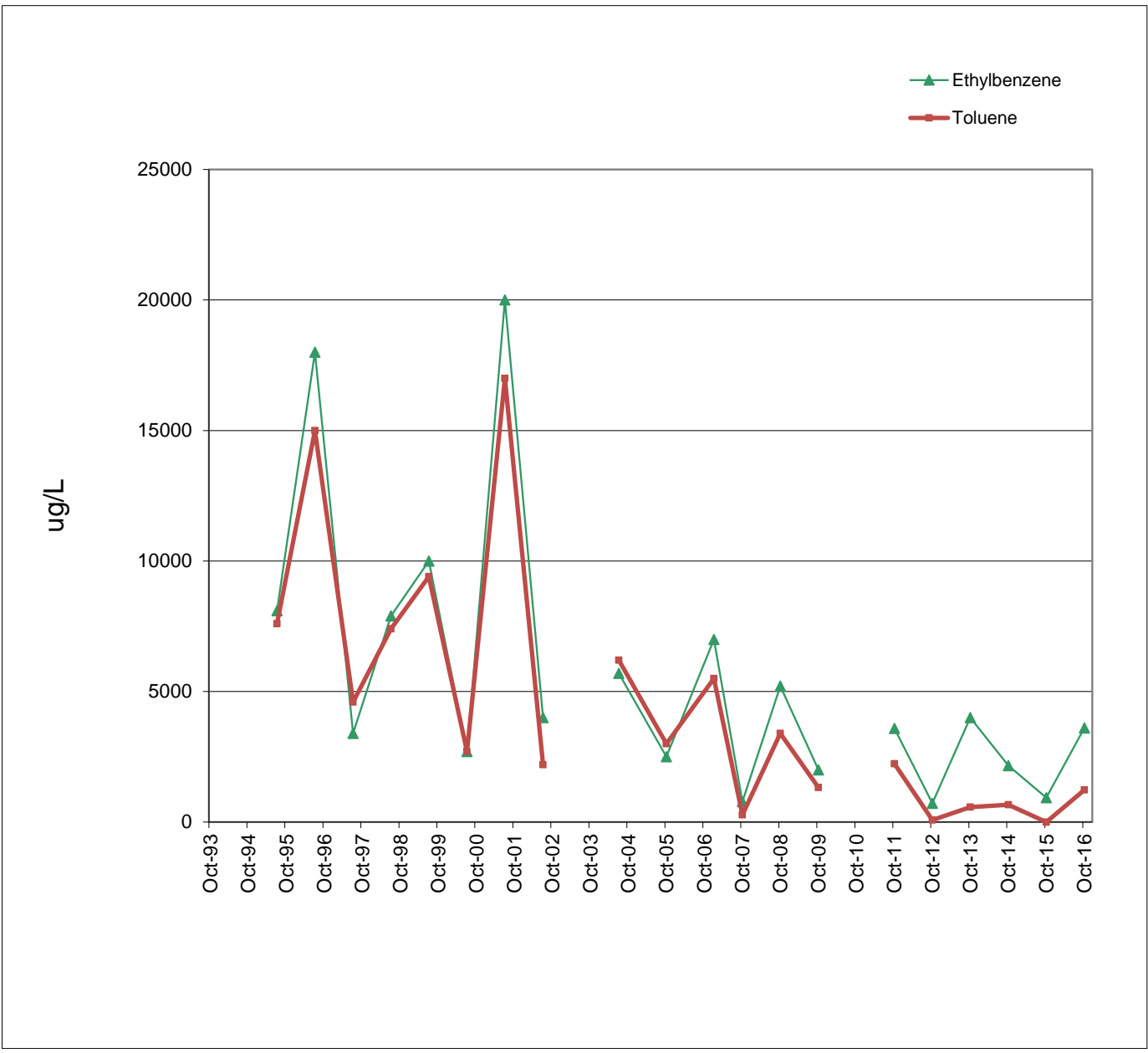
# W-47 VOC

## Remediation Progress - Glacial Drift



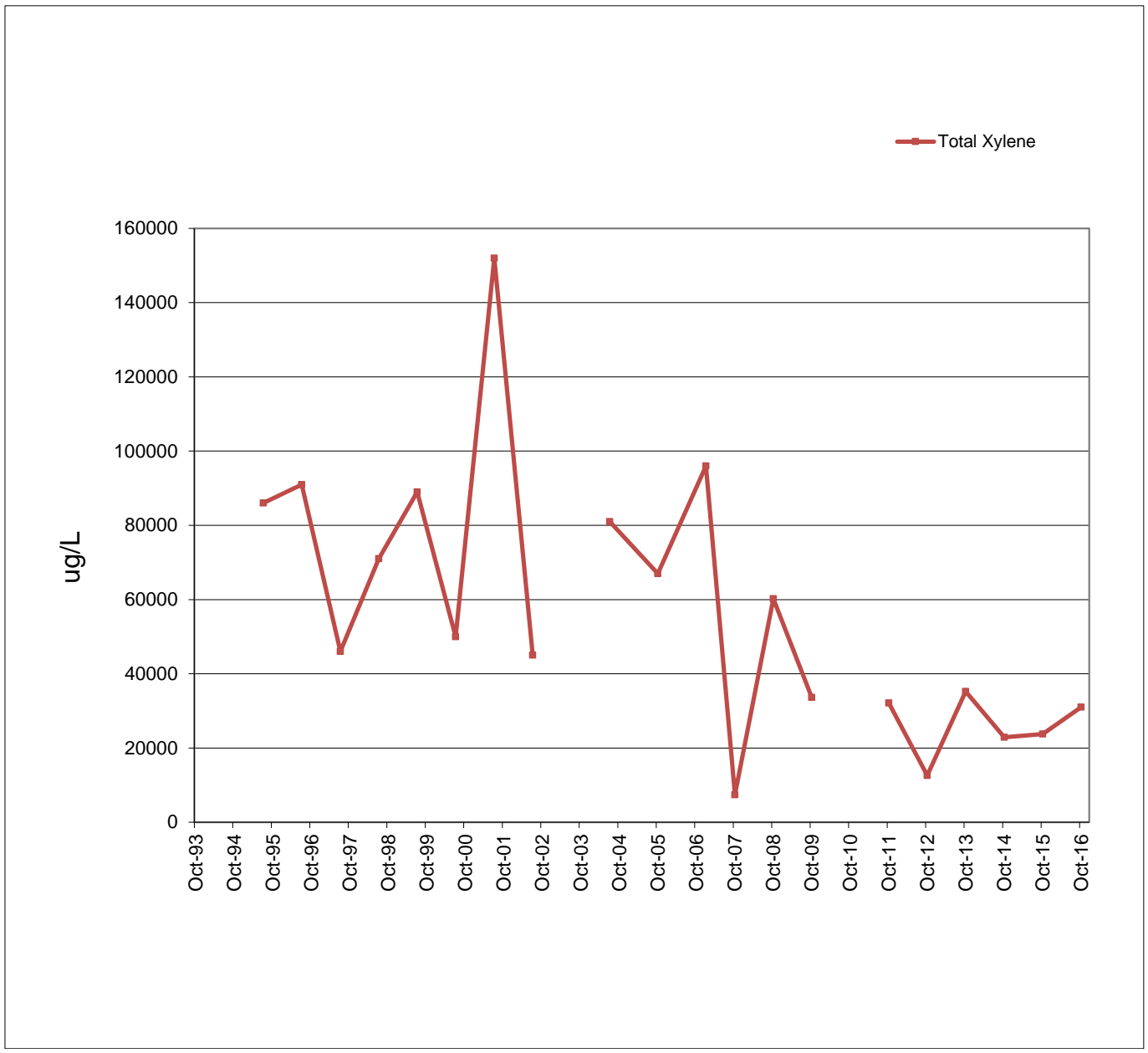
# W-47 VOC

## Remediation Progress - Glacial Drift



# W-47 VOC

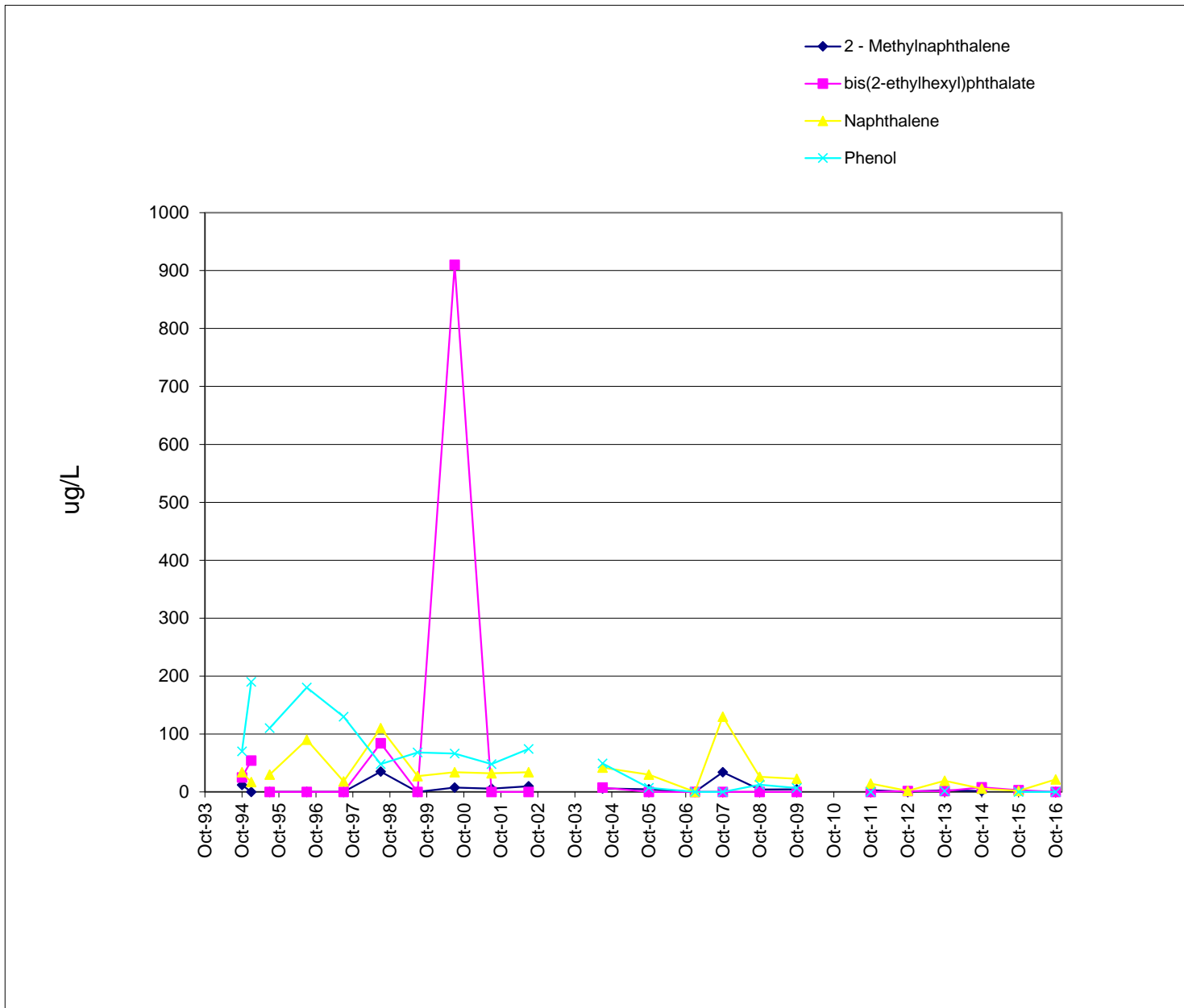
## Remediation Progress - Glacial Drift





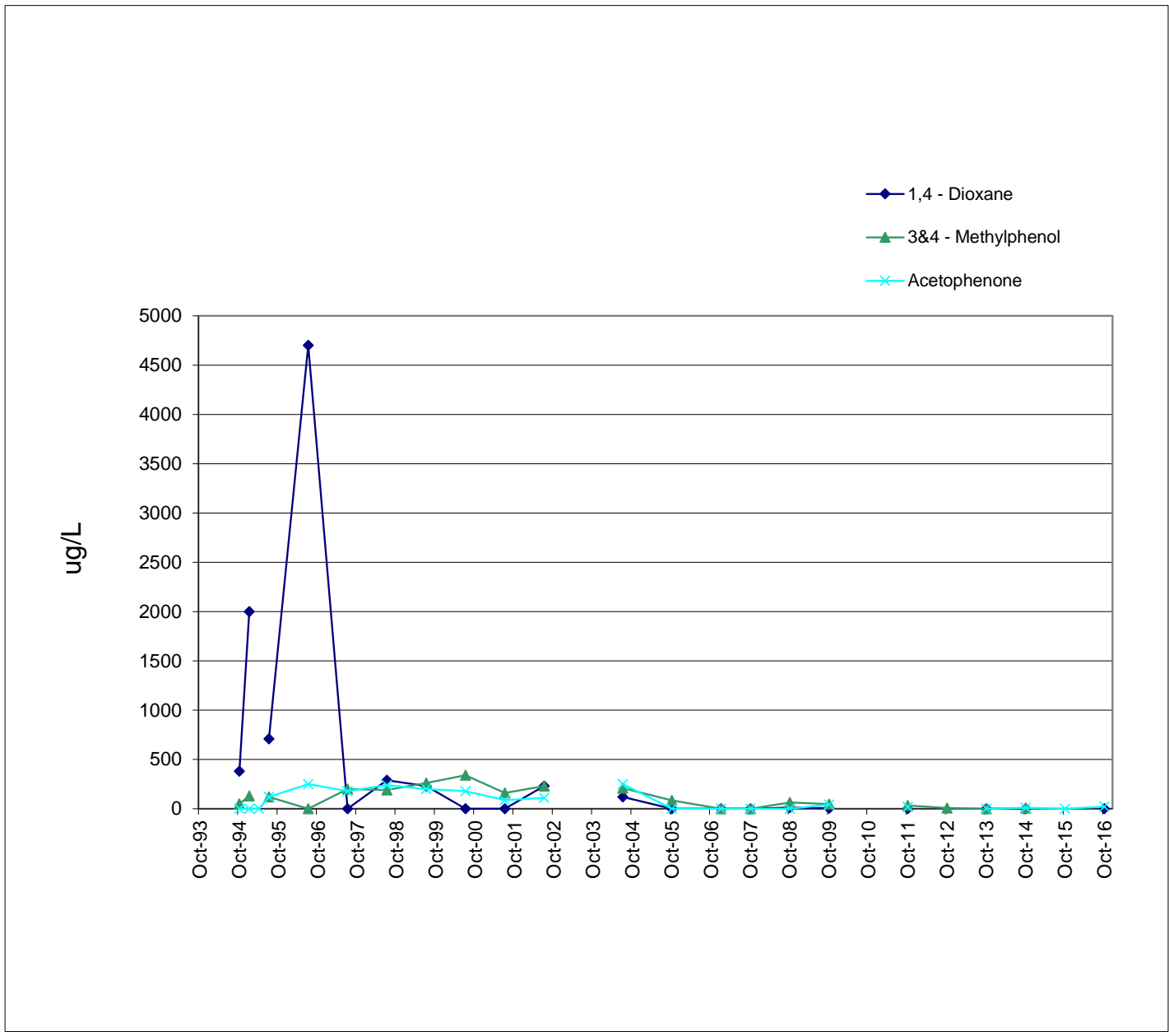
# W-47 SVOC

## Remediation Progress - Glacial Drift



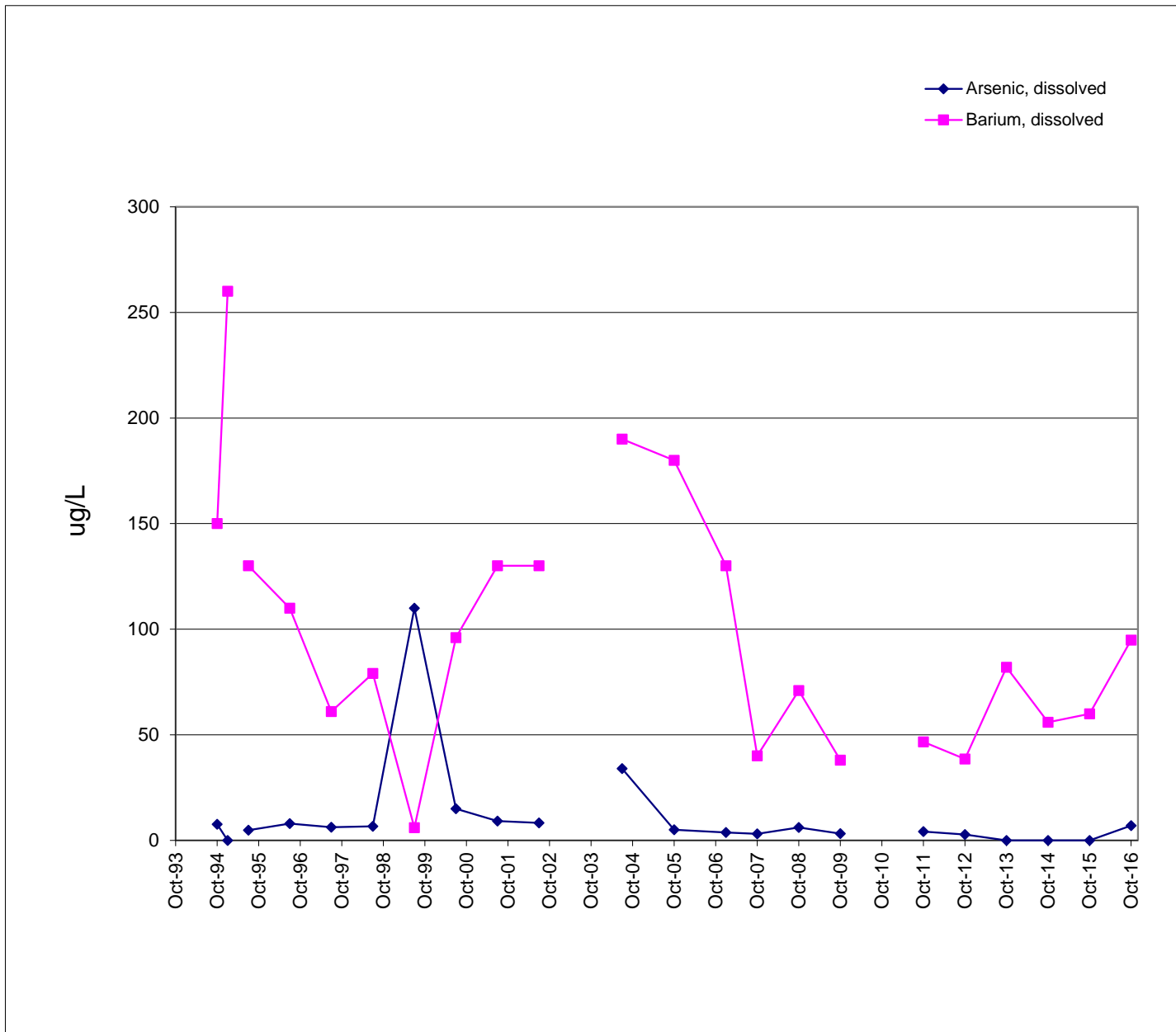
# W-47 SVOC

## Remediation Progress - Glacial Drift



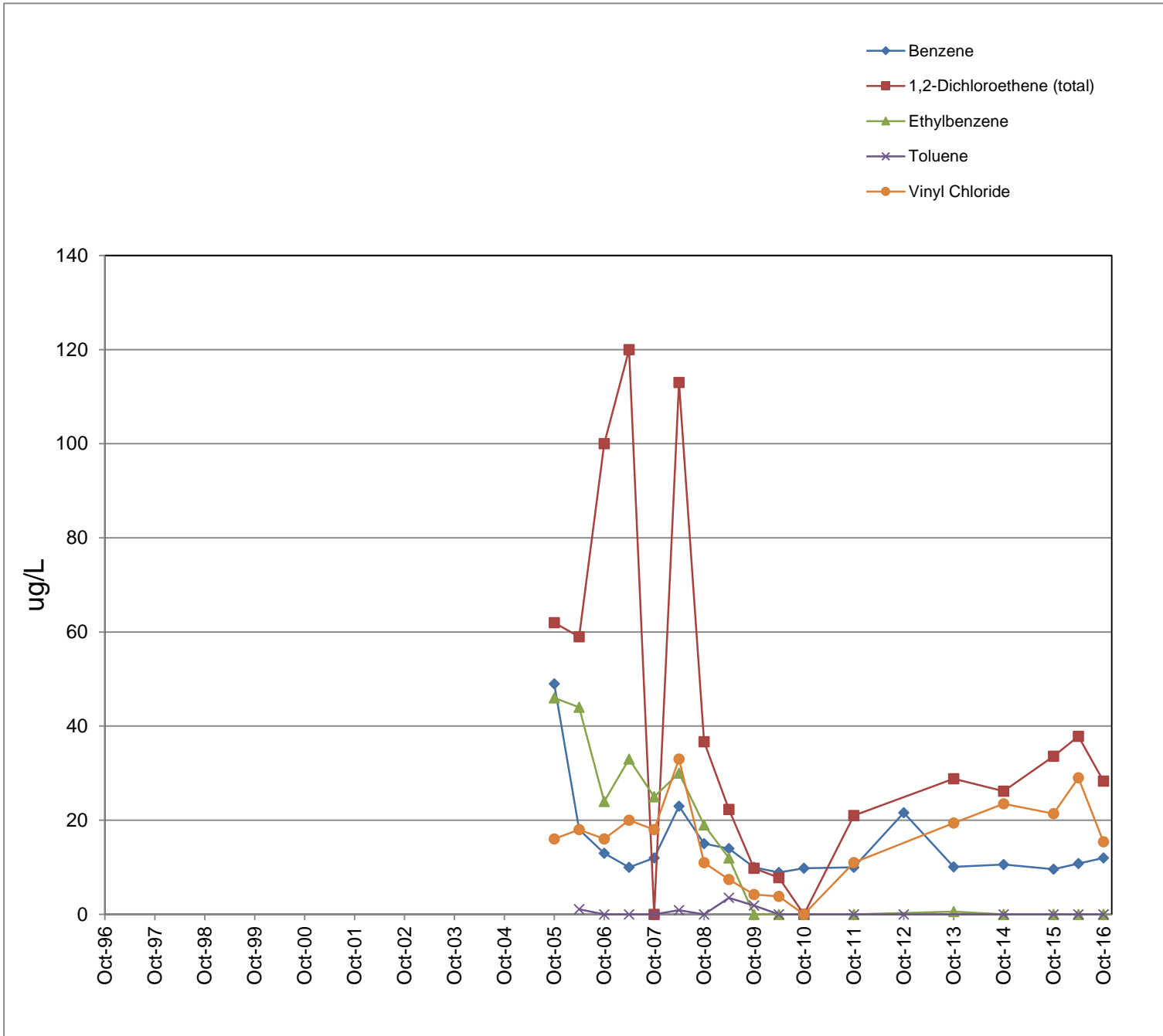
# W-47 Metals

## Remediation Progress - Glacial Drift



# W-52 VOC

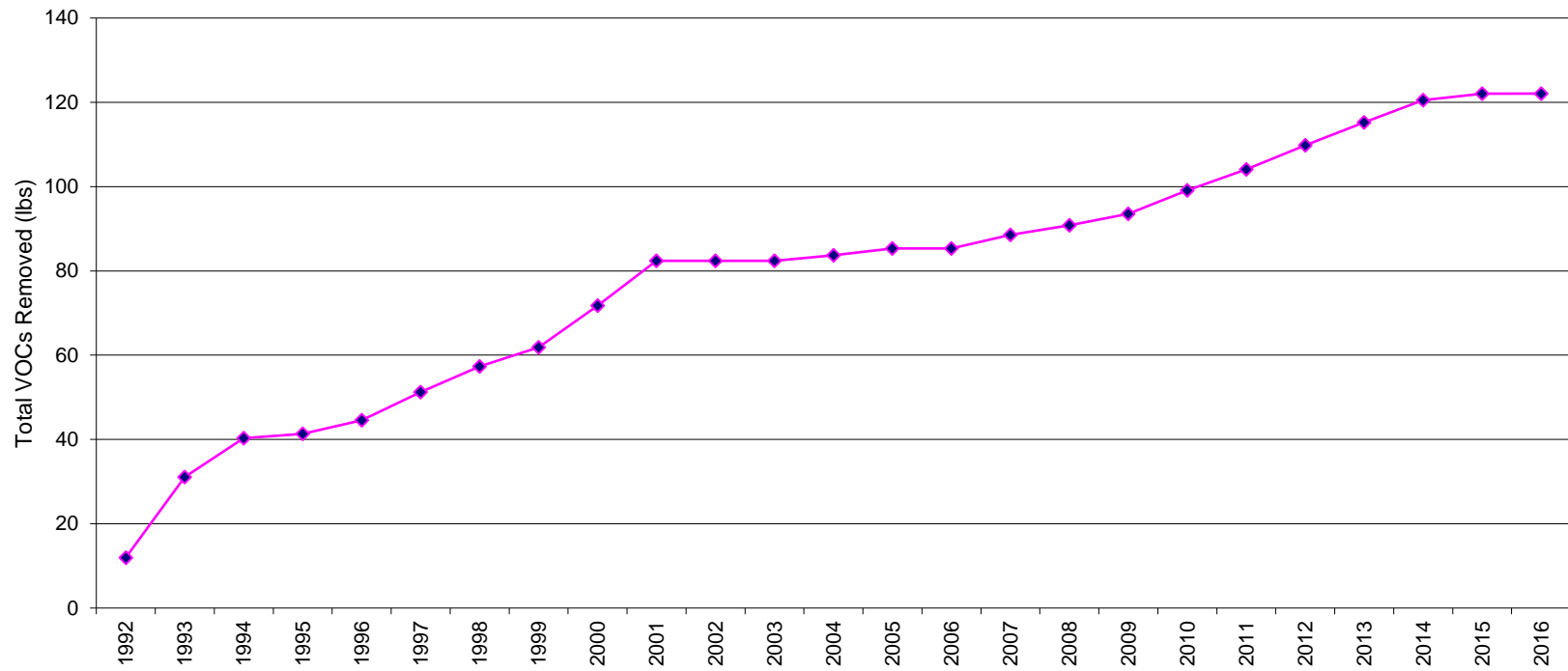
## Perimeter - Glacial Drift



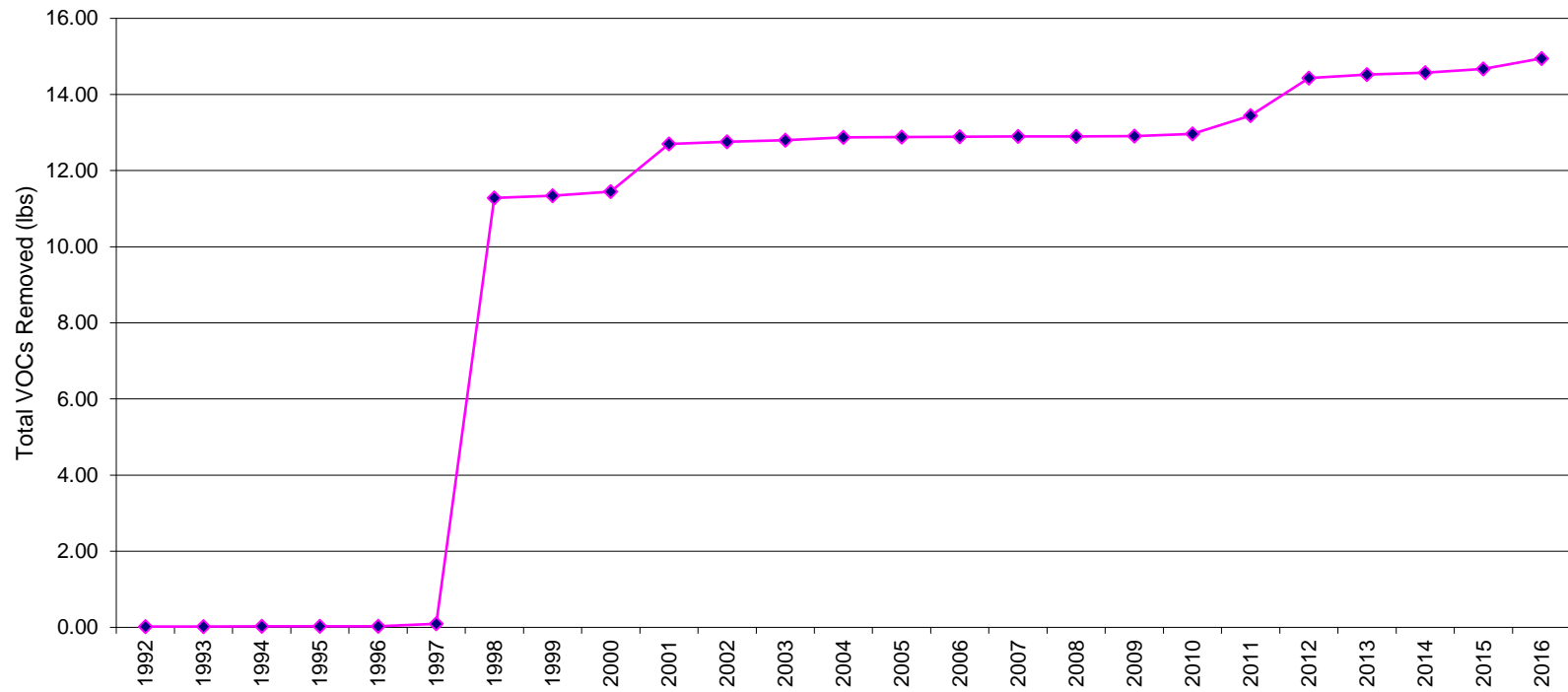
## **APPENDIX E**

### CUMULATIVE VOC MASS REMOVAL ESTIMATES

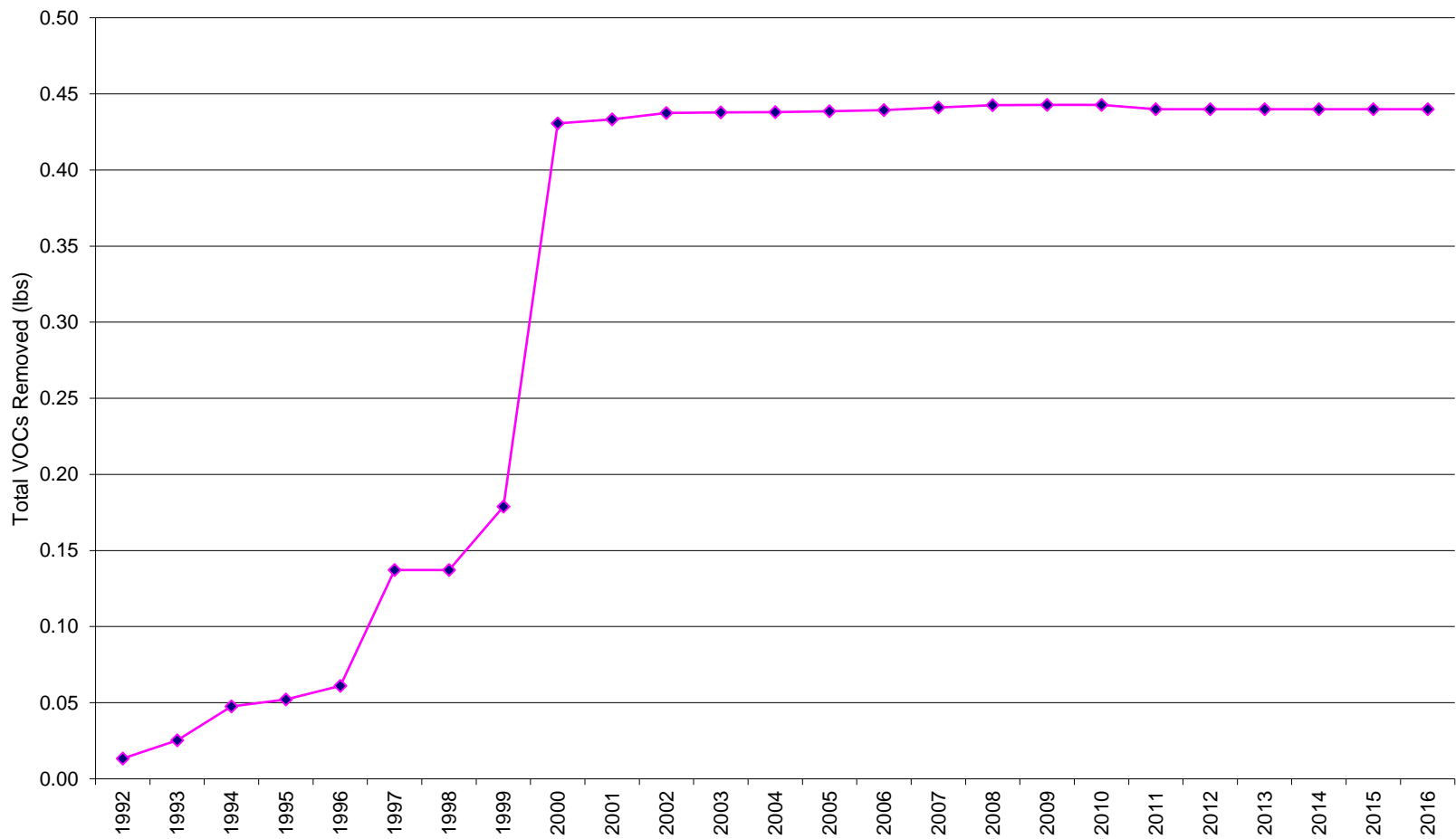
Cumulative Total VOC Removal  
Shallow Dolomite Remediation Progress Well W-21A  
Cook Composites and Polymers Co.  
Saukville, Wisconsin



Cumulative Total VOC Removal  
Shallow Dolomite Remediation Progress Well W-24A  
Cook Composites and Polymers Co.  
Saukville, Wisconsin

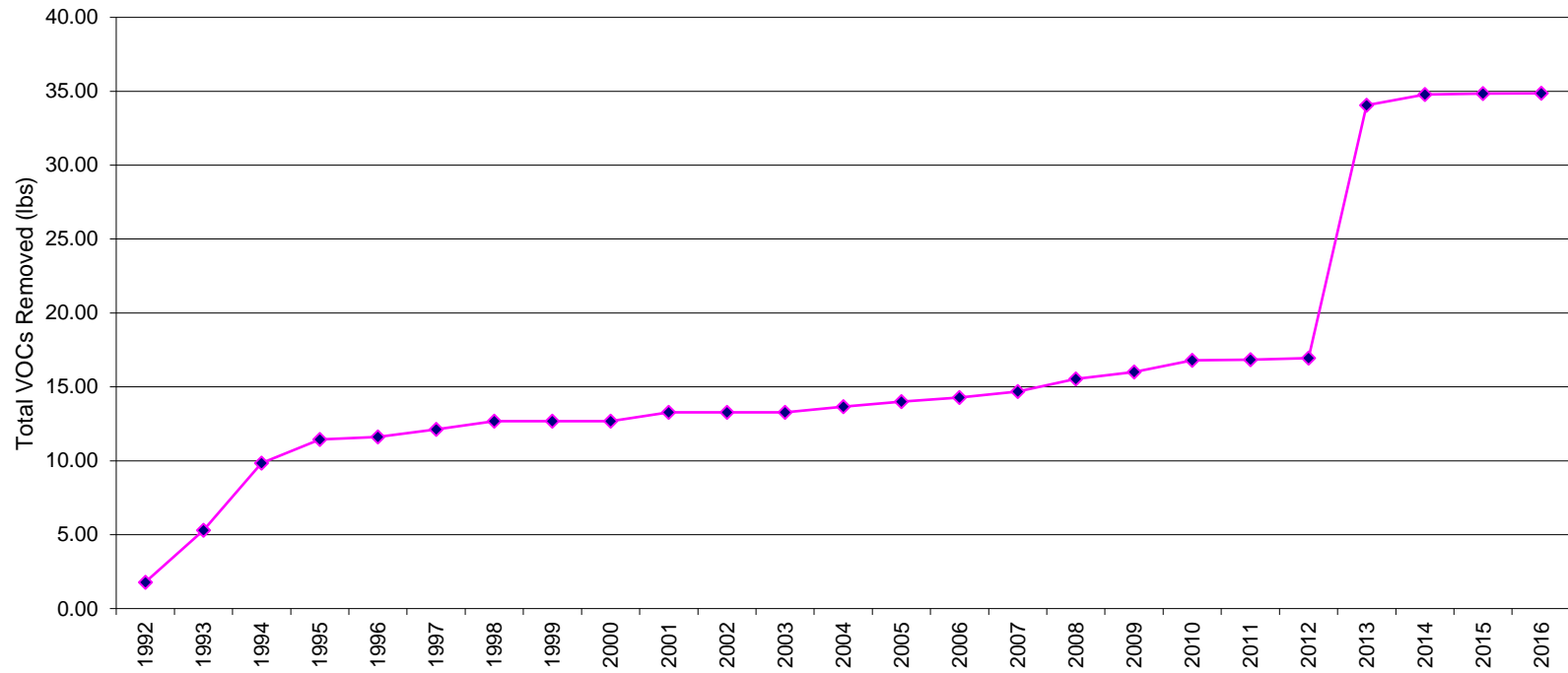


Cumulative Total VOC Removal  
Shallow Dolomite Remediation Progress Well W-28  
Cook Composites and Polymers Co.  
Saukville, Wisconsin

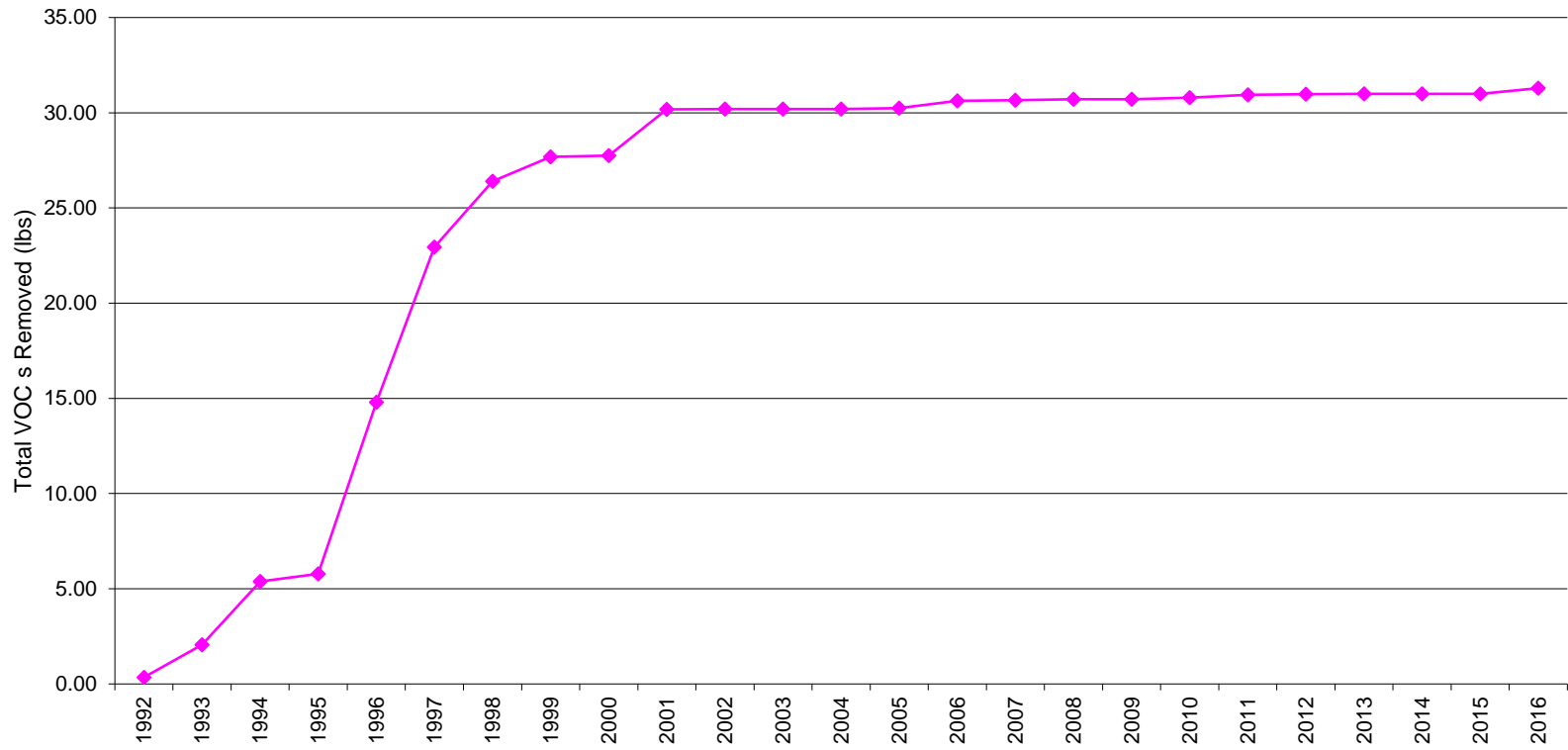




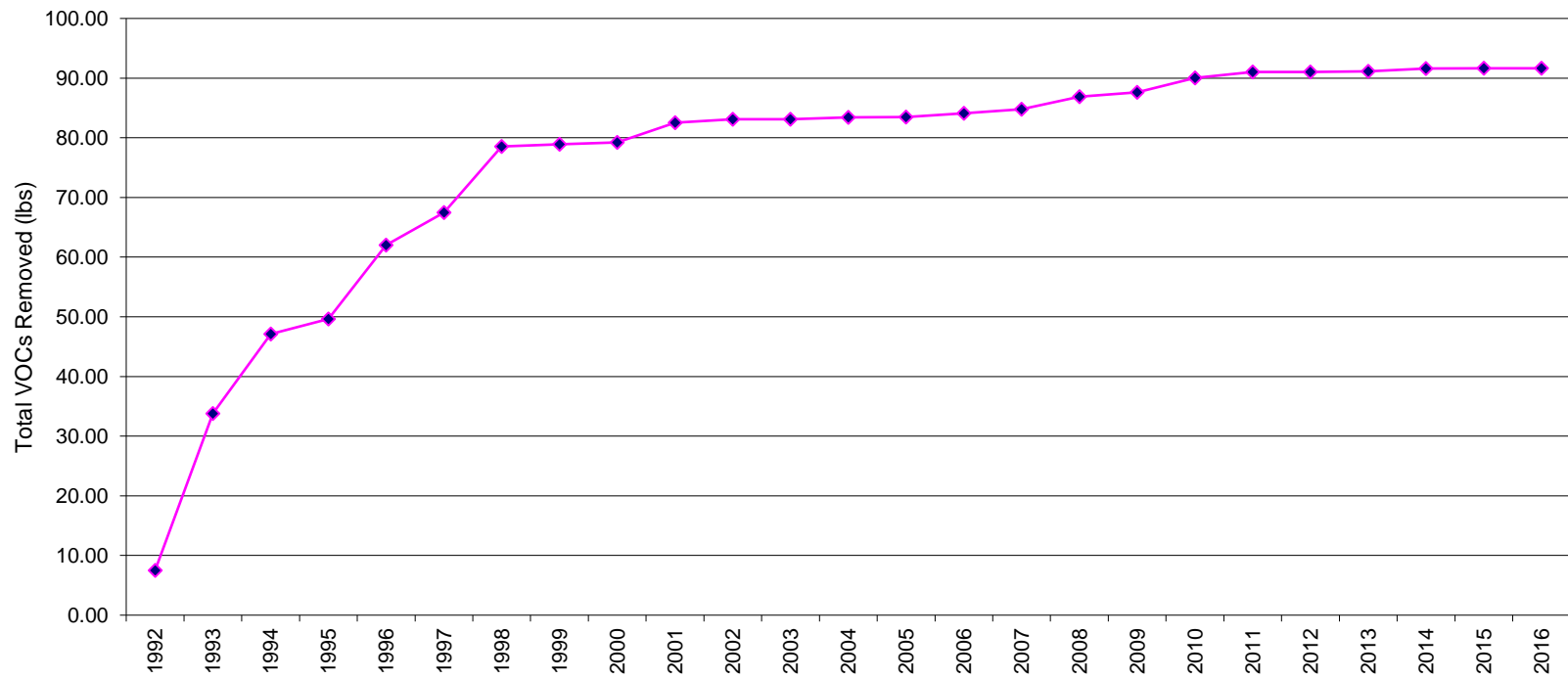
Cumulative Total VOC Removal  
Shallow Dolomite Remediation Progress Well W-29  
Cook Composites and Polymers Co.  
Saukville, Wisconsin



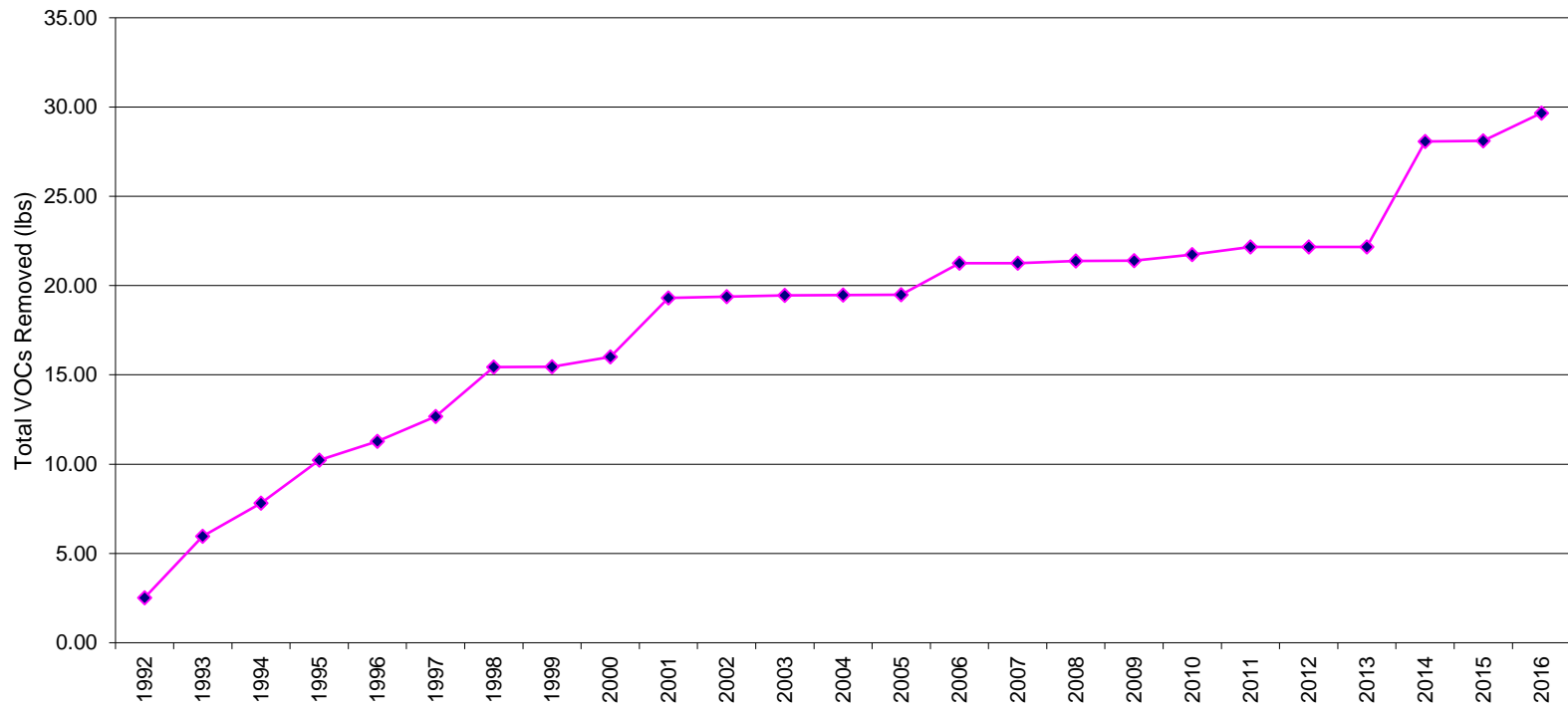
Cumulative Total VOC Removal  
Glacial Ranney Collector RC-1  
Cook Composites and Polymers Co.  
Saukville, Wisconsin



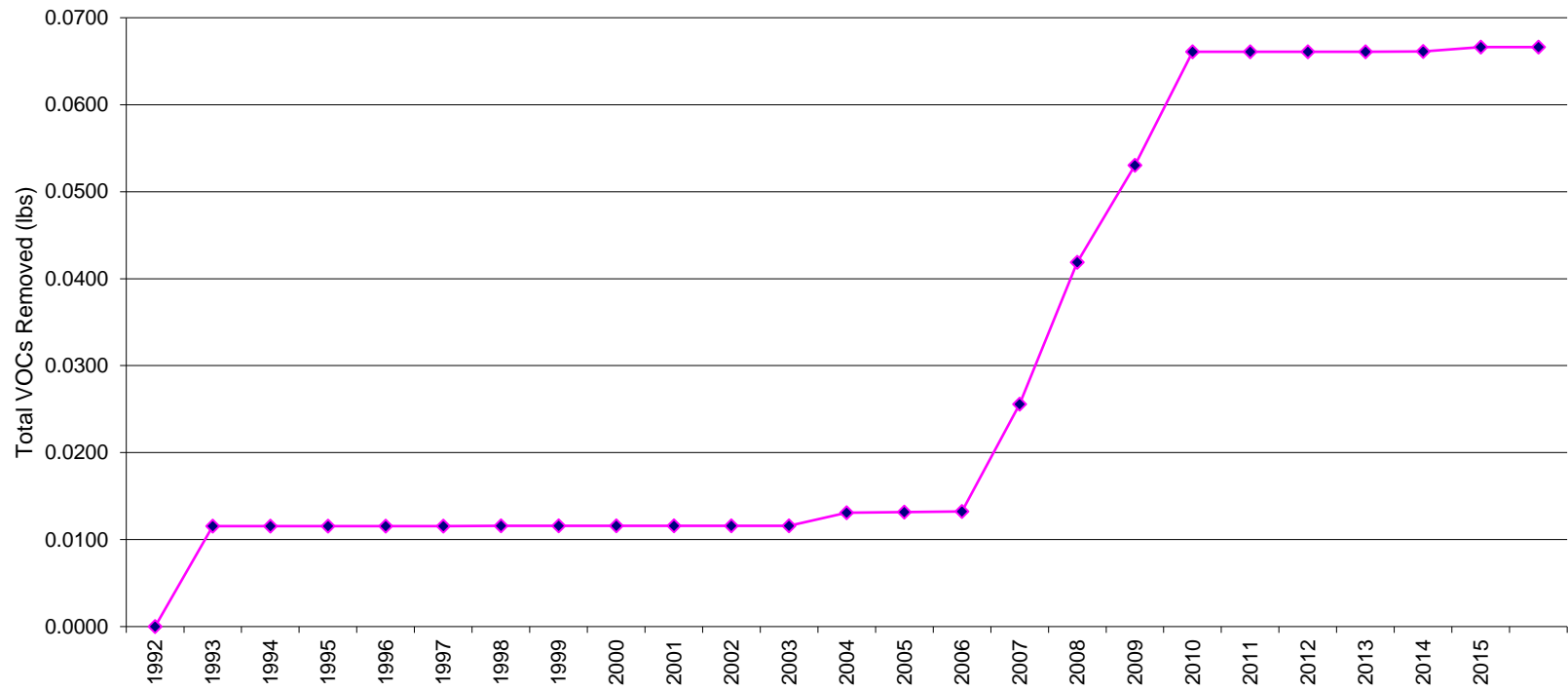
Cumulative Total VOC Removal  
Glacial Ranney Collector RC-2  
Cook Composites and Polymers Co.  
Saukville, Wisconsin



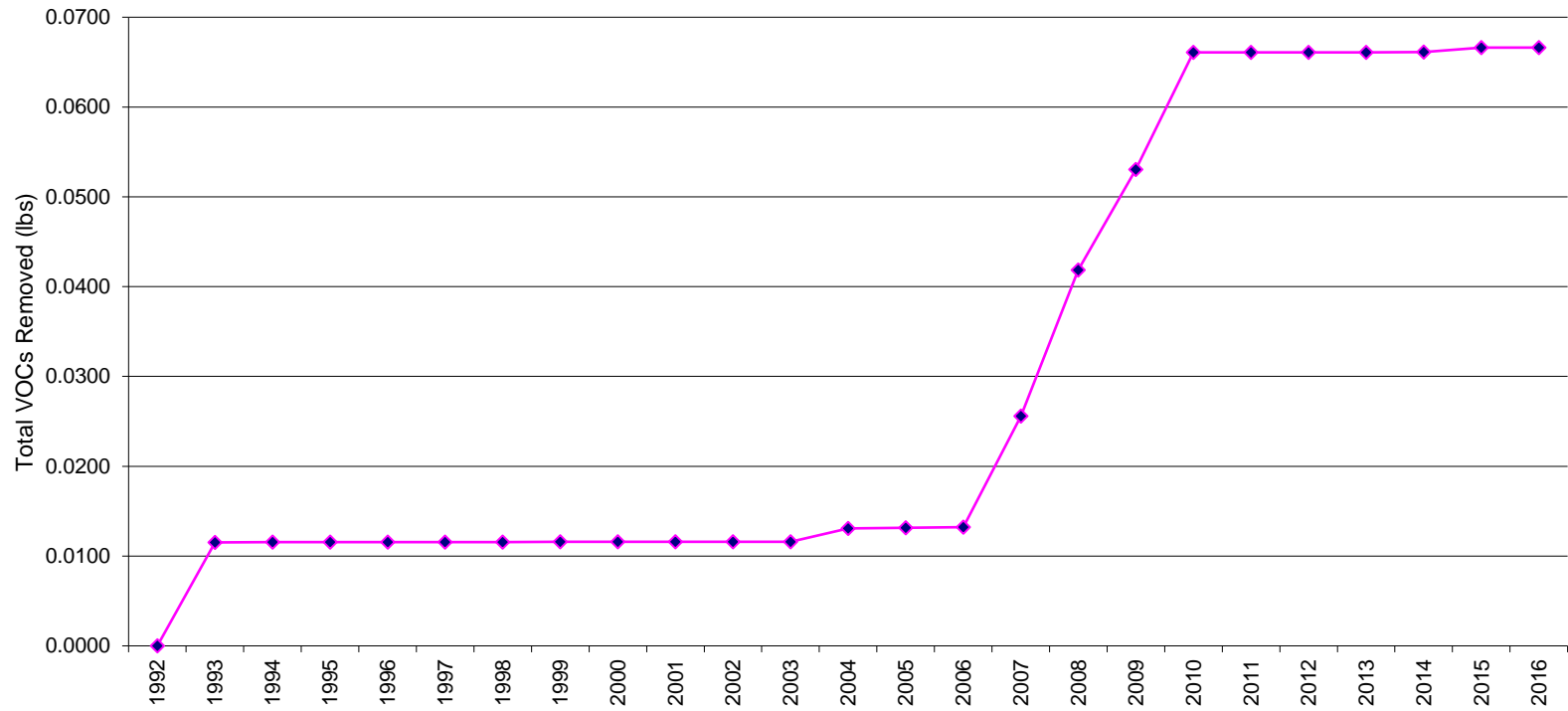
Cumulative Total VOC Removal  
Glacial Ranney Collector RC-3  
Cook Composites and Polymers Co.  
Saukville, Wisconsin



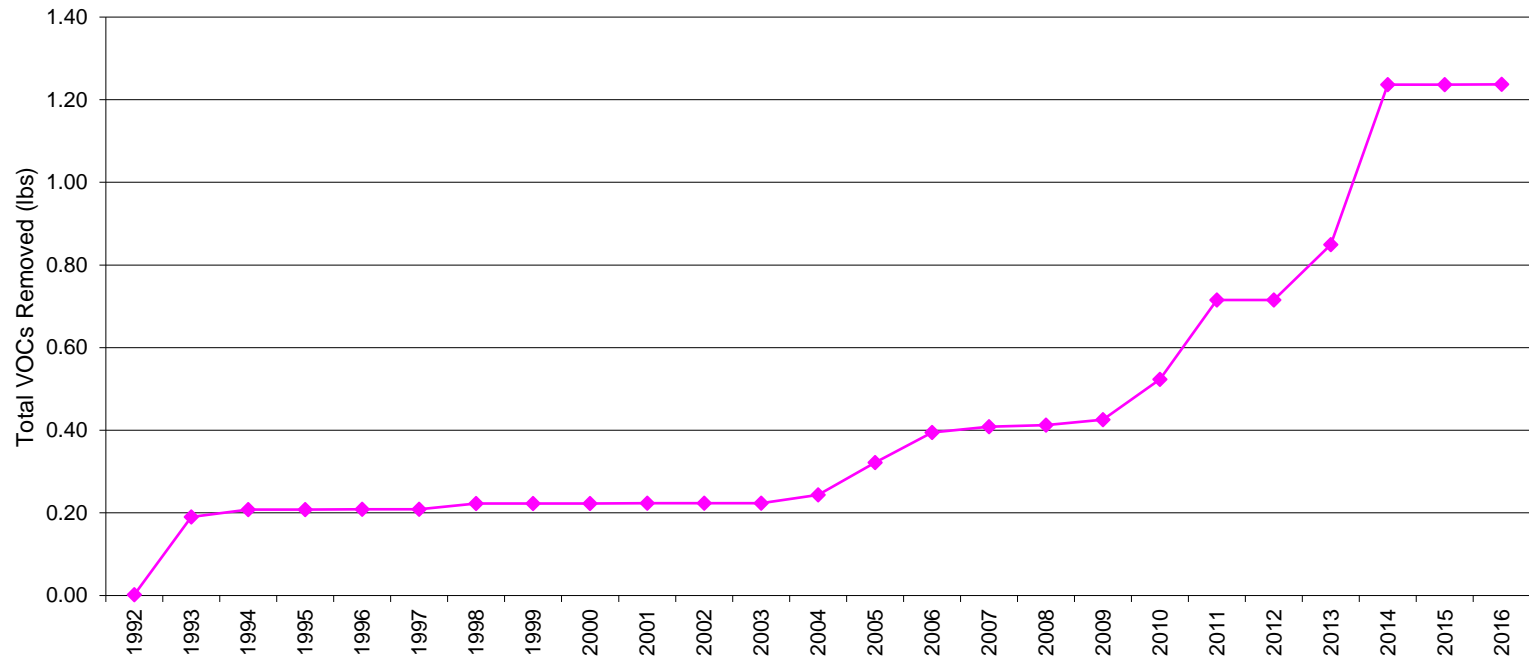
Cumulative Total VOC Removal  
Deep Dolomite Well W-30  
Cook Composites and Polymers Co.  
Saukville, Wisconsin



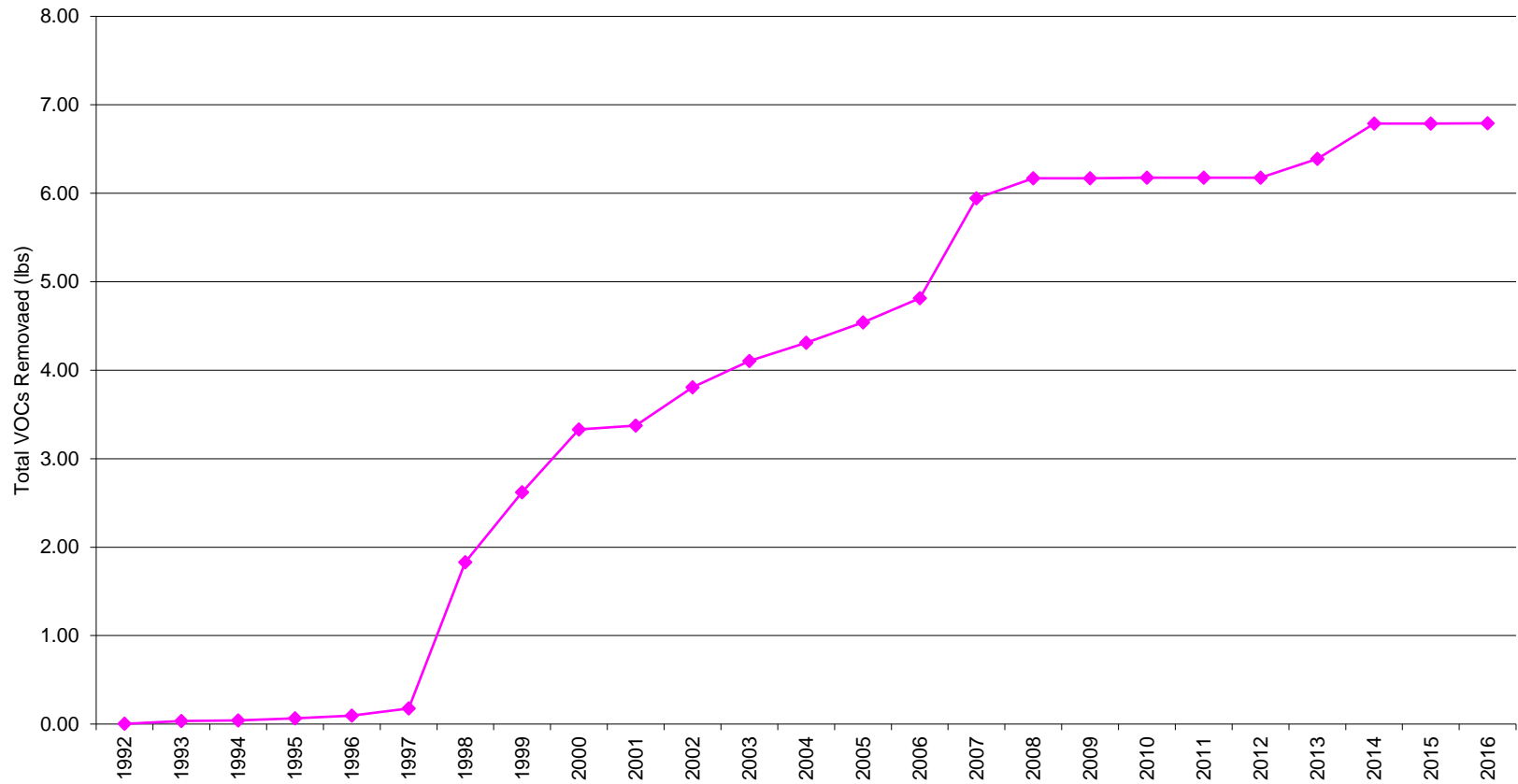
Cumulative Total VOC Removal  
Glacial Extraction Well W-31  
Cook Composites and Polymers Co.  
Saukville, Wisconsin



Cumulative Total VOC Removal  
Glacial Extraction Well W-32  
Cook Composites and Polymers Co.  
Saukville, Wisconsin

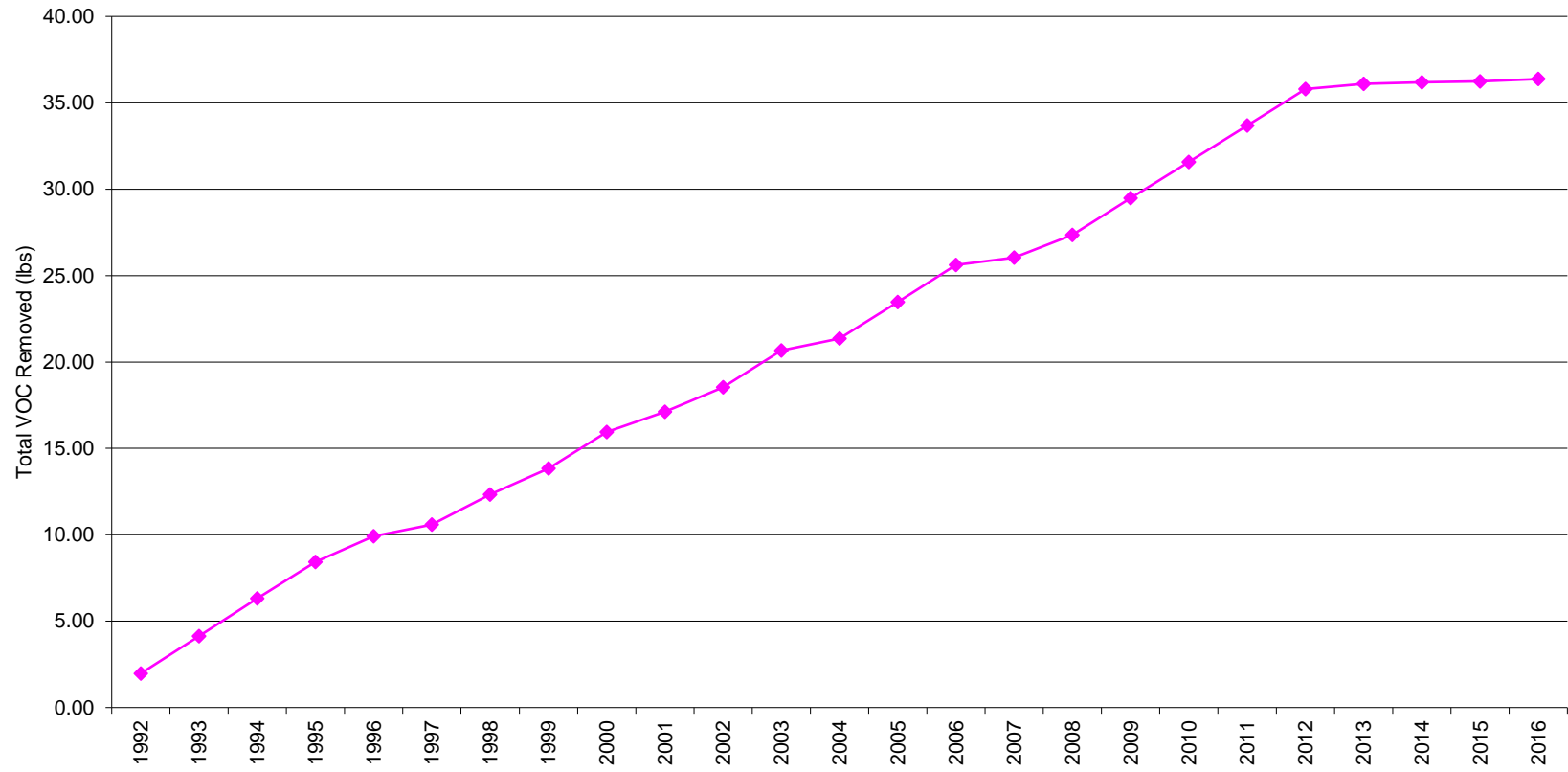


Cumulative Total VOC Removal  
Glacial Extraction Well W-33  
Cook Composites and Polymers Co

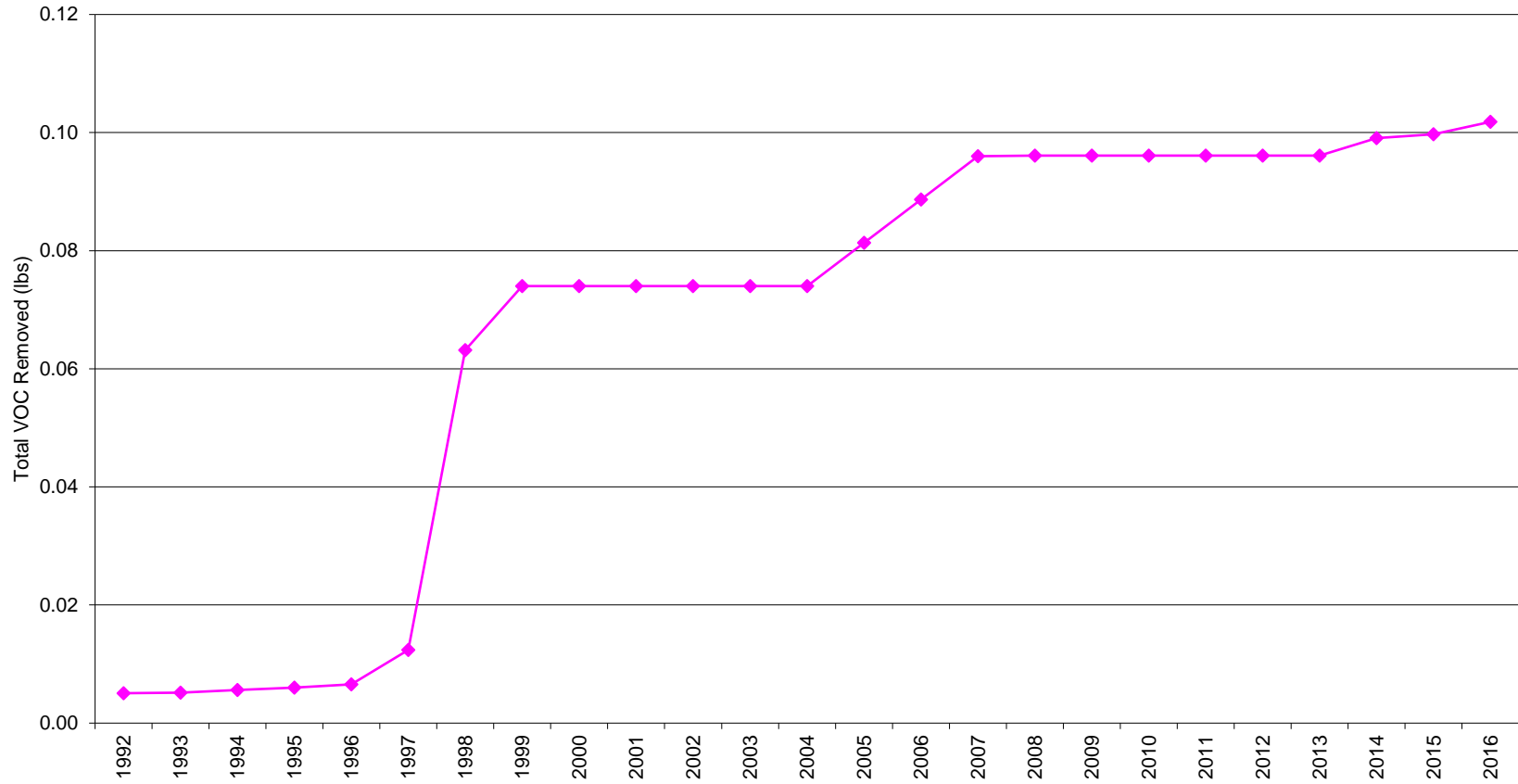




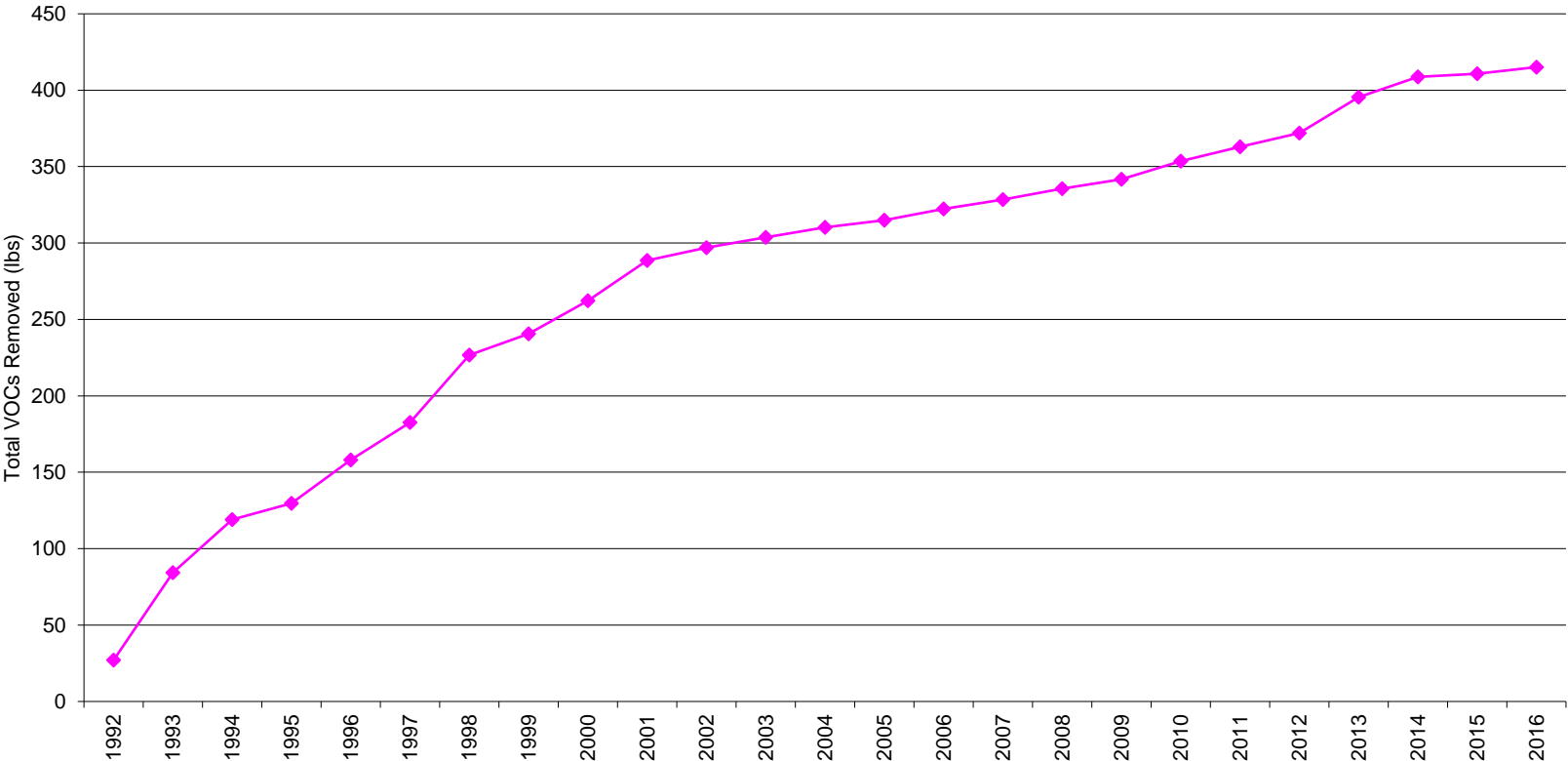
Cumulative Total VOC Removal  
Glacial Extraction Well W-34  
Cook Composites and Polymers Co.  
Saukville, Wisconsin



Cumulative Total VOC Removal  
Glacial Extraction Well W-35  
Cook Composites and Polymers Co.  
Saukville, Wisconsin



Cumulative Total VOC Removal  
All Glacial, Shallow and Deep Dolomite Wells  
Cook Composites and Polymers Co.  
Saukville, Wisconsin



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