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July 16, 2007

347192.PJ.01

Mr. William Ryan
Work Assignment Manager (SR-6J)
U.S. Environmental Protection Agency
77 West Jackson Boulevard
Chicago, IL 60604-3507

Subject: Annual Groundwater Report and Evaluation of Monitored Natural Attenuation
Oconomowoc Electroplating Company, Inc. Site, Ashippun, Wisconsin
WA No. 003-LRLR-05M8, Contract No. EP-S5-06-01

Dear Mr. Ryan:

Enclosed please find for your review one CD-ROM containing the final Annual Groundwater Report and Evaluation of Monitored Natural Attenuation for the Oconomowoc Electroplating Company, Inc. Site. This report presents results through January 2007. Please contact me if you have any questions or concerns at 414-847-0437.

Sincerely,

CH2M HILL

Matt Boekenhauer

Matt Boekenhauer
Site Manager

Received
JUL 18 2007
REMEDIATION &
REDEVELOPMENT

Enclosures
c: Stephen Nathan, PO/USEPA, Region 5 (w/o enclosure)
Charles Foss, CO/USEPA, Region 5 (w/o enclosure)
Ed Lynch/WDNR, Madison
Ike Johnson, PM/CH2M HILL, Milwaukee
Dan Plomb, DPM/CH2M HILL, Milwaukee
Gina Bayer, QAM/CH2M HILL, Milwaukee
Jeff Danko, RTL/CH2M HILL, Milwaukee (w/o enclosure)
Cindi Cruciani/CH2M HILL, Milwaukee (w/o enclosure)
Jon Tortomasi/CH2M HILL, Milwaukee (w/o enclosure)
Cherie Wilson, AA/CH2M HILL, Milwaukee

REGION 5 RAC2

REMEDIAL ACTION CONTRACT FOR

Remedial, Enforcement Oversight, and
Non-Time Critical Removal Activities at Sites of Release
or Threatened Release of Hazardous Substances in Region 5

Annual Groundwater Report and Evaluation of Monitored Natural Attenuation

Oconomowoc Electroplating
Oconomowoc, Wisconsin
WA No. 003–LRLR–05M8/Contract No. EP–S5–06–01
July 2007

PREPARED FOR

U.S. Environmental Protection Agency

PREPARED BY

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Ecology and Environment, Inc.
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May 25, 2007

347192.PJ.01

Received
MAY 29 2007
REMEDIATION &
REDEVELOPMENT

Mr. William Ryan
Work Assignment Manager (SR-6J)
U.S. Environmental Protection Agency
77 West Jackson Boulevard
Chicago, IL 60604-3507

Subject: Draft Annual Groundwater Report and Evaluation of Monitored Natural Attenuation
Oconomowoc Electroplating Company, Inc. Site, Ashippun, Wisconsin
WA No. 003-LRLR-05M8, Contract No. EP-S5-06-01

Dear Mr. Ryan:

Enclosed please find for your review one CD containing the Draft Annual Groundwater Report and Evaluation of Monitored Natural Attenuation for the Oconomowoc Electroplating Company, Inc., Site. This report presents results through January 2007. Please contact me if you have any questions or concerns at (414) 847-0437.

Sincerely,

CH2M HILL

Matt Boekenhauer

Matt Boekenhauer
Site Manager

Enclosures
c: Stephen Nathan, PO/U.S. EPA, Region 5 (w/o enclosure)
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CH2MHILL TRANSMITTAL

To: Wisconsin Dept. of Natural Resources
101 S. Webster St. RR/3

Madison, WI 53703
USA

From: Jon J. Tortomasi

Attn: Mr. Ed Lynch

Date: July 24, 2007

Re: Annual Groundwater Report and Evaluation of Monitored Natural Attenuation
Oconomowoc Electroplating Company, Inc. Site, Ashippun, Wisconsin
WA No. 003-LRLR-05M8, Contract No. EP-S5-06-01

We Are Sending You:

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Specifications

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Quantity	Description
1	Annual Groundwater Report and Evaluation of Monitored Natural Attenuation – Oconomowoc Electroplating (hardcopy)

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If the material received is not as listed, please notify us at once.

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ANNUAL GROUNDWATER REPORT AND EVALUATION OF MONITORED NATURAL ATTENUATION

OCONOMOWOC ELECTROPLATING

Oconomowoc, Wisconsin

WA No. 003-LRLR-05M8 / Contract No. EP-S5-06-01
July 2007

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Abbreviations and Acronyms

μg/L	micrograms per liter
.pdf	portable document format
BRRTS	Bureau of Remediation and Redevelopment Tracking System
COC	contaminant of concern
CVOC	chlorinated volatile organic compound
DCA	dichloroethane
DCE	dichloroethene
DO	dissolved oxygen
EDD	electronic data deliverable
ES	Enforcement Standard
FOP	field operations plan
FSP	field sampling plan
mg/L	milligrams per liter
MNA	monitoring natural attenuation
MTBE	methyl tertiary butyl ether
NA	natural attenuation
OECI	Oconomowoc Electroplating Company, Inc.
ORP	oxidation-reduction potential
OSWER	Office of Solid Waste and Emergency Response
PAL	preventative action limit
PCE	tetrachloroethene
QAPP	quality assurance project plan
site	Oconomowoc Electroplating Company, Inc. site
TCA	trichloroethane
TCE	trichloroethene
USEPA	United States Environmental Protection Agency
VC	vinyl chloride
VOC	volatile organic compound
WDNR	Wisconsin Department of Natural Resources

Executive Summary

The Oconomowoc Electroplating Company, Inc. (OECI) site (site) is undergoing groundwater monitoring in accordance with the quality assurance project plan (QAPP) (CH2M HILL 2004), QAPP changes letter (CH2M HILL 2007), and field sampling plan (CH2M HILL 2006a). A groundwater extraction system operated at the site for 8 years, substantially lowering the concentration of metals and chlorinated volatile organic compounds (CVOCs) in groundwater. In the summer of 2002, metal concentrations had decreased to levels that allowed for cessation of groundwater treatment operations per the Wisconsin Department of Natural Resources (WDNR) and U.S. Environmental Protection Agency (USEPA) Region 5. The extraction system ceased operation in July 2004.

Long-term groundwater monitoring began in October 2004. October 2004, July 2005, and October 2005 data showed similar groundwater concentrations to those measured in the previous sampling round of April 2003, when the groundwater extraction system was in operation, suggesting a relatively stable post-extraction plume. Data from 2006 and 2007 present continued evidence that natural attenuation (NA) is occurring. Evidence for NA continues to be strongest at shallow well locations downgradient of the former OECI facility.

Chlorinated compounds, including trichloroethene (TCE) and vinyl chloride (VC), continue to be detected in groundwater from downgradient bedrock wells and private wells. Although concentrations of volatile organic compounds (VOCs) in private wells are low (all below the Wisconsin Administrative Code NR 140 Enforcement Standard [ES] and many below the NR 140 Preventative Action Limit [PAL]), detections have persisted since CH2M HILL began sampling the private wells in July 2005. Previous detection limits for VC were not low enough to detect concentrations prior to 2005. Concentrations and flow patterns in the shallow and deep unconsolidated aquifers indicate there may be alternate sources of CVOCs upgradient of the site.

The VOC plume is not migrating beyond its previous extent in the shallow and deep unconsolidated aquifers. Trends are not as clear in private bedrock wells because historical detection limits were not low enough to be below the NR 140 PAL.

Methyl tertiary butyl ether (MTBE) was detected in downgradient shallow and deep unconsolidated aquifer wells, but not in onsite wells. MTBE also was detected in private bedrock wells and bedrock monitoring wells west of the site. There are several businesses north of the site that may have handled this compound as a component of gasoline. Because of the lack of MTBE in onsite shallow unconsolidated aquifer monitoring wells, this constituent does not appear to be related to the site.

Quarterly groundwater and surface water monitoring should continue and NA should continue as a remediation strategy for the site because evidence supports that NA is occurring. Potential offsite sources of VOCs should be confirmed by drive-by reconnaissance, owner interviews, interviews with state and local representatives, and file review. CH2M HILL also recommends that USEPA update the owners of the private bedrock wells with the most recent results for the private bedrock well water analysis. In addition, a contingency plan should be prepared to outline response actions in the event that the contaminants of concern (COCs) concentrations in groundwater from private bedrock wells meet or exceed the NR 140 ES.

Annual Groundwater Report and Evaluation of Monitored Natural Attenuation

Introduction

The Oconomowoc Electroplating Company, Inc. (OECI) site (site) is undergoing groundwater monitoring in accordance with the quality assurance project plan (QAPP) (CH2M HILL 2004), QAPP changes letter (CH2M HILL 2007), and field sampling plan (FSP) (CH2M HILL 2006a). This report has been prepared to present the results from the January 2007 quarterly groundwater sampling event, and provide an initial evaluation of natural attenuation (NA) being monitored at the site.

Site Background

The 10-acre site comprises the former 4-acre OECI facility (facility) bounded by Elm, Oak, and Eva streets, and the town of Ashippun municipal garage, located at 2573 Oak Street in Ashippun, Wisconsin, and 6 acres of a wet, low-lying area located adjacent to the southwest portion of the former site (Figures 1 and 2). This low-lying area is referred to in historical and recent project plans as a wetland area. Davy Creek flows through this wetland area.

Various onsite metal cleaning and electroplating processes were performed at OECI since operations began in 1957. Operation materials included chlorinated solvents, cyanide, chromium, cadmium, copper, nickel, tin, and zinc. Degreasing operations were performed at the site using unknown compounds (Ebasco 1990). OECI ceased operation in 1990 due to financial hardship. Buildings at the site were demolished in May 1992. Initial source reduction activities previously performed at the site included removing the former lagoon sediment and sludge, contaminated soil, and contaminated sediment in the wetlands around Davy Creek.

A groundwater extraction system operated at the site for 8 years, substantially lowering the concentration of metals and chlorinated volatile organic compounds (CVOCs) in groundwater. In the summer of 2002, metal concentrations had decreased to levels that allowed for cessation of groundwater treatment operations per the Wisconsin Department of Natural Resources (WDNR) and U.S. Environmental Protection Agency (USEPA) Region 5. The extraction system ceased operation in July 2004.

Groundwater samples were collected in October 2004 from a subset of existing site monitoring wells. The data supported that NA of CVOCs was occurring at downgradient portions of the plume. October 2004 concentrations (post-system shutdown) were similar to those measured in the previous sampling round (April 2003) when the system was operating, indicating overall stability in the CVOC plume. Quarterly groundwater data collected in 2005 and 2006 by CH2M HILL further indicated that NA of CVOCs was occurring at downgradient portions of the plume. Groundwater collected from several private wells was found to contain vinyl chloride (VC) above the Wisconsin Administrative

Code NR 140 Preventative Action Limit (PAL) since CH2M HILL began sampling the private wells in July 2005. It should be noted that the VC detected in groundwater collected from these private wells was present at concentrations just above the detection limits, and the detection limits used in 2005 and 2006 were lower than those previously used for VC, so it is possible that the compound was present in groundwater at these locations prior to 2005 private well sampling.

Geologic and Hydrogeologic Settings

The geologic and hydrogeologic settings summarized below are discussed in terms of regional conditions and those conditions encountered during site-specific investigations, and as documented in previous reports (RMT 2004).

Geology

The regional geology beneath the site is comprised of unconsolidated Quaternary- and/or Holocene-aged deposits, which, in turn, are underlain by a succession of bedrock units. The rock units are described herein using an "oldest to youngest" (and deepest to most shallow) sequence.

The deepest rock unit, Precambrian crystalline basement rock, is overlain in succession by Cambrian sandstone, then Ordovician deposits. The Cambrian and Ordovician units are all sedimentary in origin, and they regionally dip to the east and southeast. A preglacial and glacial erosional surface unconformity separates the Ordovician bedrock surface from the overlying unconsolidated deposits.

The unconsolidated deposits beneath the site range in thickness from 28 feet directly beneath the former OECI facility to 55 feet at the southwestern edge of the site (RMT 2004). Silt and clay fill are sporadically present in the upper 4 to 10 feet of unconsolidated material at several locations at and near the former site. The unconsolidated glacial material consists of gray-brown and yellow-brown sand, silty sand, and clay. The silt content in the glacial material varies from trace amounts to greater than 50 percent. Discontinuous lenses of silt and clay were observed to be present within the sands in several borings across the site. Compacted clay up to 8 feet thick is present directly above the top of bedrock in some locations (RMT 2004).

Hydrogeology

Hydrogeologic Units

Hydrogeologic features are conceptually depicted on Figure 3. Two bedrock aquifers (units capable of yielding water to supply wells) are present beneath the site: the Ordovician Galena-Platteville dolomite and St. Peter Sandstone. The Maquoketa shale (also Ordovician in age), which sits above these bedrock aquifers and is the uppermost bedrock unit encountered at the site, is considered to be an aquitard unit on a regional basis. It does, however, contain some dolomite interlayers and fractures that are capable of yielding sufficient quantities of water for residential use.

Groundwater is present in the unconsolidated silty sands and clays that sit above the Maquoketa shale at the site, although it is not considered to be part of a regional sand and gravel aquifer because of its higher silt content. The water table in this unconfined water-bearing unit roughly parallels the ground surface topography (the groundwater is assumed to be under atmospheric pressure [Devaul et al. 1983]).

Groundwater monitoring wells are installed at the site in the shallow and deep portions of the unconsolidated deposits and in the upper bedrock. Nested wells are installed in the unconsolidated deposits, with the shallow wells monitoring the upper portion, "water table" depths of this aquifer and the deep wells monitoring the lower portion of this aquifer (Figure 3). Groundwater elevations obtained in January 2007 measured for all monitoring wells are included in Table 1.

Interpreted Groundwater Flow Directions

Groundwater elevation maps were generated for shallow and deep unconsolidated aquifers and for the bedrock aquifer based on the most recent sampling event (January 2007). Apparent shallow groundwater flow directions in the unconsolidated aquifer (Figure 4) indicate flow at the water table appears to be mostly toward the southwest, with southern components. The flow direction in the shallow unconsolidated aquifer is toward Davy Creek. Apparent groundwater flow direction in the deep unconsolidated aquifer (Figure 5) indicates that flow appears to be toward the south-southwest, similar to the configuration of the shallow unconsolidated aquifer, based on January 2007 groundwater elevation data.

Apparent groundwater flow directions in the bedrock aquifer are shown on Figure 6 and are based on January 2007 groundwater elevation data. A groundwater divide, represented by a set of wells with higher elevations, is present through the center of the site (MW-1D, MW-2D, and MW-12B), with somewhat radial flow toward the west-northwest, southwest, and south from this divide.

The water elevation at Staff Gage 2 (SG-02) was not measured during the January 2007 event because the water surrounding it was frozen. Because of their distance from the site, water elevations from staff gage locations SG-01 and SG-03 are not included in this discussion.

Vertical Gradients

In January 2007, vertical gradients between the shallow and deep unconsolidated aquifers indicate the potential for an upward flow direction, except for crossgradient nests MW-102 and MW-15, where the flow appears to be downward (Table 2). Upward gradients are present for well nests that are situated along Davy Creek (MW-12, MW-105, MW-106, and MW-107), indicating the potential for shallow groundwater to be discharging to Davy Creek.

Gradients between the unconsolidated aquifer and the bedrock aquifer indicate the potential for upward flow along Davy Creek (MW-12 and MW-105) and downward flow in the northern and western portion of the site (MW-3, MW-4, and MW-15) (Table 2). MW-1D, situated approximately 500 feet from Davy Creek also indicates a potential for upward flow between the bedrock and the unconsolidated aquifer.

Potential Receptors

Potential human and ecological receptors for the site's groundwater include Davy Creek and its associated wetland area, private water supply wells, and residential structures. Davy Creek and its associated wetland area are likely connected to shallow groundwater from the unconsolidated aquifer in the area.

Private water supply wells closest to the site are located west and northwest of the site (Figure 1). These private wells are screened in the Maquoketa shale and upper portions of the Galena-Platteville dolomite, and recent investigation has identified the presence of site contaminants of concern (COCs) (CVOCs) and other COCs (methyl tert butyl ether [MTBE] from an unknown source).

Sampling and Analysis

The NA process is being monitored and evaluated at the site as a stand-alone remedy for compliance with state and federal drinking water regulations. Sample collection and analysis assesses the remaining onsite and downgradient groundwater CVOC concentrations. The monitoring program is summarized for each monitoring and private well in Table 3.

The evaluation of NA at the site has been expanded for 2006 and beyond to include wells screened in the bedrock aquifer and additional wells screened in the shallow and deep unconsolidated aquifers. Available sample locations for the project include private water supply wells, former extraction wells, groundwater monitoring wells, drive point piezometers, and surface water (wetland and Davy Creek). The sample locations are shown on Figures 1 and 2. Sample locations for compliance and NA monitoring are indicated in Table 3 and discussed below. (Note that some of the locations were sampled for both types of monitoring.)

Figure 3 is a conceptual depiction of the site's aquifer units and shows the relative depth where monitoring wells are placed within the units. Three aquifers are monitored at this site: the shallow unconsolidated aquifer, the deep unconsolidated aquifer, and the shallow bedrock aquifer. The unconsolidated deposits beneath the site make up the shallow and deep unconsolidated aquifers and consist of between 28 and 55 feet of silty sand and clay, with an intermittent presence of silt and/or clay fill. A relatively thin, discontinuous clay unit often separates the shallow and deep unconsolidated aquifers at various locations beneath the site. Monitoring wells in the unconsolidated aquifers include the more "shallow" or water table zone wells and the "deep" wells that monitor the lower portion of the unconsolidated deposits. Wells are designated as either "S" for shallow or "D" for deep in the unconsolidated aquifer.

The shallow bedrock material consists of the Maquoketa shale, but has discontinuous interlayered dolomite beds and fractures that can yield water. Monitoring wells generally are designated as "B" in the shallow bedrock aquifer, except for MW-1D, MW-2D, MW-3D, and MW-4D. These older monitoring wells were installed in 1988 and are screened to sample the bedrock material, even though they are designated with the suffix "D". Table 3 provides a complete listing of the monitoring network and the corresponding aquifer each well is screened across.

Compliance Monitoring of Volatile Organic Compounds

The compliance sampling locations include site monitoring wells, private water supply wells, and surface water for assessing groundwater quality related to state and federal drinking water and surface water standards, respectively. Compliance sample locations include 11 private water supply wells (within 250 feet of the site); 27 groundwater monitoring wells in the upgradient, sidegradient, and downgradient portions of the plume; and three staff gage locations for collecting volatile organic compounds (VOCs) in surface water samples (Table 3 and Figure 1). The 27 groundwater compliance wells are screened in the three hydrogeologic units as follows: 7 bedrock wells, 10 deep aquifer wells, and 10 shallow aquifer wells.

Natural Attenuation Monitoring

Background

Many organic compounds can be attenuated naturally to nonregulated end products. Monitoring and documentation of these processes is known as monitored natural attenuation (MNA). In anaerobic (chemically reducing) environments, the main degradation mechanism for effective CVOC attenuation is reductive dechlorination, which involves the sequential replacement of chlorine atoms on the alkene molecule by hydrogen atoms. For trichloroethene (TCE), a site constituent, the sequential dechlorination proceeds to 1,2-dichloroethene (1,2-DCE), preferentially the cis-isomer, and to VC, and finally to ethene. For 1,1,1-trichloroethane (1,1,1-TCA), also a site constituent, the degradation products include 1,1-dichloroethene (1,1-DCE), VC, and ethene; or 1,1-dichloroethane (1,1-DCA), chloroethane, and ethanol—with the final product in both pathways being carbon dioxide.

The Office of Solid Waste and Emergency Response (OSWER) Directive 9200.4-17 (1999) identifies three lines of evidence that can be used to demonstrate the occurrence of the NA of CVOC compounds, consisting of the following:

- Documented loss of primary contaminants at the field scale
- Documented presence and distribution of geochemical and biochemical indicators of NA
- Direct microbiological evidence

For this project, NA is being evaluated using the first two lines of evidence.

Natural Attenuation Analytes and Wells

Inorganic parameters to evaluate NA processes were analyzed in addition to the VOC data collected during compliance sampling. The NA parameters were collected from groundwater in monitoring wells at six upgradient locations, four near-source locations, and 13 downgradient locations (Table 3 and Figure 1 or 2). Of the 23 well sampling points, eight are screened in the shallow unconsolidated aquifer, eight are screened in the deep unconsolidated aquifer, and seven are screened in the bedrock aquifer. In addition, NA parameters were collected from surface water at three staff gage locations. The locations of the sampling points will monitor NA processes throughout the plume and within all three hydrogeologic units.

Sampling Activities

Sampling and analysis was completed in accordance with the FSP and the field operation plans (FOPs) therein (CH2M HILL 2006a). Water levels were measured and recorded during the first day of the sampling event for all accessible groundwater monitoring wells, drive point piezometers, and staff gages. Groundwater elevations recorded during the January 2007 sampling event are shown on Table 1. The measured water levels and well depths (described in FOP No. 2—Groundwater Level Measurements) were used to calculate a purge volume and to assess the thickness of solids deposited at the bottom of the well screen. Wells were purged and sampled as described in FOP No. 1—Low-Flow Groundwater Sampling Procedures. Groundwater field parameters were monitored with a multimeter and flow-through cells during well purging. The wells were purged continuously until monitored field parameters stabilized within the limits specified in FOP No. 1—Low-Flow Groundwater Sampling. Procedures for field filtering all groundwater samples were followed according to FOP No. 5—Field Filtering Samples. Nondedicated sampling equipment was decontaminated between locations using FOP No. 6—Field Sampling Equipment Decontamination. Samples were collected immediately following the stabilization of groundwater field parameters. The samples were processed, packaged, and shipped on the day of collection.

Private well locations were sampled as part of January 2007 compliance monitoring in accordance with FOP No. 10—Private Residential Well Groundwater Sampling Procedures (CH2M HILL 2006a). Due to variable access points for sampling, and the various treatment trains of the private wells, field parameters cannot be used as an indication of proper purging prior to sampling. Private well taps were opened for 10 to 15 minutes prior to sampling. Each sample was collected from a tap before any water softeners or other aesthetic water conditioning occurs.

Collection of three surface water samples for regulatory compliance and NA parameters was planned for locations coincident with three staff gages. Surface water samples were collected from locations SW-01 and SW-03 in January 2007. The water at location SW-02 was frozen and therefore could not be sampled during the January 2007 event.

Groundwater monitoring results for both regulatory compliance and NA monitoring wells are summarized in Table 4, including a side-by-side comparison for data collected since October 2004 (October 2004, July 2005, October 2005, January 2006, March 2006, and January 2007). Measured depths to groundwater and resultant groundwater elevations are included in Table 1.

Data Management

USEPA software Forms II Lite 5.1 was used in the field to enter field sample data and create the chain-of-custody forms. The USEPA copies of the chains-of-custody were used to enter sample information into the sample tracking spreadsheet. Upon receipt of the samples, the laboratory transmitted an electronic sample receipt, which was then compared to the chain-of-custody and entered into the sample tracking spreadsheet. Within 21 days of receipt of the last sample, the laboratory provided CH2M HILL with an electronic data deliverable (EDD), one hard copy data package, and a portable document format (.pdf) file of the data package. Prior to 2007, CH2M HILL validated the NA data after receipt and a completeness check. The hard copy data package was sent to USEPA for validation of the compliance sample data. Beginning in January 2007, all laboratory data were sent to USEPA for validation. After the data validation was completed, the validation summaries were reviewed by the CH2M HILL project chemist, and the qualifiers were entered into the EQuIS database.

Data Validation

Before 2007, USEPA performed data validation on the compliance sample data and CH2M HILL performed the data validation on the NA data. Beginning in January 2007, all sample analytical data were validated by USEPA. The CH2M HILL project chemist performed data validation on the NA sample analytical data in a manner consistent with *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review* (October 1999) and *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review* (July 2002). Compliance and NA data were both deemed valid for use, with the exceptions noted in data validation memorandums produced for each sampling event. Data validation memorandums for January 2007 and March 2006 are included as Appendix A. Previous memorandums have been provided to WDNR and USEPA, and are on file in the project archives.

Data Evaluation

The most recent assessment of groundwater quality at the site was performed by CH2M HILL in January 2007 to evaluate NA processes occurring in unconsolidated aquifer groundwater at and downgradient from the former OECI facility. During January 2007, groundwater samples were collected from 19 monitoring wells and 10 private wells. Two surface water samples were collected at Davy Creek. The surface water and groundwater was analyzed for VOCs, NA parameters, and field parameters. Groundwater collected from each private well was analyzed for VOCs.

Volatile Organic Compound Distribution

The groundwater analytical data for monitoring events since October 2004 is included in Table 4 for monitoring wells, Table 5 for private wells, and Table 6 for surface water. Presented below is a description of the current distribution of VOCs based on January 2007 data.

Shallow Unconsolidated Aquifer Monitoring Wells

In general, the distribution of parent products, TCE and 1,1,1-trichloroethane (1,1,1-TCA), in the shallow aquifer in January 2007 extends from the southern portion of the site toward the wetland area, corresponding with the groundwater flow direction in the shallow unconsolidated aquifer (Figure 7). TCE was detected at the highest concentrations in the shallow unconsolidated aquifer from groundwater samples collected at points immediately beneath or directly south of the former OECI facility (MW-103S, MW-12S, and MW-105S), consistent with pre-2004 samples (CH2MHILL 2006b). Tetrachloroethene (PCE) concentrations are much lower than TCE, and were only observed above detection limits in the shallow unconsolidated aquifer at MW-103S and MW-13S. There were no detections of parent compounds in upgradient well MW-4S or in sentinel wells MW-106S and MW-107S. TCE was detected at MW-1S, which is slightly upgradient but directly adjacent to the site (0.18 micrograms per liter [µg/L]).

Degradation products VC and cis-1,2-DCE were detected as indicated on Figure 8 primarily on and directly south (downgradient) of the facility in the shallow unconsolidated aquifer in January 2007, consistent with where parent compounds were detected and consistent with earlier sampling results (CH2M HILL 2006b). cis-1,2-DCE (0.26 µg/L) was detected in groundwater at MW-1S, which is slightly upgradient of the site. Groundwater collected at MW-16S shows the highest concentrations of both cis-1,2-DCE and VC. There were no detections of either cis-1,2-DCE or VC in groundwater from upgradient well MW-4S or in from sentinel wells MW-106S and MW-107S. TCE was detected at MW-1S, which is slightly upgradient but directly adjacent to the facility (0.18 µg/L).

VOCs were not detected in groundwater collected at well MW-107S, situated across Davy Creek, strengthening the theory that the wetland area and Davy Creek act as a discharge boundary for shallow groundwater.

The distribution of 1,1,1-TCA concentrations are similar to the TCE distribution in the shallow unconsolidated aquifer. 1,1,1-TCA was detected in groundwater collected at MW-15S, MW-13S, MW-12S, MW-103S, and MW-105S. The degradation product 1,1-DCA was detected at least once in groundwater collected from most of the same shallow wells onsite and downgradient of the facility with the exception of MW-105S, and it was detected at MW-16S where 1,1,1-TCA was not present. Chloroethane is infrequently detected across the site and across all sampling rounds, and was only detected in groundwater at one shallow unconsolidated aquifer monitoring well: MW-103S at an estimated concentration of 0.37 µg/L. The presence of the degradation products of 1,1,1-TCA indicate that natural degradation is occurring for this compound in the shallow aquifer.

MTBE was detected at concentrations below the NR 140 PAL in groundwater from some of the shallow wells around the perimeter of the former OECI facility (MW-1S, MW-13S, and MW-105S); however, it was not detected in shallow wells on the site. This suggests that this constituent is not site related. Historical information from previous reports also does not indicate that MTBE was used or stored at this site, nor was it detected in any sampling performed prior to October 2004.

The following shallow aquifer well constituents exceed the NR 140 PAL:

- MW-12S (TCE; 1,1,1-TCA; cis-1,2-DCE; VC)
- MW-16S (cis-1,2-DCE; VC)
- MW-103S (TCE; PCE; 1,1,1-TCA; cis-1,2-DCE; VC)
- MW-105S (TCE; cis-1,2-DCE; VC)

The following shallow aquifer well constituents exceed the NR 140 Enforcement Standard (ES):

- MW-12S (TCE; cis-1,2-DCE; VC)
- MW-16S (cis-1,2-DCE; VC)
- MW-103S (TCE, VC)

- MW-105S (TCE; cis-1,2-DCE; VC)

COCs have not been detected in groundwater collected at sentinel wells MW-106S and MW-107S since monitoring began at these locations.

Deep Unconsolidated Aquifer Monitoring Wells

TCE was detected at the highest concentrations in groundwater collected from the deep unconsolidated aquifer at similar locations as in the shallow aquifer (beneath the site or downgradient of the facility) (Figure 9).Based on January 2007 groundwater results, TCE concentrations are highest in the deep unconsolidated aquifer at MW-103D (1,100 μg/L), immediately beneath the former facility area. TCE concentrations are almost an order of magnitude less at MW-5D, which is located southeast and slightly downgradient. TCE also was detected in groundwater collected at the crossgradient monitoring wells in the deep unconsolidated aquifer to the west of the site (MW-102D and MW-15D). These concentrations decreased significantly with distance from the site.

PCE was not detected in the deep unconsolidated aquifer in January 2007, nor has it been historically detected in this aquifer.

Degradation products VC and cis-1,2-DCE were detected in wells onsite and downgradient of the facility, in much the same pattern as TCE (Figure 10). The highest concentration of VC in the deep unconsolidated aquifer occurred in groundwater from MW-105D (0.70 μg/L), and the highest concentration of cis-1,2-DCE occurred in MW-5D (110 μg/L). Groundwater from crossgradient wells MW-102D and MW-15D also contain VC and cis-1,2-DCE, but the concentration of these degradation products increases with distance from the facility. Comparison of the concentrations of these breakdown products to TCE (parent compound) concentrations in these wells provides further evidence of active biodegradation.

The distribution of 1,1,1-TCA concentrations in deep unconsolidated aquifer groundwater is similar to the TCE distribution, except with a more limited extent and lower concentrations. 1,1,1-TCA was only detected in the deep unconsolidated aquifer wells that are either onsite or directly downgradient. These wells are MW-103D (210 μg/L) and MW-12D (3.9 μg/L). Degradation products 1,1-DCA and 1,1-DCE were detected in deep unconsolidated aquifer wells MW-15D, MW-102D (1,1-DCE only), MW-103D, and MW-105D. Chloroethane was only detected in groundwater collected at MW-103D (0.98J μg/L) and MW-105D (1.7 μg/L). The presence of the degradation products of 1,1,1-TCA indicate that natural degradation is occurring for this compound in the deep unconsolidated aquifer.

MTBE was detected at concentrations below the NR 140 PAL in some of the deep unconsolidated aquifer wells. The deep aquifer wells where MTBE was detected are situated around the southern perimeter of the site (MW-102D, MW-15D, MW-13D, and MW-5D). Because there are no detections in groundwater from shallow unconsolidated aquifer wells, it is likely that MTBE is not site related.

The following deep unconsolidated aquifer well constituents exceeded the NR 140 PAL:

- MW-102D (TCE; cis-1,2-DCE; VC)
- MW-15D (TCE, VC)
- MW-12D (TCE, VC)

- MW-13D (VC)
- MW-103D (TCE; 1,1,1-TCA; cis-1,2-DCE)
- MW-105D (TCE, VC)
- MW-5D (TCE; cis-1,2-DCE)

The following deep unconsolidated aquifer well constituents exceeded the NR 140 ES:

- MW-12D (VC)
- MW-15D (TCE)
- MW-103D (TCE; 1,1,1-TCA)
- MW-105D (TCE, VC)
- MW-5D (TCE; cis-1,2-DCE)

Groundwater collected from sentinel wells MW-106D and MW-107D have had no confirmed (two consecutive detections recorded) VOC detections since monitoring began at these locations.

Bedrock Wells—Monitoring and Private

TCE was only detected at low concentrations (0.065 and 0.066 µg/L) in groundwater collected at monitoring wells MW-3D and MW-105B during January 2007. The groundwater collected at these same wells contained TCE degradation products VC and cis-1,2-DCE. MW-105B contained higher levels of VC and cis-1,2-DCE than MW-3D (VC not detected). PCE was not detected in any bedrock wells during January 2007 sampling.

The groundwater collected from nine private wells was sampled in January 2007. PW-01 and PW-02 are both apparently upgradient of the site (Figure 6), and neither well had detections of VOCs in the groundwater.

Groundwater collected at the other private wells sampled in January 2007 had relatively low concentrations (near the limits of detection) of VOCs detected. Groundwater from four of the private wells contained TCE at estimated (between the limits of detection and quantitation) concentrations, and groundwater from one private well had a detected TCE concentration of 0.50 µg/L (higher than the January 2007 TCE concentrations detected in site bedrock monitoring wells).

Groundwater collected at four private wells had estimated concentrations of VC, with a highest estimated concentration of 0.046 µg/L at PW-07. Groundwater collected at six private wells contained cis-1,2-DCE at levels higher than the detection limit, with the highest detected at PW-09 (5.7 µg/L).

1,1,1-TCA was not detected in groundwater in any the bedrock aquifer monitoring or private wells (Figure 11); however 1,1-DCA was detected in groundwater during all three sampling rounds (July 2005, January 2006, and January 2007) at MW-105B (0.095J, 0.077J, 0.063J µg/L). Chloroethane was detected once at MW-105B (0.066J). In private bedrock wells, 1,1-DCA was detected at PW-01 during January 2006 sampling (0.041J µg/L) without 1,1,1-TCA; 1,1-DCE; or chloroethane.

The distribution of parent compounds (TCE; 1,1,1-TCA) and degradation compounds (cis-1,2-DCE; VC; 1,1-DCA; 1,1-DCE; chloroethane) present in the groundwater beneath and downgradient of the facility support the first line of evidence that NA is occurring in the bedrock aquifer.

MTBE was detected in groundwater at concentrations below the NR 140 PAL at many of the bedrock monitoring and private wells west of the site. As previously stated, it is believed that the presence of MTBE in the bedrock wells is unlikely to be site related.

The following bedrock aquifer monitoring well constituents in groundwater exceeded the NR 140 PAL (no ES exceedances):

- MW-4D (VC)
- MW-105B (VC)

Those private wells with groundwater exceedances of the NR 140 PAL are as follows:

- PW-03 (TCE)
- PW-11 (VC)
- PW-04 (VC)
- PW-09 (VC)
- PW-07 (VC)

Surface Water

Surface water was sampled in January 2007 at two locations. There were no VOCs detected at the location of SW-01 in January 2006 or in January 2007, the two dates this location has had available water to sample.

Location SW-03, approximately 800 to 1,000 feet downstream and in a sidegradient groundwater flow direction from the site, had detections as follows:

Detections in SW-03 Surface Water

	March 2006	January 2007
1,1,1-TCA[a]	ND	0.089J
1,1-DCA[1]	0.034J	ND
Chloromethane[a]	0.053J	ND
cis-1,2-DCE[a]	0.1J	0.29
TCE[a]	0.17	0.51
Dichlorodifluoromethane	ND	0.074J

[a] Compound detected in site groundwater

Although these compounds have been observed in groundwater at the site (except dichlorodifluoromethane), their detection in the surface water samples obtained from SW-03 is not believed to be a result of the site for the following reasons:

- These volatile compounds would not be expected to persist in a flowing surface water body and be detected 800 to 1,000 feet downgradient from the site.

- This suite of VOCs is not detected in sentinel wells downgradient of the site.

As such, the detections in sample SW-03 may be from an alternative source unrelated to the site. CH2M HILL will continue to attempt surface water sampling from location SW-02 whenever possible.

Contaminant Concentration Trends

Concentration trend plots have been compiled to summarize PCE, TCE, cis-1,2-DCE, and VC trends between 2004 and 2007 for all individual wells in the sampling program. All plots are included in Appendix B. The purpose of this section is to summarize trends for the original CVOCs in the source area (PCE and TCE) and for the primary degradation products of these materials via the reductive dehalogenation process (cis-1,2-DCE and VC). The occurrence and trend of the site constituents are typically described first, followed by a description of the occurrence and trends of the degradation products. Trends are summarized for upgradient wells, onsite/downgradient wells, and sentinel wells for each flow aquifer (shallow, deep, and bedrock). (Sentinel wells are defined as those wells downgradient or crossgradient from the site that are located beyond the groundwater plume and act as the first indicator that the plume is actively migrating beyond the present monitoring well network.) Refer to Figures 1 and 2 for well locations and to Figures 7 to 12 for VOC concentrations of these constituents at each well location.

Shallow Unconsolidated Aquifer

Wells that are apparently upgradient of the site in the shallow unconsolidated aquifer have shown variable CVOC concentrations. MW-4S groundwater has not had detections of PCE, TCE, or degradation products since 2004. MW-1S, at the northeast corner of the site, has shown an increase in TCE since October 2006, although concentrations are at low levels (less than 0.2 µg/L). Parent compounds TCE and PCE are both present in groundwater beneath the location of the former facility (onsite well MW-103S) and continue to produce degradation products. Groundwater from well locations immediately downgradient of the former facility (MW-12S and MW-105S) also has some parent TCE with both cis-1,2-DCE and VC being produced. Further downgradient groundwater (MW-16S) contains only degradation products. No CVOCs have been detected in groundwater from sentinel wells MW-106S and MW-107S since CH2M HILL began monitoring at these locations in 2004. These shallow zone conditions indicate that natural attenuation of CVOCs is ongoing.

Deep Unconsolidated Aquifer

Groundwater from upgradient well MW-14D had low TCE concentrations (0.04 to 0.07 µg/L) detected that may be attributable to an alternate source upgradient of the site. Groundwater sampled from wells situated directly beneath (MW-103D and MW-5D) or downgradient (MW-12D) of the former facility showed increases in TCE concentration in 2005, possibly indicating TCE dissolved phase material moving into this zone during that time period. TCE concentrations returned to pre-2005 levels in 2006 and 2007 sampling. Degradation products are consistently present in groundwater from these onsite/downgradient wells. Crossgradient well MW-15D groundwater had steady TCE concentrations (about 35 µg/L), except for March 2006 (0.17 µg/L—possibly erroneous laboratory results). MW-102D, which is farther to the east, shows lower, steady groundwater concentrations of TCE (less than 1 µg/L) and an increasing concentration of cis-1,2-DCE. The detections of these compounds in groundwater cross gradient to the Site may indicate an alternate source for the compounds.

Groundwater in sentinel wells MW-106D and MW-107D has not shown detections of CVOCs since CH2M HILL began monitoring in 2004, with the exception of TCE (0.039J) in MW-106D in January 2006 that has not been confirmed in recent sampling events.

For all the onsite deep unconsolidated aquifer wells, there are parent compounds present along with the cis-1,2-DCE degradation compound. For wells farther downgradient, there are mostly only degradation compounds present. This situation indicates that NA is ongoing in the deep unconsolidated aquifer.

Bedrock Aquifer

The only upgradient bedrock monitoring well, MW-1D, has had no detectable concentration of VOCs since CH2M HILL begin monitoring at this location in 2004.

Downgradient and Onsite Monitoring Wells. The onsite well MW-3D is a bedrock monitoring well situated directly downgradient and/or onsite. Groundwater sampling results from MW-3D had low concentrations of TCE (0.065J µg/L), cis-1,2-DCE (0.067J µg/L), and MTBE (0.11J µg/L) in January 2007. (As indicated previously, MTBE is thought to be a constituent contributed from an alternate site, upgradient of the site.) Groundwater in MW-12B (downgradient) had one unconfirmed detection of toluene (0.091J) in three rounds of sampling. MW-105B is the only downgradient bedrock well with relatively steady levels of TCE (less than 0.10 µg/L) and degradation products (cis-1,2-DCE and VC). VC was the only constituent detected in MW-4D in January 2006 (0.11 µg/L) and January 2007 (0.043J µg/L).

Private Wells. PW-01, PW-02, and PW-10 had no VOCs detected in groundwater during the sampling period. The remaining private wells have relatively low concentrations of VOCs detected with overall trends through four sampling rounds as follows:

- PW-04 and PW-05 are both situated northwest of the site. Trends in these two wells are similar, namely that cis-1,2-DCE concentrations "spike" to approximately 3 µg/L during January 2006 and decrease thereafter with low concentrations of VC and TCE detected.
- PW-03 and PW-11 also are northwest of the site—PW-03 is west of the PW-04/PW-05 pair and PW-03 is east of that pair. PW-03 and PW-11 both showed steady concentrations of cis-1,2-DCE through all four events, with a possible slight increase. PW-03 has a TCE increase that mirrors the cis-1,2-DCE trend. PW-11 had VC detected at consistent concentrations (less than 0.1 µg/L) during the last two events.
- PW-07 and PW-09 show similar trends to one another and are situated due south of PW-05 and PW-04. These wells both had detections of cis-1,2-DCE at low concentrations, with an increasing trend since January 2006. There also were low concentrations of TCE (0.076J µg/L and 0.11J µg/L, respectively) and VC (0.046J µg/L and 0.040J µg/L, respectively) in January 2007.
- PW-08 is situated close to the site, due west of the southeastern corner of the property. Concentrations in this well showed an overall decreasing trend for both TCE and cis-1,2-DCE, but at low values. In addition, VC was detected once during January 2007 (0.032J µg/L).

The private well trends have either intermittent detections of compounds at relatively low concentrations or have steady, low concentrations. cis-1,2-DCE and/or VC are present with some isolated detections of TCE. Because trend patterns are not evident for groundwater from onsite/nearsite bedrock monitoring wells, and MTBE is detected (apparently not a site constituent), the source of the VOCs in bedrock private wells west of the site may not be attributable to historical activity at the former OECI facility.

A brief search was performed to identify alternate potential source sites upgradient of the site (north of Highway 67/Oak Street). The State of Wisconsin Bureau of Remediation and Redevelopment Tracking System (BRRTS) database was searched, and one potential alternate site for these compounds was identified: Production Enterprises, Incorporated on Highway 67, approximately 0.25 mile upgradient from the site. The BRRTS database lists this site as the source of a chlorinated solvent release, with a high potential risk of groundwater contamination.

VOC Distribution and Trend Summary

In general, the highest concentrations of parent compounds (PCE and/or TCE) are detected onsite or immediately downgradient of the site. Degradation compounds (cis-1,2-DCE and VC) are observed onsite/nearsite, but concentrations of these compounds increase at downgradient locations, and parent compounds are at low concentrations or are not detected. The first line of evidence of NA of CVOCs is supported by the documented loss of primary contaminants through the observation of degradation products (USEPA 1999).

The private well trends are stable or intermittent, and at low levels, with cis-1,2-DCE and/or VC present and some isolated detections of TCE and consistent detections of MTBE in certain wells. The occurrence and distribution of compounds in the private and bedrock wells, including detections of MTBE, indicates that the source of VOCs in bedrock private wells may not be the site. State of Wisconsin database information confirms that potential alternate source sites are situated upgradient of the site (to the north of Highway 67/Oak Street).

Natural Attenuation Analysis

The purpose of this section is to discuss the distribution of geochemical and biochemical indicators of NA. To organize this evaluation, a screening tool was used as described in the *Technical Prootocol for Evaluating Natural Attenuation of Chlorinated Solvents in Ground Water* (Wiedemeier et al. 1998). A scoring system is described in the protocol and used for this site as summarized for each of the recommended parameters in Table 7. Each separate hydrogeologic unit was assigned a score based on the values of the geochemical and biochemical parameters in that unit.

(Note: Many wells did not yield reliable oxidation-reduction potential [ORP] or dissolved oxygen [DO] measurements in January 2007 because of problems with measuring equipment. Therefore, the scoring evaluation utilized ORP values from previous data rounds to assign a score.) DO and ORP were measured during well purging to assess the redox conditions in the groundwater. DO results are extremely variable from measurement to measurement as a result of the sensitivity of this measurement to atmospheric exposure (Table 4). At two points in January 2007, DO levels at shallow wells are higher than 0.5 milligrams per liter (mg/L) and less than 5 mg/L, indicating reductive dechlorination may be inhibited (Wiedemeier et al. 1998). In the deep unconsolidated aquifer, high DO levels were measured at MW-13D and MW-107D, away from the site, indicating VC may be oxidized aerobically there. In the bedrock aquifer, higher DO values are present upgradient (MW-4D), and the amount decreases beneath and just downgradient from the site.

Results of January 2007 field measurements of ORP indicate that most wells are within the range where reductive dechlorination is possible (+50 millivolts and lower) (Wiedemeier et al. 1998) (Table 4). Strong negative values were present in the shallow aquifer downgradient and crossgradient of the site (MW-15S, MW-106S, and MW-13). High negative ORP values were prevalent in the deep unconsolidated aquifer at all locations, and there were similar values in the bedrock wells for ORP, indicating the reductive pathway is likely.

According to Wiedemeier et al. (1998), dissolved iron concentrations greater than 1,000 μg/L indicate that reductive dechlorination may be possible (Table 7). Wells MW-105S, MW-16S, MW-105D, MW-102D, MW-5D, and MW-4D met these criteria in January 2007. MW-16S showed the highest dissolved iron concentration (8,700 mg/L), which is consistent with other evidence suggesting reductive dechlorination is occurring at this location. These higher values in the shallow and deep unconsolidated aquifers are typically immediately beneath or directly downgradient of the site. Bedrock readings were not greater than 1,000 μg/L, except at MW-4D (1,610 μg/L), which is directly downgradient of the former source areas. Other dissolved iron values, farther out from the site boundary, were lower.

Methane is produced by the metabolism of a wide range of organic substrates by methanogenic bacteria. This group of bacteria is known to play a role in CVOC attenuation. Methane was present in the highest concentrations (above 40 μg/L) at MW-105S, MW-16S, MW-105D, MW-105B, MW-15B, and MW-1D, indicating that methanogenic conditions exist at portions of the site (Table 4); however, methane concentrations were below the 500 μg/L level that is optimal for reductive dechlorination (Wiedemeier et al. 1998). All bedrock wells contained between 18 and 440 μg/L of methane. These conditions are not optimal for reductive dechlorination, but are favorable for oxidation of VC (Wiedemeier et al. 1998).

Ethane was detected in MW-16S and MW-105S, both downgradient of the site. Ethane is a final degradation product of TCE, and its presence suggests reductive dechlorination is progressing in some areas downgradient of the site, especially in MW-16S and MW-105S.

During each step of the reductive dechlorination process, chloride is released as a byproduct; therefore, areas of high chloride concentration relative to the background concentration can indicate areas where dechlorination is occurring. Chloride concentrations are generally higher than background in the area of highest CVOC detections (Table 4). In the shallow unconsolidated aquifer, chloride concentrations were highest in MW-105S and MW-16S, downgradient of the site. In the deep unconsolidated aquifer, concentrations were highest in crossgradient wells, MW-102D and MW-15D. In the bedrock aquifer, all downgradient wells showed higher chloride concentrations than the upgradient background concentrations. Chloride concentrations and distribution suggest that some degree of reductive dehalogenation is occurring.

A pH value between 5 and 9 in groundwater provides the optimal range for reductive dechlorination (Wiedemeier et al. 1998), and values were measured in this range for all site wells in each of the three hydrogeologic units.

Using the methods presented by Wiedemeier et al. (1998), data were compared to the preferred concentrations of NA indicator parameters for an overall screening of site conditions. Wells were divided into categories based on the hydrogeologic unit in which they were screened (shallow unconsolidated, deep unconsolidated, and bedrock). This scoring exercise shows that adequate evidence for anaerobic biodegradation is present in all three units (Table 7). Of the three aquifers, the shallow unconsolidated aquifer wells scored slightly higher, followed by deep unconsolidated aquifer wells and then bedrock wells. Therefore, both lines of evidence of NA of CVOCs are supported (OSWER 1999).

BIOCHLOR Modeling

To evaluate NA remediation clean-up times and the travel distances of TCE, cis-1,2-DCE, and VC from the source area of the site, the USEPA analytical solute transport model, BIOCHLOR, was employed. BIOCHLOR is a screening model that simulates remediation by NA of dissolved chlorinated solvents in groundwater. The model's software is a series of macros programmed into a Microsoft Excel spreadsheet and is based on the Domenico analytical solute transport model. This model has the ability to simulate one-dimensional advection, three-dimensional dispersion, linear adsorption, and biotransformation via reductive dechlorination. For the site, the BIOCHLOR Natural Attenuation Decision Support System, Version 2.2 was used. This model includes three different model types:

1. Solute transport without biotransformation,
2. Solute transport with biotransformation modeled as a sequential first-order decay process, or
3. Solute transport with biotransformation modeled as a sequential first-order decay process with two different reaction zones (that is, each zone has a different set of rate coefficient values).

Model Assumptions

The model input parameters are a combination of site-specific measurements and, when site-specific information is not available, generic values provided by relevant literature (Table 8). The simulated migration pathway was from the source area southward toward Davy Creek, consistent with groundwater flow directions observed in the unconsolidated aquifer. This pathway begins at the source area located in the southeast corner of the former operation area to approximately 250 feet downgradient within the Davy Creek wetland area. The model simulation was run for the entire unconsolidated aquifer system and utilized the highest concentrations observed for a given well nest. Groundwater analytical results from January 2007 wells along this pathway (MW-103S, MW-105D, and MW-16S) were used to calibrate the model to site conditions.

Based on the data provided in a previous report (RMT 2004), the highest known concentration in groundwater at the site for TCE (16,000 µg/L) was used as the initial source concentration. Based on the descriptions of the source area in previous reports and the approximate saturated thickness of the unconsolidated aquifer, the source area plume was assumed to be 150 feet wide and 26 feet thick.

Modeling Procedure and Results

Hydraulic and physical data collected at the site were used in conjunction with appropriate literature values to provide inputs to the model (Table 8). To calibrate the model to recent analytical results, the half-lives for TCE, cis-1,2-DCE, and VC were systematically adjusted until modeled concentrations along the plume axis came close to predicting the January 2007 concentrations. Upon calibration, half-life values were all found to fall within the typical ranges cited in the BIOCHLOR Users Manual for TCE, cis-1,2-DCE, and VC (Aziz et al. 2000). The site's source release was modeled as a continuous and constant release of TCE, beginning in 1957, when operations began at the site. A model run was performed with the plume as a decaying source (that is, removal of the source); however, this scenario produced a poor fit to the current analytical data.

Model results generally predicted the January 2007 concentrations best when a Type 2 model was used. The model generally predicted the relative concentrations and trends until the modeled plume was beneath the wetland area (near MW-16S). Attempts to vary the input parameters within the established measured site values or literature values were unsuccessful in predicting the concentrations at the wetland area monitoring location. This may be a result of one or more factors:

- Simplified assumptions inherent with using the model (simple groundwater flow and uniform hydrogeologic conditions),
- Complex site conditions, including presence of vertical gradients and the increased anaerobic conditions present in the wetland area, and/or
- Uncertainties in model input values that relate to the source release and size.

Using the calibrated Type 2 model, a simulation of concentrations of TCE, cis-1,2-DCE, and VC beginning in 1957 (year 1 in the model) were projected into the future to see how the plume's dimensions change to evaluate potential cleanup times. Because the use of a continuous source in the model obtained the best fit with the groundwater monitoring data, the model predicts a plume expansion in the future, and cleanup times cannot be predicted. While plume expansion does continue downgradient, it does so at a very slow rate of approximately 5 feet per 10 years. At site wells MW-105D and MW-16S, concentrations appear to reach steady-state conditions within 150 years from the present (year 200 in the model).

The use of BIOCHLOR in estimating CVOC concentrations is recommended only as an "order of magnitude" guide for site decisions due to the complex hydraulic nature of the site and unknowns regarding the dimensions and timing of the release.

Conclusions

Based on the information obtained during previous and current investigations, the following conclusions can be made:

- Source reduction activities have been previously performed at the site and include the removal of the former lagoon sediment and sludge, contaminated soil, and contaminated sediment in the wetlands around Davy Creek and the operation of a groundwater extraction system.

- October 2004, July 2005, and October 2005 data showed similar groundwater concentrations as those measured in the previous sampling round of April 2003, when the groundwater extraction system was in operation, suggesting a relatively stable post-extraction plume. Data from 2006 and 2007 present continued evidence that NA is occurring. Evidence for NA continues to be strongest at shallow well locations downgradient of the site.

- Chlorinated compounds, including TCE and VC, continue to be detected in groundwater from downgradient bedrock wells and private wells. Although concentrations of VOCs in private wells are low (all below the ES and many below the PAL), detections have persisted since CH2M HILL began sampling the private wells in July 2005. Previous detection limits for VC were not low enough to detect concentrations prior to 2005. Concentrations and flow patterns in the shallow and deep unconsolidated aquifers indicate there may be alternate sources of CVOCs upgradient of the site.

- The VOC plume is not migrating beyond its previous extent in the shallow and deep unconsolidated aquifers. Trends are not as clear in private bedrock wells because historical detection limits were not low enough to be below the State of Wisconsin NR 140 PAL.

- Both the first and second lines of evidence as outlined in OSWER (1999) are present to support that NA is ongoing at the site. The first line of evidence is documented loss of primary contaminants at the field scale—TCE concentrations are steady overall and degradation products such as 1,2-DCE and VC are present in all three hydrogeologic units. The second line of evidence is documented presence and distribution of geochemical and biochemical indicators of NA including conventional parameters such as chloride, sulfate, and sulfide and field parameters such as ORP, DO, and pH.

- Screening for evidence of anaerobic biodegradation processes based on the method of Wiedemeier et al. (1998) was performed for the site, and screening results indicate adequate evidence for NA by anaerobic biodegradation is present within all three studied portions of the groundwater flow system (shallow unconsolidated, deep unconsolidated, and bedrock aquifers).

- BIOCHLOR transport and decay modeling was performed using available current and historical site data. BIOCHLOR modeling attempted for this project was not able to perform cleanup calculations because the model simulations had to be run assuming a continuous source in order to calibrate to site data; however, plume expansion as predicted using the modeled continuous source appears to be minimal.

- MTBE was detected in downgradient shallow and deep unconsolidated aquifer wells, but not in onsite wells. MTBE also was detected in private bedrock wells and bedrock monitoring wells west of the site. There are several businesses north of the site which may have handled this compound as a component of gasoline. Because of the lack of

MTBE in onsite shallow unconsolidated aquifer monitoring wells, this constituent does not appear to be related to the site.

- The contaminant occurrence and distribution in the private and bedrock wells, including detection of MTBE, indicates that the source of VOCs in bedrock private wells may not be the site. A brief WDNR BRRTS database search was performed to identify alternate potential source sites upgradient of the site. One potential alternate source for these compounds was identified: Production Enterprises, Incorporated on Highway 67, approximately 0.25 mile upgradient from the site. The BRRTS database lists this site as the source of a chlorinated solvent release and a high potential risk of groundwater contamination. MTBE could be contributed upgradient by a number of gasoline and auto repair-type facilities.

Recommendations

Quarterly groundwater and surface water monitoring should continue and NA should continue as a remediation strategy for the site because evidence supports that NA is occurring. CH2M HILL also recommends that USEPA update the owners of the private bedrock wells with the most recent results for the private bedrock well water analysis. In addition, a contingency plan should be prepared to outline response actions in the event that the COC concentrations in the private bedrock wells meet or exceed the NR 140 ES.

Potential offsite sources of VOCs in private bedrock wells, including MTBE, should be confirmed by drive-by reconnaissance, owner interviews, interviews with state and local representatives, and file review. Addresses of these potential source businesses should be confirmed and the locations specifically noted on a map. This information will supplement future data evaluation, enhance the conceptual site model, and allow for evaluation of potential offsite sources.

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Tables

TABLE 1
Groundwater Elevations--January 2007
2007 Annual Groundwater Report and Evaluation of Monitored Natural Attenuation
OECI Site

Well ID	Easting	Northing	Top of Casing (TOC) Elevation (ft amsl)	Groundwater Depth (measured from TOC)	Groundwater Elevation January 2007 (ft amsl)
MW-1S	2394259.30	445973.14	853.42	5.62	847.80
MW-1D	2394252.78	445978.12	853.14	5.31	847.83
MW-2D	2393793.67	445926.71	852.36	4.41	847.95
MW-3S	2393738.44	446036.84	853.39	6.35	847.04
MW-3D	2393741.30	446042.16	853.51	7.05	846.46
MW-4S	2393935.52	446192.21	854.58	6.81	847.77
MW-4D	2393929.17	446196.40	854.63	7.49	847.14
MW-5	2394005.19	445775.88	849.07	Well damaged	--
MW-5D	2394048.17	445747.95	848.80	2.41	846.39
MW-9S	2394125.35	445855.57	851.57	4.52	847.05
MW-12S	2393695.99	445828.83	849.17	4.07	845.10
MW-12D	2393703.25	445824.80	848.31	2.22	846.09
MW-12B	2393701.06	445830.86	849.40	3.26	846.14
MW-13S	2393538.15	445837.51	850.91	4.95	845.96
MW-13D	2393542.81	445839.55	850.02	4.00	846.02
MW-14D	2393819.63	446234.88	850.58	Well buried-inaccessible	--
MW-15S	2393573.85	446061.45	854.68	8.09	846.59
MW-15D	2393570.31	446060.63	855.30	9.01	846.29
MW-15B	2393576.76	446059.53	854.35	8.73	845.62
MW-16S	2393819.67	445628.30	847.90	2.79	845.11
MW-101S	2393769.38	446158.18	851.24	3.79	847.45
MW-101B	2393773.61	446162.03	851.08	Well buried-inaccessible	--
MW-102S	2393397.36	446152.77	853.65	7.00	846.65
MW-102D	2393401.90	446150.01	853.70	7.41	846.29
MW-103S	2393960.50	445837.62	851.84	5.34	846.50
MW-103D	2393956.14	445840.14	851.97	5.46	846.51
MW-104S	2394184.43	445744.90	850.56	Well cover damaged-inaccessible	--
MW-104D	2394181.04	445740.67	850.57	Well cover damaged-inaccessible	--
MW-105S	2393974.30	445666.24	849.01	3.39	845.62
MW-105D	2393972.02	445661.60	848.90	2.88	846.02
MW-105B	2393970.39	445657.12	848.90	2.78	846.12
MW-106S	2393207.21	445898.99	848.92	3.69	845.23
MW-106D	2393210.37	445895.85	849.01	2.90	846.11
MW-107S	2393899.31	445355.98	848.66	3.02	845.64
MW-107D	2393909.90	445352.34	848.64	2.68	845.96

ft amsl = feet above mean sea level

TABLE 2

Vertical Gradient Summary - January 2007

2007 Annual Groundwater Report and Evaluation of Monitored Natural Attenuation

OECI Site

Well Nest	Screen Midpoint Shallow	Screen Midpoint Deep	Screen Midpoint Bedrock	GW Elev. Shallow - Jan 2007	GW Elev. Deep - Jan 2007	Unconsolidated Aquifer Vertical Gradient (ft/ft)	GW Elev. Unconsolidated - Jan 2007	GW Elev. Bedrock - Jan 2007	Vertical Gradient (ft/ft)
1	842.62		806.04				847.80	847.83	-0.0008
3	844.59		810.51				847.04	846.46	0.0170
4	844.78		809.73				847.77	847.14	0.0180
5	841.07	825.30		Well Damaged	846.39	NA			
12	841.17	827.81	810.90	845.10	846.09	-0.074	846.09	846.14	-0.003
13	842.91	823.52		845.96	846.02	-0.003			
15	843.18	818.30	799.35	846.59	846.29	0.012	846.59	845.62	0.051
101	843.24		804.58				847.45	NA	NA
102	842.65	807.20		846.65	846.29	0.010			
103	842.84	830.47		846.50	846.51	-0.001			
104	840.56	825.07		NA	NA	NA			
105	841.01	824.40	807.40	845.62	846.02	-0.024	845.62	846.12	-0.029
106	838.92	797.51		845.23	846.11	-0.021			
107	835.62	818.24		845.64	845.96	-0.018			

Note: Negative values for vertical gradients indicate upward movement. Positive values indicate downward movement.

NA = Not Available

All elevations in feet above mean sea level

TABLE 3

Monitoring Program Summary
2007 Annual Groundwater Report and Evaluation of Monitored Natural Attenuation
OECI Site

Well Name/Location	Monitoring Zone	Water Level Measurement Collected	Compliance Sampling (VOC)	Natural Attenuation Sampling (Conv. & Diss gases)
Water Supply Wells				
PW-01	GW-Upper bedrock		X	
PW-02	GW-Upper bedrock		X	
PW-03	GW-Upper bedrock		X	
PW-04	GW-Upper bedrock		X	
PW-05	GW-Upper bedrock		X	
PW-06	GW-Upper bedrock		X	
PW-07	GW-Upper bedrock		X	
PW-08	GW-Upper bedrock		X	
PW-09	GW-Upper bedrock		X	
PW-10	GW-Upper bedrock		X	
PW-11	GW-Upper bedrock		X	
Site Bldg. Well (DW-01)	GW-Bedrock		X	
SUBTOTAL			12	
Monitoring Wells				
MW-1S	GW-Shallow unconsolidated	X	X	X
MW-1D	GW-Upper bedrock	X	X	X
MW-2D	GW-Upper bedrock	X		
MW-3S	GW-Shallow unconsolidated			
MW-3D	GW-Upper bedrock	X	X	X
MW-4S	GW-Shallow unconsolidated	X	X	X
MW-4D	GW-Upper bedrock	X	X	X
MW-5	GW-Shallow unconsolidated			
MW-5D	GW-Deep unconsolidated	X	X	X
MW-9S	GW-Shallow unconsolidated	X		
MW-12S	GW-Shallow unconsolidated	X	X	X
MW-12D	GW-Deep unconsolidated	X	X	X
MW-12B	GW-Upper bedrock	X	X	X
MW-13S	GW-Shallow unconsolidated	X	X	X
MW-13D	GW-Deep unconsolidated	X	X	X
MW-14D	GW-Deep unconsolidated	X	X	X
MW-15S	GW-Shallow unconsolidated	X	X	X
MW-15D	GW-Deep unconsolidated	X	X	X
MW-15B	GW-Upper bedrock	X	X	X
MW-16S	GW-Shallow unconsolidated	X	X	X
MW-101S	GW-Shallow unconsolidated	X		
MW-101B	GW-Upper bedrock	X	X	X
MW-102S	GW-Shallow unconsolidated	X		
MW-102D	GW-Deep unconsolidated	X	X	X
MW-103S	GW-Shallow unconsolidated	X	X	X
MW-103D	GW-Deep unconsolidated	X	X	X
MW-104S	GW-Shallow unconsolidated	X		
MW-104D	GW-Deep unconsolidated	X		
MW-105S	GW-Shallow unconsolidated	X	X	X
MW-105D	GW-Deep unconsolidated	X	X	X
MW-105B	GW-Upper bedrock	X	X	X
MW-106S	GW-Shallow unconsolidated	X	X	
MW-106D	GW-Deep unconsolidated	X	X	
MW-107S	GW-Shallow unconsolidated	X	X	
MW-107D	GW-Deep unconsolidated	X	X	
SUBTOTAL		33	27	23

TABLE 3

Monitoring Program Summary
2007 Annual Groundwater Report and Evaluation of Monitored Natural Attenuation
OECI Site

Well Name/Location	Monitoring Zone	Water Level Measurement Collected	Compliance Sampling (VOC)	Natural Attenuation Sampling (Conv. & Diss gases)
Drive Point Piezometers				
P-01	SW	X		
P-02	SW	X		
P-03	SW	X		
SUBTOTAL		3		
Staff Gauges				
SG-01	SW	X	X	X
SG-02	SW	X	X	X
SG-03	SW	X	X	X
SUBTOTAL		3	3	3
TOTAL		39	42	26

(1) Compliance sampling includes the analysis of VOCs. Water levels would be taken at all accessible monitoring wells, drive point piezometers, and staff gauges. Semiannual sampling will be performed.

(2) Natural Attenuation sampling includes the analysis of VOCs and natural attenuation parameters (nitrate, diss. Managnese, total and diss. Iron, sulfate, sulfide, methane, ethene, ethane, chloride, alkalinity and soluble organic carbon) and the measurement of field parameters (temperature, pH, specific conductivity, dissolved oxygen, and oxidation reduction potential). Water levels would be taken at all accessible monitoring wells, drive point piezometers, and staff gauges. Quarterly sampling will be performed to evaluate seasonal trends in natural attenuation parameters for a 2-year period.

(3) Surface water monitoring will be performed for the same analysis and frequency as NA groundwater sampling. In addition, Orthophosphate and ammonia will be performed on surface water samples.

GW-Groundwater

SW-Surface water

TABLE 4

Field and Analytical Results—Groundwater Monitoring Well Sampling

October 2004, July 2005, October 2005, January 2006, March 2006, and January 2007

2007 Annual Groundwater Report and Evaluation of Monitored Natural Attenuation

OECI Site

				MW-1S						MW-1D	MW-3D	MW-4S	MW-4D			MW-5D			MW-12B			MW-12S						MW-12D					
Constituent	**Units**	**WAC NR 140 PAL**	**WAC NR 140 ES**	**05CA05-01, 02 Oct 04**	**05CA40-08, 09 Jul 05**	**06CA01-26, 27 Oct 05**	**06CD09-26, 27 Jan 06**	**06CD16-08, 09 Mar 06**	**07CE18-14, 15 Jan 07**	**07CE18-16, 17 Jan 07**	**07CE18-27, 28 Jan 07**	**07CE18-10, 11 Jan 07**	**05CA40-13 Jul 05**	**06CD09-35 Jan 06**	**07CE18-12, 13 Jan 07**	**05CA40-10 Jul 05**	**06CD09-49 Jan 06**	**07CE18-29, 30 Jan 07**	**05CA40-43 Jul 05**	**06CD09-38 Jan 06**	**07CE18-77, 78 Jan 07**	**05CA05-07, 08 Oct 04**	**05CA40-46, 47 Jul 05**	**06CA01-07, 08 Oct 05**	**06CD09-36, 37 Jan 06**	**06CD16-10, 11 Mar 06**	**07CE18-67, 68 Jan 07**	**05CA05-05, 06 Oct 04**	**05CA40-44, 45 Jul 05**	**06CA01-05, 06 Oct 05**	**06CD09-30, 31 Jan 06**	**06CD16-08, 09 Mar 06**	**07CE18-65, 66 Jan 07**
Field Parameters																																	
Dissolved Oxygen (DO)	mg/L			1.82	28.8%	0.53	2.53	0.54	1.77	0.65	1.82	0.68	0.92	0.51	2.49	10.9%	-0.21	0.63	10.2%	0.59	NR	0.34	6.5%	1.32	0.47	0.59	0.87	0.18	7.6%	3.51	0.77	0.25	NR
Oxidation Reduction Potential (ORP)	millivolts			73.5	214.6	135.1	179.4	121.6	-302.9	-261.1	-105.3	49.4	-55.7	-77.9	-109.6	28.6	-25.4	-66.7	29.8	25.6	-258.1	14.6	68.7	324	204.9	48.8	7.7	-81.6	-71.7	-43.5	-54.8	-31.6	-336.2
pH	pH units			6.93	6.51	6.64	7.04	6.78	7.03	7.55	7.47	6.90	7.81	7.02	7.41	6.51	7.12	7.26	7.77	7.46	7.74	7.26	7.15	4.62	7.19	7.25	7.29	7.33	7.08	6.37	7.56	7.05	7.18
Specific Conductivity	mmhos/cm			0.956	0.668	0.857	1.369	1.372	1.219	0.643	1.038	1.447	0.955	0.959	1.174	2.364	2.208	1.286	1.116	0.933	1.146	1.522	1.180	1.297	1.367	1.251	1.410	1.587	1.522	1.636	1.712	1.723	1.469
Temperature	deg c			16.34	15.88	17.78	9.54	7.24	7.95	6.77	6.50	7.85	11.97	9.64	8.74	13.53	10.26	7.87	17.40	8.18	8.11	12.84	13.76	15.15	6.77	6.63	6.81	11.05	13.52	12.28	7.55	8.08	8.02
Depth to water	feet			8.56	8.24	9.66	7.93	5.60	5.62	5.31	7.05	6.81	9.78	10.19	7.49	5.05	3.90	2.41	5.69	4.73	3.26	5.47	5.69	6.43	4.63	4.07	4.07	4.39	4.80	5.66	3.65	2.45	2.22
Natural Attenuation Parameters																																	
Alkalinity, total (as CaCO3)	mg/L	N/A	N/A	370	350	360	340	360	380	350	350	730			390			400			320	391	370	400	380	390	420	392	400	450	420	410	400
Chloride (as Cl)	mg/L	125	250	65.9	24	98	**230**	**160**	**150**	9.3	120	35			**140**			**180**			**150**	**207**	**140**	**180**	**210**	**150**	**190**	**224**	**230**	**280**	**240**	**270**	**200**
Ethane	µg/L	N/A	N/A	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.4 UJ	0.4 UJ	0.4 UJ	0.4 UJ			0.4 UJ			0.4 UJ			0.4 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.4 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.4 UJ
Ethene	µg/L	N/A	N/A	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U			0.5 U			0.5 U			0.5 U	0.82 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1.4 J	0.5 U	1.5	2	0.5 U	0.5 U
Iron, total	µg/L	150	300	**281 J**	**468**	**377**	**253**	39 U	**207**	**553**	**1,240**	**325**			**5,950**			**2,570**			**337**	**499**	**300**	**264**	**626**	**396 J**	**375**	**2,060**	**1,210**	**1,050**	**1,020**	**1,190 J**	**995**
Iron, dissolved	µg/L	150	300	14 U	25 U	25 U	25 U	10 U	10 U	**185**	**914**	94.2			**1,610**			**1,640**			**314**	19.4 J	25 U	25 U	25 U	10 U	36.9	**1,010**	**993**	**875**	**984**	**1,170 J**	**932**
Manganese, total	µg/L	25	50		15.2	11.9	14.2	**68.2**	**72.6**	12.9	14.8	**163**			**208**			**70**			**28.2**		**114**	**121**	**128**	**116**	**119**		**31.5**	**28.2**	**30 J**	**34.5**	**34.6**
Manganese, dissolved	µg/L	25	50	14.6	1.2 U	2 J	5.1	**66**	**49**	8.1	11.6	**140**			**125**			**62.5**			22.5 B	**123**	**109**	**115**	**115**	**108**	**113**	**42.5**	**29.7**	**26.7**	**29.5 J**	**35**	**31.6**
Methane	µg/L	N/A	N/A	2.3 J	0.5 U	1.4 J	1.1 J	0.5 U	2.2 J	71 J	31 J	1.1 U			22 J			16			18 J	130	32	1.4 J	2	57	11	31	43	87	27	45	6 J
Nitrogen, nitrate (as N)	mg/L	2	10	0.4 J	1	0.18	0.4	0.06 U	0.11 J	0.34	0.21	0.19 J			0.19 J			0.086 J			0.25	0.06 U	0.06 J	0.048 J	1.6	0.06 U	0.06 U	0.06 U	0.04 U	0.04 U	0.04 U	0.06 U	0.06 U
Sulfate (as SO4)	mg/L	125	250	47.2	24	35	54	38	64	0.8 U	41	**160**			50			54			46	60	**220**	62	**180**	47	56	85.2	93	84	100	97	92
Sulfide	mg/L	N/A	N/A	1 UJ	1 U	1 U	1 U	1 J	1 U	1 U	1 U	1 U			1 U			1 U			1 U	1 UJ	1 U	1 U	1 J	1 U	1 U	1 UJ	1 U	1 U	1 U	1 U	1 U
Total Organic Carbon	mg/L	N/A	N/A	1.6 J	1.1 J	2.2 J	0.91 J	2.8	0.7 U	0.7 U	0.7 U	9.5			0.89 J			1.2 J			0.8 J	4.7	3.3	3.5	3.3	2.8	3.4	4.6	4.1	5.6	3.9	3.2	2.8
VOCs																																	
1,1,1-Trichloroethane	µg/L	40	200	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U	0.04 U	0.04 U	0.04 U	0.04 U	0.07 U	0.07 U	0.04 U	0.07 U	4.7 J	2 U	0.07 U	0.07 U	0.04 U	**66**	**74 J**	**57 J**	19	**73**	**120**	25	12 J	**43**	**40 J**	9.7	3.9
1,1,2,2-Tetrachloroethane	µg/L	0.02	0.2	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	**0.9 U**	**0.9 U**	0.018 U	0.018 U	0.018 U	0.018 U	**0.36 U**	**0.36 U**	**0.36 U**	**0.36 U**	**0.36 U**	0.018 U	**0.09 U**	**0.45 U**	**0.45 U**	**0.09 U**	**0.09 U**
1,1,2-Trichloroethane	µg/L	0.5	5	0.09 U	0.09 U	0.09 U	0.09 U	0.09 U	0.04 U	0.04 U	0.04 U	0.04 U	0.09 U	0.09 U	0.04 U	0.09 U	**4.5 U**	**2 U**	0.09 U	0.09 U	0.04 U	0.09 U	**1.8 U**	**1.8 U**	**1.8 U**	**1.8 U**	**0.8 U**	0.09 U	0.45 U	**2.3 U**	**2.3 U**	0.45 U	0.2 U
1,1-Dichloroethane	µg/L	85	850	0.031 U	0.031 U	0.031 U	0.031 U	0.031 U	0.06 U	0.06 U	0.06 U	0.06 U	0.031 U	0.031 U	0.06 U	17 J	16	11	0.031 U	0.031 U	0.06 U	43	25	31 J	22	19	61	46	34	**140**	**130**	35	19
1,1-Dichloroethene	µg/L	0.7	7	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.04 U	0.04 U	0.04 U	0.04 U	0.06 U	0.06 U	0.04 U	**3**	**6.9 J**	**2 U**	0.06 U	0.06 U	0.04 U	**7.1**	**5 J**	**6.4 J**	**3.4 J**	**4.8**	**15**	**3.9**	**1.1 J**	**18**	**20**	**2**	0.57 J
1,2,3-Trichlorobenzene	µg/L	N/A	N/A	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	4 U	4 U	0.08 U	0.08 U	0.08 U	0.08 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	0.08 U	0.4 U	2 U	2 U	0.4 U	0.4 U
1,2,4-Trichlorobenzene	µg/L	14	70	0.06 U	0.06 UJ	0.06 U	0.06 U	0.06 UJ	0.1 U	0.1 U	0.1 U	0.1 U	0.06 U	0.06 U	0.1 U	0.06 U	3 U	5 U	0.06 U	0.06 U	0.1 U	0.06 U	1.2 U	1.2 U	1.2 U	1.2 U	2 U	0.06 U	0.3 U	1.5 U	1.5 U	0.3 U	0.5 U
1,2-Dibromo-3-chloropropane	µg/L	0.02	0.2	**0.026 U**	**0.026 R**	**0.026 UJ**	**0.026 U**	**0.026 R**	**0.04 U**	**0.04 U**	**0.04 U**	**0.04 U**	**0.026 U**	**0.026 U**	**0.04 U**	**0.026 U**	**1.3 U**	**2 U**	**0.026 U**	**0.026 U**	**0.04 U**	**0.026 U**	**0.52 U**	**0.52 UJ**	**0.52 U**	**0.52 U**	**0.8 U**	**0.026 U**	**0.13 U**	**0.65 UJ**	**0.65 U**	**0.13 U**	**0.2 U**
1,2-Dibromoethane	µg/L	0.5	5	0.023 U	0.023 U	0.023 U	0.023 U	0.023 U	0.03 U	0.03 U	0.03 U	0.03 U	0.023 U	0.023 U	0.03 U	0.023 U	**1.2 U**	**1.5 U**	0.023 U	0.023 U	0.03 U	0.023 U	0.46 U	0.46 U	0.46 U	0.46 U	**0.6 U**	0.023 U	0.12 U	**0.58 U**	**0.58 U**	0.12 U	0.15 U
1,2-Dichlorobenzene	µg/L	60	600	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	2 U	2 U	0.04 U	0.04 U	0.04 U	0.04 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.04 U	0.2 U	1 U	1 U	0.2 U	0.2 U
1,2-Dichloroethane	µg/L	0.5	5	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.03 U	0.03 U	0.03 U	0.03 U	0.04 U	0.04 U	0.03 U	**1.3**	**2 U**	**1.5 U**	0.04 U	0.04 U	0.03 U	0.04 U	**0.8 U**	**0.8 U**	**0.8 U**	**0.8 U**	**0.6 U**	0.27	0.2 U	**1 U**	**1 U**	0.24 J	0.15 U
1,2-Dichloropropane	µg/L	0.5	5	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.05 U	0.05 U	0.05 U	0.05 U	0.06 U	0.06 U	0.05 U	0.06 U	**3 U**	**2.5 U**	0.06 U	0.06 U	0.05 U	0.06 U	**1.2 U**	**1.2 U**	**1.2 U**	**1.2 U**	**1 U**	0.06 U	0.3 U	**1.5 U**	**1.5 U**	0.3 U	0.25 U
1,3-Dichlorobenzene	µg/L	125	1,250	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.05 U	0.05 U	0.05 U	0.05 U	0.04 U	0.04 U	0.05 U	0.04 U	2 U	2.5 U	0.04 U	0.04 U	0.05 U	0.04 U	0.8 U	0.8 U	0.8 U	0.8 U	1 U	0.04 U	0.2 U	1 U	1 U	0.2 U	0.25 U
1,4-Dichlorobenzene	µg/L	15	75	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.06 U	0.06 U	0.06 U	0.06 U	0.05 U	0.05 U	0.06 U	0.05 U	2.5 U	3 U	0.05 U	0.05 U	0.06 U	0.05 U	1 U	1 U	1 U	1 U	1.2 U	0.05 U	0.25 U	1.3 U	1.3 U	0.25 U	0.3 U
2-Butanone	µg/L	N/A	N/A	0.4 UJ	0.4 R	0.4 UJ	0.4 U	0.4 R	0.5 U	0.5 U	0.5 U	0.5 U	0.4 R	0.4 R	0.5 U	0.4 R	20 R	25 U	0.4 R	0.4 R	0.5 U	0.4 UJ	8 R	8 UJ	8 R	8 U	10 U	0.4 UJ	2 R	10 UJ	10 R	2 U	2.5 U
2-Hexanone	µg/L	N/A	N/A	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.8 U	0.8 U	0.8 U	0.8 U	0.5 U	0.5 R	0.8 U	0.5 U	25 U	40 U	0.5 UJ	0.5 R	0.8 U	0.5 U	10 UJ	10 U	10 R	10 U	16 U	0.5 U	2.5 UJ	13 U	13 R	2.5 U	4 U
4-Methyl-2-pentanone	µg/L	N/A	N/A	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.4 U	0.4 U	0.4 U	0.4 U	0.6 U	0.6 R	0.4 U	0.6 U	30 U	20 U	0.6 UJ	0.6 R	0.4 U	0.6 U	12 UJ	12 U	12 R	12 U	8 U	0.6 U	3 UJ	15 U	15 R	3 U	2 U
Acetone	µg/L	200	1,000	1.5 UJ	1.5 R	1.5 UJ	1.5 U	1.5 R	1.3 UJ	1.3 UJ	1.3 UJ	1.3 UJ	1.5 R	1.5 R	1.3 UJ	1.5 R	75 R	65 UJ	1.5 R	1.5 R	1.3 UJ	1.5 UJ	30 R	30 UJ	30 R	30 U	26 UJ	1.5 UJ	7.5 R	38 UJ	38 R	7.5 U	6.5 UJ
Benzene	µg/L	0.5	5	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.04 U	0.04 U	0.04 U	0.04 U	0.05 U	0.05 U	0.04 U	0.05 U	**2.5 U**	**2 U**	0.05 U	0.05 U	0.04 U	0.085 UB	**1 U**	**1 U**	**1 U**	**1 U**	**0.8 U**	0.069 UB	0.25 U	**1.3 U**	**1.3 U**	0.25 U	0.2 U
Bromochloromethane	µg/L	N/A	N/A	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	2.5 U	2.5 U	0.05 U	0.05 U	0.05 U	0.05 U	1 U	1 U	1 U	1 U	1 U	0.05 U	0.25 U	1.3 U	1.3 U	0.25 U	0.25 U
Bromodichloromethane	µg/L	0.06	0.6	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	**2 U**	**3 J**	0.04 U	0.04 U	0.04 U	0.04 U	**0.8 U**	**1.6 J**	**0.8 U**	**0.8 U**	**1.3 J**	0.04 U	**0.2 U**	**1.7 J**	**1 U**	**0.26 J**	**0.2 U**
Bromoform	µg/L	0.44	4.4	0.07 U	0.07 U	0.07 UJ	0.07 U	0.07 U	0.04 U	0.04 U	0.04 U	0.04 U	0.07 U	0.07 UJ	0.04 U	0.07 U	**3.5 U**	**2 U**	0.07 U	0.07 UJ	0.04 U	0.07 U	**1.4 U**	**1.4 U**	**1.4 UJ**	**1.4 U**	**0.8 U**	0.07 U	0.35 U	**1.8 U**	**1.8 UJ**	0.35 U	0.2 U
Bromomethane	µg/L	1	10	0.06 U	0.06 UJ	0.06 UJ	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 UJ	0.06 UJ	0.06 U	0.06 UJ	**3 U**	**3 U**	0.06 U	0.06 UJ	0.06 U	0.06 U	**1.2 U**	**1.2 U**	**1.2 UJ**	**1.2 U**	**1.2 UJ**	0.06 U	0.3 U	**1.5 U**	**1.5 UJ**	0.3 U	0.3 UJ
Carbon disulfide	µg/L	200	1,000	0.1 U	0.1 U	0.1 UJ	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 UJ	0.1 U	0.1 U	5 U	5 U	0.1 U	0.1 UJ	0.1 U	0.1 U	2 U	2 U	2 UJ	2 U	2 U	0.1 U	0.5 U	2.5 U	2.5 UJ	0.5 U	0.5 U
Carbon tetrachloride	µg/L	0.5	5	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.04 U	0.04 U	0.04 U	0.04 U	0.05 U	0.05 U	0.04 U	0.05 U	**2.5 U**	**2 U**	0.05 U	0.05 U	0.04 U	0.05 U	**1 U**	**1 U**	**1 UJ**	**1 U**	**0.8 U**	0.05 U	0.25 U	**1.3 U**	**1.3 UJ**	0.25 U	0.2 U
Chlorobenzene	µg/L	N/A	N/A	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.06 U	0.06 U	0.06 U	0.06 U	0.05 U	0.05 U	0.06 U	0.05 U	2.5 U	3 U	0.05 U	0.05 U	0.06 U	0.05 U	1 U	1 U	1 U	1 U	1.2 U	0.05 U	0.25 U	1.3 U	1.3 U	0.25 U	0.3 U
Chloroethane	µg/L	80	400	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.05 U	0.05 U	0.05 U	0.05 U	0.06 U	0.06 U	0.05 U	2.2 J	3 U	2.5 U	0.06 U	0.06 U	0.05 U	0.6 J	1.2 U	1.2 U	1.2 UJ	1.2 U	1 U	0.16 J	0.3 U	1.5 U	1.5 UJ	0.39 J	0.25 U
Chloroform	µg/L	0.6	6	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U	0.04 U	0.04 U	0.04 U	0.04 U	0.07 U	0.07 U	0.04 U	0.07 U	**3.5 U**	**2 U**	0.07 U	0.07 U	0.04 U	0.1 UB	**1.7 J**	**1.4 U**	**1.4 U**	**1.4 U**	**0.8 U**	0.07 U	0.35 U	**1.8 U**	**1.8 U**	0.35 U	0.2 U
Chloromethane	µg/L	0.3	3	0.05 U	0.05 UJ	0.22 UB	0.05 U	0.17 U	0.28 U	0.05 U	**0.33 U**	**0.3 U**	0.05 UJ	0.05 UJ	**1.1 U**	0.05 UJ	**2.5 U**	**2.5 U**	0.05 U	0.05 UJ	**0.32 U**	0.05 U	**1 U**	**1 U**	**1 U**	**1 U**	**1 U**	0.05 U	0.25 U	**1.3 U**	**1.3 U**	0.25 U	**0.43 U**
cis-1,2-Dichloroethene	µg/L	7	70	0.06 U	0.06 U	0.06 U	0.06 U	0.15 J	0.26	0.03 U	0.067 U	0.03 U	0.06 U	0.06 U	0.03 U	**250**	**310**	**110**	0.06 U	0.06 U	0.03 U	**29**	**17 J**	**64 J**	**80**	**24**	**33**	**13**	**7.1**	**30**	**31**	**8.5**	6.2
cis-1,3-Dichloropropene	µg/L	0.02	0.2	0.016 U	0.016 U	0.016 U	0.016 U	0.016 U	0.017 U	0.017 U	0.017 U	0.017 U	0.016 U	0.016 U	0.017 U	0.016 U	**0.8 U**	**0.85 U**	0.016 U	0.016 U	0.017 U	0.016 U	**0.32 U**	**0.32 U**	**0.32 U**	**0.32 U**	**0.34 U**	0.016 U	**0.08 U**	**0.4 U**	**0.4 U**	**0.08 U**	**0.085 U**
Dibromochloromethane	µg/L	6	60	0.09 U	0.09 U	0.09 U	0.09 U	0.09 U	0.029 U	0.029 U	0.029 U	0.029 U	0.09 U	0.09 U	0.029 U	0.09 U	4.5 U	1.5 U	0.09 U	0.09 U	0.029 U	0.09 U	1.8 U	1.8 U	1.8 U	1.8 U	0.58 U	0.09 U	0.45 U	2.3 U	2.3 U	0.45 U	0.15 U
Dichlorodifluoromethane	µg/L	200	1,000	0.06 U	0.06 UJ	0.06 U	0.06 U	0.06 U	0.05 U	0.05 U	0.05 U	0.05 U	0.06 U	0.06 U	0.05 U	0.06 U	3 U	2.5 U	0.06 U	0.06 U	0.05 U	0.06 U	1.2 U	1.2 U	1.2 U	1.2 U	1 U	0.06 U	0.3 U	1.5 U	1.5 U	0.3 U	0.25 U
Ethylbenzene	µg/L	140	700	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	2.5 U	2.5 U	0.05 U	0.05 U	0.05 U	0.05 U	1 U	1 U	1 U	1 U	1 U	0.05 U	0.25 U	1.3 U	1.3 U	0.25 U	0.25 U
Isopropylbenzene	µg/L	N/A	N/A	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.05 U	0.05 U	0.05 U	0.05 U	0.03 U	0.03 U	0.05 U	0.03 U	1.5 U	2.5 U	0.03 U	0.03 U	0.05 U	0.03 U	0.6 U	0.6 U	0.6 U	0.6 U	1 U	0.03 U	0.15 U	0.75 U	0.75 U	0.15 U	0.25 U
m,p-Xylene (sum of isomers)	µg/L	1,000	10,000	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.09 U	0.09 U	0.09 U	0.09 U	0.12 U	0.12 U	0.09 U	0.12 U	6 U	4.5 U	0.12 U	0.12 U	0.09 U	0.12 U	2.4 U	2.4 U	2.4 U	2.4 U	1.8 U	0.12 U	0.6 U	3 U	3 U	0.6 U	0.45 U
Methyl tert-butyl ether	µg/L	12	60	0.15 J	0.05 U	0.14 J	0.17	0.3	0.19	0.05 U	0.11 J	0.05 U	0.05 U	1.6	2.1	0.22 J	2.5 U	2.5 U	0.05 U	0.05 U	0.05 U	0.05 U	1 U	1 U	1 U	1 U	1 U	0.05 U	0.25 U	1.3 U	1.3 U	0.25 U	0.31 J
Methylene chloride	µg/L	0.5	5	0.11 UJ	0.11 UJ	**1.8 J**	0.11 U	**1 J**	0.15 UJ	0.15 UJ	0.15 UJ	0.15 UJ	0.11 UJ	0.11 R	0.15 UJ	0.11 UJ	**14 J**	**7.5 UJ**	0.11 UJ	0.11 R	0.15 UJ	0.11 UJ	**2.2 UJ**	**70 J**	**2.2 R**	**2.2 UJ**	**3 R**	0.11 UJ	**0.55 UJ**	**77 J**	**2.8 R**	**7.1 UJ**	**0.75 R**
o-Xylene	µg/L	N/A	N/A	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.05 U	0.05 U	0.05 U	0.05 U	0.04 U	0.04 U	0.05 U	0.04 U	2 U	2.5 U	0.04 U	0.04 U	0.05 U	0.04 U	0.8 U	0.8 U	0.8 U	0.8 U	1 U	0.04 U	0.2 U	1 U	1 U	0.2 U	0.25 U
Styrene	µg/L	10	100	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.05 U	0.05 U	0.05 U	0.05 U	0.04 U	0.04 U	0.05 U	0.04 U	2 U	2.5 U	0.04 U	0.04 U	0.05 R	0.04 U	0.8 U	0.8 U	0.8 U	0.8 U	1 U	0.04 U	0.2 U	1 U	1 U	0.2 U	0.25 U
Tetrachloroethene	µg/L	0.5	5	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	**2.5 U**	**2.5 U**	0.05 U	0.091 J	0.05 U	0.051 J	**1 U**	**1 U**	**1 U**	**1 U**	**1 U**	0.05 U	0.25 U	**1.3 U**	**1.3 U**	0.25 U	0.25 U
Toluene	µg/L	200	1,000	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.05 U	0.05 U	0.05 U	0.05 U	0.08 U	0.08 U	0.05 U	0.08 U	4 U	2.5 U	0.08 U	0.08 U	0.05 U	0.08 U	1.6 U	1.6 U	1.6 U	1.6 U	1 U	0.08 U	0.4 U	2 U	2 U	0.4 U	0.25 U
trans-1,2-Dichloroethene	µg/L	20	100	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.06 U	0.06 U	0.06 U	0.06 U	0.04 U	0.04 U	0.06 U	9.7 J	9.9	6.2 J	0.04 U	0.04 U	0.06 U	16 J	16 J	**20 J**	7.4	16	**21**	3.2	1.6 J	10	11	2.2	1.2
trans-1,3-Dichloropropene	µg/L	0.02	0.2	0.015 U	0.015 U	0.015 U	0.015 U	0.015 U	0.019 U	0.019 U	0.019 U	0.019 U	0.015 U	0.015 U	0.019 U	0.015 U	**0.75 U**	**0.95 U**	0.015 U	0.015 U	0.019 U	0.015 U	**0.3 U**	**0.3 U**	**0.3 U**	**0.3 U**	**0.38 U**	0.015 U	**0.075 U**	**0.38 U**	**0.38 U**	**0.075 U**	**0.095 U**
Trichloroethene	µg/L	0.5	5	0.07 J	0.03 U	0.031 J	0.03 U	0.063 J	0.18 J	0.05 U	0.065 U	0.05 U	0.03 U	0.03 U	0.05 U	**180**	**190**	**170**	0.03 U	0.03 U	0.05 U	**120**	**100**	**100 J**	**19**	**100**	**130**	**10**	**3.8**	**27**	**25**	**6.2**	**2.5**
Vinyl chloride	µg/L	0.02	0.2	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	**0.11**	**0.043 J**	**3.8**	**4.6**	**0.9 U**	0.018 U	0.018 U	0.018 U	**0.38**	**0.36 U**	**4.4 J**	**8.8**	**0.84 J**	**1.1 J**	**3**	**2.4 J**	**5.7**	**15**	**1.3**	**0.57**

J indicates that the value was between the method detection limit and the limit of quantitation and, therefore, is estimated.
U indicates that the constituent was not detected above the method detection limit.
UJ indicates that the constituent was not detected above the estimated method detection limit.
R indicates that the initial calibration report associated with this SDG contained relative response factors (RRFs) lower than 0.05 for acetone, 2-Butanone and 1,2-dibromo-3-chloropropane.
Non-detected concentrations were qualified and flagged "R" as rejected.
UB indicates that the constiuent is considered to be below the detection limit listed due to blank contamination.
Bolded values indicate attainment or exceedance of the Wisconsin Administrative Code (WAC) NR 140 Preventative Action Limit (PAL).
Shaded values indicate attainment or exceedance of the Wisconsin Administrative Code (WAC) NR 140 Enforcement Standard (ES).

TABLE 4

Field and Analytical Results—Groundwater Monitoring Well Sampling

October 2004, July 2005, October 2005, January 2006, March 2006, and January

2007 Annual Groundwater Report and Evaluation of Monitored Natural Attenuatior

OECI Site

				MW-13S			MW-13D						MW-14D					MW-15B			MW-15S						MW-15D					
Constituent	**Units**	**WAC NR 140 PAL**	**WAC NR 140 ES**	**05CA40-30 Jul 05**	**06CD09-61 Jan 06**	**07CE18-51, 52 Jan 07**	**05CA05-09, 10 Oct 04**	**05CA40-22, 23 Jul 05**	**06CA01-32, 33 Oct 05**	**06CD09-59, 60 Jan 06**	**06CD16-28, 29 Mar 06**	**07CE18-55, 56 Jan 07**	**05CA05-11, 12 Oct 04**	**05CA40-16, 17 Jul 05**	**06CA01-09, 10 Oct 05**	**06CD09-28, 29 Jan 06**	**06CD16-23, 24 Mar 06**	**05CA40-01 Jul 05**	**06CD09-10 Jan 06**	**07CE18-21, 22 Jan 07**	**05CA05-15, 16 Oct 04**	**05CA40-04, 05 Jul 05**	**06CA01-11, 12 Oct 05**	**06CD09-08, 09 Jan 06**	**06CD16-14, 15 Mar 06**	**07CE18-23, 24 Jan 07**	**05CA05-13, 14 Oct 04**	**05CA40-02, 03 Jul 05**	**06CA01-15, 16 Oct 05**	**06CD09-17, 18 Jan 06**	**06CD16-12, 13 Mar 06**	**07CE18-39, 40 Jan 07**
Field Parameters																																
Dissolved Oxygen (DO)	mg/L			3.19	1.84	NR	0.31	7.1%	0.36	0.76	0.78	151.56	0.45	1.24	0.59	1.47	0.39	9.7%	0.76	1.23	8.47	93.9%	5.33	5.82	14.51	4.66	0.43	0.79	1.46	0.72	0.60	60.85
Oxidation Reduction Potential (ORP)	millivolts			241.4	83.5	-283.4	-85.7	-69.2	-35.7	-18.3	-82.3	-331.1	43.4	15.1	117.5	165.6	134.4	-43.9	-54.2	-306.2	72.0	28.1	105.8	126.2	152.7	-240.5	60.5	258.2	171	22	37.0	-321.6
pH	pH units			6.42	7.06	7.27	7.16	7.12	6.43	7.08	7.01	7.29	7.28	7.02	6.87	7.33	6.94	6.86	6.85	7.05	7.46	7.24	7.02	7.16	7.23	7.41	7.12	6.27	6.46	7.37	7.09	7.14
Specific Conductivity	mmhos/cm			0.972	1.139	0.877	2.081	1.394	1.856	1.278	1.559	1.110	0.947	0.883	1.189	1.212	1.471	0.898	0.776	0.929	0.480	0.621	0.831	0.708	0.667	0.652	1.832	1.447	1.354	2.644	1.433	1.346
Temperature	deg c			12.39	8.30	6.17	12.35	11.99	11.86	9.81	8.99	8.10	13.20	11.99	14.64	9.93	9.91	14.96	10.85	8.46	15.83	14.97	16.7	10.98	9.01	8.83	14.20	13.95	14.33	10.79	11.59	9.71
Depth to water	feet			7.02	6.39	4.95	6.12	6.38	7.30	5.43	4.17	4.00	5.88	5.64	7.42	6.10	3.42	9.34	12.90	8.37	10.43	10.21	11.73	10.41	8.44	8.09	11.31	11.62	12.74	10.98	9.20	9.01
Natural Attenuation Parameters																																
Alkalinity, total (as CaCO3)	mg/L	N/A	N/A			310	475	390	480	390	400	330	347	350	370	340	340			390	229	300	330	300	360	270	422	370	400	390	260	340
Chloride (as Cl)	mg/L	125	250			68	**271**	**180**	**290**	**210**	**220**	**130**	82.9	45	**180**	**150**	**240**			27	9.86 J	32	90	66	**220**	33	**291**	**200**	**220**	21	40	**220**
Ethane	µg/L	N/A	N/A			0.4 UJ	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.4 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U			0.4 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.4 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.4 UJ
Ethene	µg/L	N/A	N/A			0.5 U	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U			0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Iron, total	µg/L	150	300			73.4 J	**2,180**	**983**	**2,210**	**1,230 J**	**1,230 J**	**1,230**	7 U	25.6 J	25 U	25 U	39 U			**448**	**224 J**	59.7 J	95.3	30.6 J	39 U	91.3 J	7.2 J	25 UJ	**170 J**	73.5 J	39 U	55.7 J
Iron, dissolved	µg/L	150	300			10 U	**2,180**	**820**	**2,030**	**1,340 J**	**1,070 J**	**652**	14 U	25 U	25 U	25 U	10 U			**427**	14 U	25 U	25 U	25 U	10 U	10 U	14 U	25 U	25 U	47.5 J	10 U	10 U
Manganese, total	µg/L	25	50			2.3		**48.3**	**58.8**	**47.7**	**39.8**	**31.6**		**81.6**	**105**	**97.5**	**105**			**1,020**		8.2	**29.2**	16.7	**216**	20.7		**276**	**257**	**220 J**	1.7 U	**308**
Manganese, dissolved	µg/L	25	50			0.4 U	**65.5**	**45.1**	**57.1**	**47.7**	**36.2**	**31.1**	**67**	**69.2**	**88.9**	**87.1**	**88.8**			**1,010**	9.6	1.2 U	7.7	5.5	**197**	0.4 U	**314**	**250**	**254**	**227 J**	0.4 U	**318**
Methane	µg/L	N/A	N/A			0.35 U	66	17	34	38	25	6.4 J	14	4.3	2.3	2.5	1.5 U			440 J	1 J	0.5 U	0.84 J	0.5 U	1.5 U	1.2 U	4.6 J	1.4 J	1.8 J	22	0.5 U	3.1 J
Nitrogen, nitrate (as N)	mg/L	2	10			**9.7**	0.06 U	0.28	0.06 J	0.04 U	0.06 U	0.14 J	0.97 J	1.6	1.7	**2.8**	**2.1**			0.06 U	**4.65 J**	0.8	0.92	1.1	0.45	1.2	0.16 J	0.18	0.29	0.04 U	**2.4**	**2**
Sulfate (as SO4)	mg/L	125	250			35	**225**	93	**190**	110	120	72	32.4	40	45	45	47			84	13.1 J	15	22	46	51	28	43.8	43	49	8.6	28	55
Sulfide	mg/L	N/A	N/A			1 U	1 UJ	1 U	1 U	1 U	1 U	1 U	1 UJ	1 U	1 U	1 R	1 U			1 U	1 UJ	1 U	1 U	1 U	1 U	1 U	1 UJ	1 U	1 U	1 U	1 U	1 U
Total Organic Carbon	mg/L	N/A	N/A			2.6	4.9	2.2 J	4.2	3.4	1.7 J	1.6 J	2.7 J	1.4 J	1.8 J	1.5 J	2.1 J			0.79 J	1.5 J	2 J	1.9 J	1 J	1.3 J	1.4 J	3.3	2.5 J	2.4 J	2.1 J	0.88 J	1.5 J
VOCs																																
1,1,1-Trichloroethane	µg/L	40	200	0.18 J	0.77	0.092 J	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U	0.04 U	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U	0.04 U	1.1	0.39 J	1.5	1.3	0.07 U	0.12 J	0.07 U	0.35 U	0.35 U	0.35 U	0.48	0.04 U
1,1,2,2-Tetrachloroethane	µg/L	0.02	0.2	0.018 UJ	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	**0.09 U**	**0.09 U**	**0.09 U**	0.018 U	0.018 U
1,1,2-Trichloroethane	µg/L	0.5	5	0.09 UJ	0.09 U	0.04 U	0.09 U	0.09 U	0.09 U	0.09 U	0.09 U	0.04 U	0.09 U	0.09 U	0.09 U	0.09 U	0.09 U	0.09 U	0.09 U	0.04 U	0.09 U	0.09 U	0.09 U	0.09 U	0.09 U	0.04 U	0.09 U	0.45 U	0.45 U	0.45 U	0.09 U	0.04 U
1,1-Dichloroethane	µg/L	85	850	0.062 J	0.47	0.06 U	0.031 U	0.031 U	0.031 U	0.031 U	0.031 U	0.06 U	0.031 U	0.031 U	0.031 U	0.031 U	0.031 U	0.031 U	0.031 U	0.06 U	0.031 U	0.031 U	0.031 U	0.031 U	0.1	0.06 U	0.13 J	0.16 U	0.16 U	0.16 U	0.031 U	0.067 J
1,1-Dichloroethene	µg/L	0.7	7	0.06 UJ	0.11 J	0.04 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.04 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.04 U	0.06 U	0.06 U	0.06 U	0.06 U	0.16 J	0.04 U	0.3	0.3 U	0.3 U	0.3 U	0.06 U	0.11 J
1,2,3-Trichlorobenzene	µg/L	N/A	N/A	0.08 UJ	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.4 U	0.4 U	0.4 U	0.08 U	0.08 U
1,2,4-Trichlorobenzene	µg/L	14	70	0.06 UJ	0.06 U	0.1 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.1 U	0.06 U	0.06 UJ	0.06 U	0.06 UJ	0.06 UJ	0.06 U	0.06 U	0.1 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.1 U	0.06 U	0.3 U	0.3 U	0.3 U	0.06 U	0.1 U
1,2-Dibromo-3-chloropropane	µg/L	0.02	0.2	**0.026 UJ**	**0.026 U**	**0.04 U**	**0.026 U**	**0.026 U**	**0.026 UJ**	**0.026 U**	**0.026 U**	**0.04 U**	**0.026 U**	**0.026 R**	**0.026 UJ**	**0.026 U**	**0.026 R**	**0.026 U**	**0.026 U**	**0.04 U**	**0.026 U**	**0.026 U**	**0.026 U**	**0.026 U**	**0.026 U**	**0.04 U**	**0.026 U**	**0.13 U**	**0.13 UJ**	**0.13 U**	**0.026 U**	**0.04 U**
1,2-Dibromoethane	µg/L	0.5	5	0.023 UJ	0.023 U	0.03 U	0.023 U	0.023 U	0.023 U	0.023 U	0.023 U	0.03 U	0.023 U	0.023 U	0.023 U	0.023 U	0.023 U	0.023 U	0.023 U	0.03 U	0.023 U	0.023 U	0.023 U	0.023 U	0.023 U	0.03 U	0.023 U	0.12 U	0.12 U	0.12 U	0.023 U	0.03 U
1,2-Dichlorobenzene	µg/L	60	600	0.04 UJ	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.2 U	0.2 U	0.2 U	0.04 U	0.04 U
1,2-Dichloroethane	µg/L	0.5	5	0.04 UJ	0.22	0.03 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.03 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.03 U	0.04 U	0.04 U	0.04 U	0.04 U	0.058 J	0.03 U	0.16 J	0.2 U	0.2 U	0.2 U	0.04 U	0.03 U
1,2-Dichloropropane	µg/L	0.5	5	0.06 UJ	0.06 U	0.05 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.05 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.05 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.05 U	0.06 U	0.3 U	0.3 U	0.3 U	0.06 U	0.05 U
1,3-Dichlorobenzene	µg/L	125	1,250	0.04 UJ	0.04 U	0.05 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.05 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.05 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.05 U	0.04 UJ	0.2 U	0.2 U	0.2 U	0.04 U	0.05 U
1,4-Dichlorobenzene	µg/L	15	75	0.05 UJ	0.05 U	0.06 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.06 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.06 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.06 U	0.05 U	0.25 U	0.25 U	0.25 U	0.05 U	0.06 U
2-Butanone	µg/L	N/A	N/A	0.4 R	0.4 R	0.5 U	0.4 UJ	0.4 R	0.4 UJ	0.4 R	0.4 U	0.5 U	0.4 UJ	0.4 R	0.4 UJ	0.4 U	0.4 R	0.4 R	0.4 U	0.5 U	0.4 UJ	0.4 R	0.4 U	0.4 R	0.4 U	0.5 U	0.4 UJ	2 R	2 UJ	2 R	0.4 U	0.5 U
2-Hexanone	µg/L	N/A	N/A	0.5 UJ	0.5 U	0.8 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.8 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.8 U	0.5 U	0.5 U	0.5 U	0.5 R	0.5 U	0.8 U	0.5 U	2.5 U	2.5 U	2.5 R	0.5 U	0.8 U
4-Methyl-2-pentanone	µg/L	N/A	N/A	0.6 UJ	0.6 U	0.4 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.4 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.4 U	0.6 U	0.6 U	0.6 U	0.6 R	0.6 U	0.4 U	0.6 U	3 U	3 U	3 R	0.6 U	0.4 U
Acetone	µg/L	200	1,000	1.5 R	1.5 R	1.3 UJ	1.5 UJ	1.5 R	2.2 J	3 J	1.5 U	1.3 UJ	1.5 UJ	1.5 R	1.5 J	1.5 U	1.5 R	1.5 R	1.5 U	1.3 UJ	1.5 UJ	1.5 R	1.5 U	1.5 R	1.5 U	1.3 UJ	1.5 UJ	7.5 R	7.5 UJ	7.5 R	1.5 U	1.3 UJ
Benzene	µg/L	0.5	5	0.05 UJ	0.05 U	0.04 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.04 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.04 U	0.05 U	0.05 U	0.05 U	0.05 U	0.058 J	0.04 U	0.11 UB	0.25 U	0.25 U	0.25 U	0.05 U	0.04 U
Bromochloromethane	µg/L	N/A	N/A	0.05 UJ	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.25 U	0.25 U	0.25 U	0.05 U	0.05 U
Bromodichloromethane	µg/L	0.06	0.6	0.04 UJ	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	**0.2 U**	**0.2 U**	**0.2 U**	0.04 U	0.04 U
Bromoform	µg/L	0.44	4.4	0.07 UJ	0.07 U	0.04 U	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U	0.04 U	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U	0.07 UJ	0.04 U	0.07 U	0.07 U	0.07 U	0.07 UJ	0.07 U	0.04 U	0.07 U	0.35 U	0.35 U	0.35 UJ	0.07 U	0.04 U
Bromomethane	µg/L	1	10	0.06 UJ	0.06 U	0.06 UJ	0.06 U	0.06 UJ	0.06 U	0.06 U	0.06 U	0.06 UJ	0.06 U	0.06 UJ	0.06 U	0.06 U	0.06 U	0.06 UJ	0.06 UJ	0.06 U	0.06 U	0.06 UJ	0.06 U	0.06 UJ	0.06 U	0.06 U	0.06 U	0.3 UJ	0.3 U	0.3 UJ	0.06 U	0.06 UJ
Carbon disulfide	µg/L	200	1,000	0.1 UJ	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 UJ	0.1 U	0.1 U	0.1 U	0.1 U	0.1 UJ	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 UJ	0.1 U	0.1 U
Carbon tetrachloride	µg/L	0.5	5	0.05 UJ	0.05 U	0.04 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.04 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.04 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.04 U	0.05 U	0.25 U	0.25 U	0.25 UJ	0.05 U	0.04 U
Chlorobenzene	µg/L	N/A	N/A	0.05 UJ	0.05 U	0.06 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.06 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.06 U	0.05 U	0.05 U	0.05 U	0.05 U	3.3	0.06 U	4.1	3.3	4	3.2	0.05 U	3.3
Chloroethane	µg/L	80	400	0.06 UJ	0.06 U	0.05 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.05 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.05 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.05 U	0.06 U	0.3 U	0.3 U	0.3 UJ	0.06 U	0.05 U
Chloroform	µg/L	0.6	6	0.07 UJ	0.07 U	0.04 U	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U	0.04 U	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U	0.04 U	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U	0.04 U	0.07 U	0.35 U	0.35 U	0.35 U	0.07 U	0.04 U
Chloromethane	µg/L	0.3	3	0.05 UJ	0.05 U	**0.4 U**	0.05 U	0.24	**0.48**	0.2	0.078 J	**0.44 U**	0.05 U	0.05 UJ	**0.38 UB**	0.05 UJ	0.05 U	0.05 UJ	0.05 U	**0.43 U**	0.05 U	0.05 U	**0.32**	0.05 UJ	0.082 U	**0.35 U**	0.05 U	0.25 U	**0.5 J**	0.25 U	0.05 U	**0.36 U**
cis-1,2-Dichloroethene	µg/L	7	70	0.14 J	3.4	0.03 U	0.21 J	0.26	0.38	2.1	0.39	0.68	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.03 U	0.06 U	0.06 U	0.06 U	0.06 U	4.3	0.03 U	6	2.5 J	4.3	4.3	0.06 U	2.8
cis-1,3-Dichloropropene	µg/L	0.02	0.2	0.016 UJ	0.016 U	0.017 U	0.016 U	0.016 U	0.016 U	0.016 U	0.016 U	0.017 U	0.016 U	0.016 U	0.016 U	0.016 U	0.016 U	0.016 U	0.016 U	0.017 U	0.016 U	0.016 U	0.016 U	0.016 U	0.016 U	0.017 U	0.016 U	**0.08 U**	**0.08 U**	**0.08 U**	0.016 U	0.017 U
Dibromochloromethane	µg/L	6	60	0.09 UJ	0.09 U	0.029 U	0.09 U	0.09 U	0.09 U	0.09 U	0.09 U	0.029 U	0.09 U	0.09 U	0.09 U	0.09 U	0.09 U	0.09 U	0.09 U	0.029 U	0.09 U	0.09 U	0.09 U	0.09 U	0.09 U	0.029 U	0.09 U	0.45 U	0.45 U	0.45 U	0.09 U	0.029 U
Dichlorodifluoromethane	µg/L	200	1,000	0.06 UJ	0.06 U	0.05 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.05 U	0.06 U	0.06 UJ	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.05 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.05 U	0.06 U	0.3 U	0.3 U	0.3 U	0.06 U	0.05 U
Ethylbenzene	µg/L	140	700	0.05 UJ	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.25 U	0.25 U	0.25 U	0.05 U	0.05 U
Isopropylbenzene	µg/L	N/A	N/A	0.03 UJ	0.03 U	0.05 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.05 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.05 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.05 U	0.03 U	0.15 U	0.15 U	0.15 U	0.03 U	0.05 U
m,p-Xylene (sum of isomers)	µg/L	1,000	10,000	0.12 UJ	0.12 U	0.09 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.09 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.09 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.09 U	0.12 U	0.6 U	0.6 U	0.6 U	0.12 U	0.09 U
Methyl tert-butyl ether	µg/L	12	60	0.05 UJ	0.16 J	0.05 U	0.05 U	0.28	0.16 J	0.18	0.26	0.43	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.051 J	0.05 U	0.05 U	0.05 U	0.05 U	0.25	0.05 U	0.69 J	0.25 U	0.4 J	0.45 J	0.05 U	0.15
Methylene chloride	µg/L	0.5	5	0.11 UJ	0.11 UJ	0.15 R	0.11 UJ	0.11 UJ	**2.1 J**	0.11 UJ	**0.83 U**	0.15 R	0.11 UJ	0.11 UJ	**2.1 J**	0.11 UJ	**0.9 J**	0.11 UJ	0.11 R	0.15 UJ	0.11 UJ	0.11 UJ	**2.1**	0.11 R	0.29 UJ	0.15 UJ	0.11 UJ	**0.55 UJ**	**15 J**	**0.55 R**	0.46 UJ	0.15 R
o-Xylene	µg/L	N/A	N/A	0.04 UJ	0.04 U	0.05 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.05 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.05 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.05 U	0.04 U	0.2 U	0.2 U	0.2 U	0.04 U	0.05 U
Styrene	µg/L	10	100	0.04 UJ	0.04 U	0.05 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.05 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.05 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.05 U	0.04 U	0.2 U	0.2 U	0.2 U	0.04 U	0.05 U
Tetrachloroethene	µg/L	0.5	5	0.097 J	0.055 J	0.074 J	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.085 J	0.05 U	0.05 U	0.05 U	0.25 U	0.25 U	0.25 U	0.05 U	0.05 U
Toluene	µg/L	200	1,000	0.08 UJ	0.08 U	0.05 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.05 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.05 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.05 U	0.08 U	0.4 U	0.4 U	0.4 U	0.08 U	0.05 U
trans-1,2-Dichloroethene	µg/L	20	100	0.04 UJ	0.25	0.06 U	0.04 U	0.04 U	0.04 U	0.075 J	0.04 U	0.06 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.06 U	0.04 U	0.04 U	0.04 U	0.04 U	0.33	0.06 U	0.6 J	0.3	0.4 J	0.41 J	0.04 U	0.26
trans-1,3-Dichloropropene	µg/L	0.02	0.2	0.015 UJ	0.015 U	0.019 U	0.015 U	0.015 U	0.015 U	0.015 U	0.015 U	0.019 U	0.015 U	0.015 U	0.015 U	0.015 U	0.015 U	0.015 U	0.015 U	0.019 U	0.015 U	0.015 U	0.015 U	0.015 U	0.015 U	0.019 U	0.015 U	**0.075 U**	**0.075 U**	**0.075 U**	0.015 U	0.019 U
Trichloroethene	µg/L	0.5	5	0.33 J	**2.8**	0.11 J	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.066 J	0.03 U	0.041 J	0.062 J	0.066 J	0.045 J	0.03 U	0.03 U	0.05 U	0.15 J	0.03 U	0.03 U	**0.61**	**25**	0.051 U	**41**	**30**	**40**	**35**	0.17	**25 J**
Vinyl chloride	µg/L	0.02	0.2	0.018 UJ	**0.047 J**	0.018 U	**0.23**	**0.028**	**0.2**	**0.97**	**0.084**	**0.044 J**	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	**0.023 J**	0.018 U	**0.074**	**0.09 U**	**0.09 U**	**0.09 U**	0.018 U	**0.023 J**

J indicates that the value was between the method detection limit and the limit of quantitation and, therefore, is estimated.

U indicates that the constituent was not detected above the method detection limit.

UJ indicates that the constituent was not detected above the estimated method detection limit.

R indicates that the initial calibration report associated with this SDG contained relative response factors (RRFs) lower than 0.05 for acetone, 2-Butanone and 1,2-dibromo-3-chloropropane.

Non-detected concentrations were qualified and flagged "R" as rejected.

UB indicates that the constiuent is considered to be below the detection limit listed due to blank contamination.

Bolded values indicate attainment or exceedance of the Wisconsin Administrative Code (WAC) NR 140 Preventative Action Limit (PAL).

Shaded values indicate attainment or exceedance of the Wisconsin Administrative Code (WAC) NR 140 Enforcement Standard (ES).

TABLE 4

Field and Analytical Results—Groundwater Monitoring Well Sampling
October 2004, July 2005, October 2005, January 2006, March 2006, and January
2007 Annual Groundwater Report and Evaluation of Monitored Natural Attenuatior
OECI Site

				MW-16S						MW-101B		MW-102D			MW-103S						MW-103D						MW-105B			MW-105S					
Constituent	**Units**	**WAC NR 140 PAL**	**WAC NR 140 ES**	**05CA05-17, 18 Oct 04**	**04CA40-35, 36 Jul 05**	**06CA01-28, 29 Oct 05**	**06CD09-50, 51 Jan 06**	**06CD16-44, 45 Mar 06**	**07CE18-85, 86 Jan 07**	**05CA40-14 Jul 05**	**06CD09-47 Jan 06**	**05CA40-15 Jul 05**	**06CD09-19 Jan 06**	**07CE18-41, 42 Jan 07**	**05CA05-21, 22 Oct 04**	**05CA40-26, 27 Jul 05**	**06CA01-03, 04 Oct 05**	**06CD09-03, 04 Jan 06**	**06CD16-03, 04 Mar 06**	**07CE18-03, 04 Jan 07**	**05CA05-19, 20 Oct 04**	**05CA40-24, 25 Jul 05**	**06CA01-01, 02 Oct 05**	**06CD09-01, 02 Jan 06**	**06CD16-01, 02 Mar 06**	**07CE18-01, 02 Jan 07**	**05CA40-32 Jul 05**	**06CD09-14 Jan 06**	**07CE18-59, 60 Jan 07**	**05CA05-25, 26 Oct 04**	**05CA40-20, 21 Jul 05**	**06CA01-19, 20 Oct 05**	**06CD09-21, 22 Jan 06**	**06CD16-18, 19 Mar 06**	**07CE18-63, 64 Jan 07**
Field Parameters																																			
Dissolved Oxygen (DO)	mg/L			3.33	5.6%	0.17	0.34	2.53	NR	0.58	0.37	8.1%	1.02	NR	0.38	0.96	0.77	1.61	0.75	0.97	0.35	6.5%	1.59	0.57	0.47	NR	0.86	0.98	0.89	0.19	11.9%	5.27	0.70	0.48	NR
Oxidation Reduction Potential (ORP)	millivolts			-157.8	75.1	-58.3	-118.7	-70.4	-348.1	-35.7	128.2	23.6	-59.6	-331.0	197.7	205.3	173	241.5	97.1	180.5	24.8	98.2	221.0	128.4	143.7	-276.2	-51.8	-52.2	-33.5	-32.8	-50.1	70.2	-11.8	-4.0	-294.3
pH	pH units			7.03	6.69	6.23	6.87	6.57	6.77	7.02	6.97	6.88	7.40	7.13	6.95	6.44	6.63	7.08	7.05	7.55	7.12	7.04	5.95	6.94	6.97	7.20	6.45	6.89	7.09	7.31	7.02	6.21	7.31	7.09	7.07
Specific Conductivity	mmhos/cm			3.293	3.459	3.623	3.154	4.229	4.647	1.167	0.925	1.470	2.453	1.672	1.249	1.462	1.381	2.807	1.341	1.378	1.565	1.373	1.100	1.163	1.359	1.225	1.105	0.916	1.151	1.620	1.714	1.414	1.368	1.433	1.730
Temperature	deg c			12.87	15.14	14.02	8.22	9.07	7.15	13.23	11.80	13.79	10.01	10.31	16.17	14.39	18.14	8.31	6.73	7.72	14.35	13.41	16.84	10.41	8.97	7.04	12.90	8.17	7.31	12.98	12.71	14.86	8.11	8.67	8.05
Depth to water	feet			4.17	4.93	5.25	3.30	2.90	2.79	7.14	6.61	9.83	9.55	7.41	7.60	7.56	8.68	6.74	5.52	5.34	7.73	7.67	8.80	6.89	5.64	5.46	5.08	4.39	2.78	5.16	5.55	6.18	4.20	3.54	3.39
Natural Attenuation Parameters																																			
Alkalinity, total (as CaCO3)	mg/L	N/A	N/A	930	840	930	910	890	920					430	445	450	450	460	460	510	452	410	440	420	390 J	400			360	367	370	390	310	330	440
Chloride (as Cl)	mg/L	125	250	**155**	**170**	**220**	**220**	**260**	**290**					**240**	**218**	**160**	**190**	**150**	**140**	**140**	**200**	**170**	**180**	**180**	**170**	**160**			**140**	**281**	**290**	**250**	**150**	**190**	**290**
Ethane	µg/L	N/A	N/A	1.8 J	1.3 J	0.56 J	0.5 U	1.5 U	3.5 J					0.4 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.4 UJ	0.6 J	0.5 U	0.5 U	0.5 U	0.5 UJ	0.4 UJ			0.4 UJ	1.4 J	0.5 U	0.5 U	0.5 U	0.5 U	1.3 J
Ethene	µg/L	N/A	N/A	12	4.1	4.3	6.1	4	0.5 U					0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.96 J	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U			0.5 U	0.61 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Iron, total	µg/L	150	300	**6,450**	**8,260**	**6,590**	**4,790**	**8,350**	**9,710**					**1,510**	**154**	69.9 J	39.8 J	**226**	89.3 J	39 U	29.6	25 U	25 U	28.4 J	39 U	39 U			**817**	**384**	**930**	**540**	**366**	**714 J**	**2,850**
Iron, dissolved	µg/L	150	300	**5,830**	**7,420**	**6,130**	**4,470**	**7,990**	**8,700**					**1,370**	139	43.6 J	30.4 J	123	42.7 J	10 U	14 U	25 U	25 U	25 U	10 U	10 U			**449**	**338**	**557**	**287**	**213**	**435 J**	**1,000**
Manganese, total	µg/L	25	50		**78.1**	**85**	**85.5**	**85.5**	**91.5**					**50.7**		**395**	**351**	**267**	**270**	**319**		**284**	**254 J**	**278**	**261**	**200**			**1,210**		**241**	**198**	**202**	**243**	**220**
Manganese, dissolved	µg/L	25	50	**81.5**	**71.2**	**79.2**	**81.4**	**80.4**	**84.6**					**48.6**	**402**	**375**	**354**	**247**	**263**	**324**	**283**	**272**	**255 J**	**258**	**264**	**194**			**776**	**227**	**229**	**197**	**190**	**226**	**209**
Methane	µg/L	N/A	N/A	680	530	180	440	200	49					4.7 J	7.5 J	62	24	24	47 J	4.5 J	72	73	79	60	48 J	12 J			440	110	42	0.59 J	7.3	89	280 J
Nitrogen, nitrate (as N)	mg/L	2	10	0.06 U	0.052 J	0.08 J	0.12 J	0.06 U	0.11 J					0.12 J	0.19 J	0.28	0.05 J	**2.2**	**4.3**	0.66	0.06 UJ	0.04 U	0.05 J	0.04 U	0.06 U	0.12 J			0.12 J	0.06 UJ	0.04 U	0.048 J	0.04 U	0.06 U	0.06 U
Sulfate (as SO4)	mg/L	125	250	**941 J**	**1,000**	**1,300**	**1,400**	**1,400**	**1,500**					**140**	**128**	74	72	89	93	93	60	47	45	48	45	41			22	77.5	68	66	61	100	62
Sulfide	mg/L	N/A	N/A	1 UJ	1 U	1 U	1 U	1	1 U					1 U	1 UJ	1 U	1 U	1 U	1 U	1 U	1 UJ	1 U	1 U	1 U	1 U	1 U			1 U	1 UJ	1.3 J	1 J	1 U	1 U	1 U
Total Organic Carbon	mg/L	N/A	N/A	5	3.9	3.7	3.8	2.8	3.4					2.2 J	6.6	6.1	5.8	5.2	18	6.7	5.3	3.7	4.1	3.2	2.7	2.7			1.2 J	3.5	2.6 J	4.1	2.9	2.5	2.4
VOCs																																			
1,1,1-Trichloroethane	µg/L	40	200	0.07 U	1.8 U	3.5 U	7 U	7 U	8 U	0.07 U	0.07 U	0.07 UJ	0.07 U	0.04 U	**140**	**150**	**200**	**110**	**110**	**180**	**480**	**450 J**	**460**	**520**	**320**	**210**	0.07 UJ	0.07 U	0.04 U	0.64 J	0.45 J	1.1 J	1.8 U	2.2 J	3.3 J
1,1,2,2-Tetrachloroethane	µg/L	0.02	0.2	0.018 U	**0.45 U**	**0.9 U**	**1.8 U**	**1.8 U**	**3.6 U**	0.018 U	0.018 U	0.018 UJ	0.018 U	0.018 U	0.018 U	**0.9 U**	**0.9 U**	**0.36 U**	**0.36 U**	**0.36 U**	0.018 U	**9 U**	**1.8 U**	**1.8 U**	**1.8 U**	**9 U**	0.018 UJ	0.018 U	0.018 U	0.018 U	0.018 U	**0.18 U**	**0.45 U**	**0.45 U**	**0.45 U**
1,1,2-Trichloroethane	µg/L	0.5	5	0.09 U	**2.3 U**	**4.5 U**	**9 U**	**9 U**	**8 U**	0.09 U	0.09 U	0.09 UJ	0.09 U	0.04 U	0.09 U	**4.5 U**	**4.5 U**	**1.8 U**	**1.8 U**	**0.8 U**	**0.7**	**45 U**	**9 U**	**9 U**	**9 U**	**20 U**	0.09 U	0.09 U	0.04 U	0.09 U	0.09 U	**0.9 U**	**2.3 U**	**2.3 U**	**1 U**
1,1-Dichloroethane	µg/L	85	850	0.067 J	0.78 U	1.6 U	3.1 U	3.1 U	12 U	0.031 U	0.031 U	0.031 UJ	0.031 U	0.06 U	7.6	16 J	22	17	12	7.8	**120**	**89 J**	76	59	65	30 U	0.095 J	0.077 J	0.063 J	4.8	6.5	14	11	7.9	55
1,1-Dichloroethene	µg/L	0.7	7	0.12 J	**1.5 U**	**3 U**	**6 U**	**6 U**	**8 U**	0.06 U	0.06 U	0.06 UJ	0.12 J	0.094 J	**3.5**	**6.9 J**	**10**	**7.2 J**	**4.2**	**4.8**	**80**	**85 J**	**73**	**83 J**	**70**	**20 U**	0.06 U	0.06 U	0.04 U	**0.94**	0.52	**2**	**2.4 J**	**1.5 U**	**10**
1,2,3-Trichlorobenzene	µg/L	N/A	N/A	0.08 U	2 U	4 U	8 U	8 U	16 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	4 UJ	4 U	1.6 U	1.6 U	1.6 U	0.08 U	40 UJ	8 U	8 U	8 U	40 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.8 U	2 U	2 U	2 U
1,2,4-Trichlorobenzene	µg/L	14	70	0.06 U	1.5 U	3 U	6 U	6 U	**20 U**	0.06 U	0.06 U	0.06 U	0.06 U	0.1 U	0.06 U	3 UJ	3 U	1.2 UJ	1.2 UJ	2 U	0.06 U	**30 UJ**	6 U	6 UJ	6 UJ	**50 U**	0.06 U	0.06 U	0.1 U	0.06 U	0.06 U	0.6 U	1.5 U	1.5 U	2.5 U
1,2-Dibromo-3-chloropropane	µg/L	0.02	0.2	**0.026 U**	**0.65 U**	1.3 UJ	**2.6 U**	**2.6 U**	**8 U**	**0.026 U**	**0.026 U**	**0.026 U**	**0.026 U**	**0.04 U**	**0.026 U**	**1.3 R**	1.3 UJ	**0.52 U**	**0.52 R**	**0.8 U**	**0.026 U**	**13 R**	2.6 UJ	**2.6 U**	2.6 R	**20 U**	**0.026 U**	**0.026 U**	**0.04 U**	**0.026 U**	**0.026 U**	0.26 UJ	**0.65 U**	**0.65 U**	**1 U**
1,2-Dibromoethane	µg/L	0.5	5	0.023 U	**0.58 U**	**1.2 U**	**2.3 U**	**2.3 U**	**6 U**	0.023 U	0.023 U	0.023 U	0.023 U	0.03 U	0.023 U	**1.2 U**	**1.2 U**	0.46 U	0.46 U	**0.6 U**	0.023 U	**12 U**	**2.3 U**	**2.3 U**	**2.3 U**	**15 U**	0.023 UJ	0.023 U	0.03 U	0.023 U	0.023 U	0.23 U	**0.58 U**	**0.58 U**	**0.75 U**
1,2-Dichlorobenzene	µg/L	60	600	0.04 U	1 U	2 U	4 U	4 U	8 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	2 U	2 U	0.8 U	0.8 U	0.8 U	0.04 U	20 U	4 U	4 U	4 U	20 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.4 U	1 U	1 U	1 U
1,2-Dichloroethane	µg/L	0.5	5	**0.54**	**1 U**	**2 U**	**4 U**	**4 U**	**6 U**	0.04 U	0.04 U	0.071 J	0.14	0.38	0.26	**2 U**	**2 U**	**0.8 U**	**0.8 U**	**3.1**	**0.75**	**20 U**	**4 U**	**4 U**	**4 U**	**15 U**	0.04 UJ	0.04 U	0.03 U	0.04 U	0.04 U	0.4 U	**1 U**	**1 U**	**0.75 U**
1,2-Dichloropropane	µg/L	0.5	5	0.06 U	**1.5 U**	**3 U**	**6 U**	**6 U**	**10 U**	0.06 U	0.06 U	0.06 UJ	0.06 U	0.05 U	0.06 U	**3 U**	**3 U**	**1.2 U**	**1.2 U**	**1 U**	0.06 U	**30 U**	**6 U**	**6 U**	**6 U**	**25 U**	0.06 UJ	0.06 U	0.05 U	0.06 U	0.06 U	**0.6 U**	**1.5 U**	**1.5 U**	**1.3 U**
1,3-Dichlorobenzene	µg/L	125	1,250	0.04 U	1 U	2 U	4 U	4 U	10 U	0.04 U	0.04 U	0.04 U	0.04 U	0.05 U	0.04 U	2 U	2 U	0.8 U	0.8 U	1 U	0.04 U	20 U	4 U	4 U	4 U	25 U	0.04 U	0.04 U	0.05 U	0.04 U	0.04 U	0.4 U	1 U	1 U	1.3 U
1,4-Dichlorobenzene	µg/L	15	75	0.05 U	1.3 U	2.5 U	5 U	5 U	12 U	0.05 U	0.05 U	0.05 U	0.05 U	0.06 U	0.05 U	2.5 U	2.5 U	1 U	1 U	1.2 U	0.05 U	**25 U**	5 U	5 U	5 U	**30 U**	0.05 U	0.05 U	0.06 U	0.05 U	0.05 U	0.5 U	1.3 U	1.3 U	1.5 U
2-Butanone	µg/L	N/A	N/A	0.4 UJ	10 R	20 UJ	40 R	40 U	100 U	0.4 R	0.4 R	0.4 R	0.4 R	0.5 U	0.4 UJ	20 R	20 UJ	8 U	8 R	10 U	0.4 UJ	200 R	40 UJ	40 U	40 R	250 U	0.4 R	0.4 R	0.5 U	0.4 UJ	0.4 R	4 UJ	10 R	10 U	13 U
2-Hexanone	µg/L	N/A	N/A	0.5 U	13 U	25 U	50 U	50 U	160 U	0.5 U	0.5 U	0.5 UJ	0.5 R	0.8 U	0.5 U	25 U	25 J	10 U	10 U	16 U	0.5 U	250 U	50 U	50 U	50 U	400 U	0.5 UJ	0.5 R	0.8 U	0.5 U	0.5 U	5 U	13 R	13 U	20 U
4-Methyl-2-pentanone	µg/L	N/A	N/A	0.6 U	15 U	30 U	60 U	60 U	80 U	0.6 U	0.6 U	0.6 UJ	0.6 R	0.4 U	0.6 U	30 U	30 U	12 U	12 U	8 U	0.6 U	300 U	60 U	60 U	60 U	200 U	0.6 UJ	0.6 R	0.4 U	0.6 U	0.6 U	6 U	15 R	15 U	10 U
Acetone	µg/L	200	1,000	1.5 UJ	38 R	75 UJ	190 J	150 U	**260 UJ**	1.5 R	1.5 R	1.5 R	2.1 J	1.3 UJ	1.5 UJ	75 R	75 UJ	61 J	30 R	26 UJ	1.5 UJ	**750 R**	150 UJ	150 U	150 R	**650 UJ**	1.5 R	1.5 R	1.3 UJ	1.5 UJ	1.5 R	15 UJ	38 R	38 U	33 UJ
Benzene	µg/L	0.5	5	0.05 U	**1.3 U**	**3.2 J**	**5 U**	**5 U**	**8 U**	0.05 U	0.05 U	0.05 U	0.05 U	0.04 U	0.096 UB	**2.5 U**	**2.5 U**	**1.1 J**	**1 U**	**1.4 J**	0.18 UB	**25 U**	**5 U**	**5 U**	**5 U**	**20 U**	0.05 U	0.05 U	0.04 U	0.056 UB	0.05 U	**0.5 U**	**1.3 U**	**1.3 U**	**1 U**
Bromochloromethane	µg/L	N/A	N/A	0.05 U	1.3 U	2.5 U	5 U	5 U	10 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	2.5 U	2.5 U	1 U	1 U	1 U	0.05 U	25 U	5 U	5 U	5 U	25 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.5 U	1.3 U	1.3 U	1.3 U
Bromodichloromethane	µg/L	0.06	0.6	0.04 U	**1.1 J**	**2.1 J**	**4 U**	**4.9 J**	**12 J**	0.04 U	0.04 U	0.04 UJ	0.04 U	0.04 U	0.04 U	**2 U**	**2.5 J**	**0.8 U**	**0.8 U**	**1.2 J**	0.04 U	**34 J**	**4.9 J**	**4 U**	**4.1 J**	**31 J**	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	**0.4 U**	**1 U**	**1 U**	**1.5 J**
Bromoform	µg/L	0.44	4.4	0.07 U	**1.8 UJ**	**3.5 U**	**7 U**	**7 U**	**8 U**	0.07 U	0.07 U	0.07 U	0.07 UJ	0.04 U	0.07 U	**3.5 UJ**	**3.5 U**	**1.4 UJ**	**1.4 U**	**0.8 U**	0.07 U	**35 UJ**	**7 U**	**7 UJ**	**7 U**	**20 U**	0.07 UJ	0.07 U	0.04 U	0.07 U	0.07 UJ	**0.7 U**	**1.8 UJ**	**1.8 U**	**1 U**
Bromomethane	µg/L	1	10	0.06 U	**1.5 U**	**3 U**	**6 U**	**6 U**	**12 UJ**	0.06 UJ	0.06 U	0.06 UJ	0.06 UJ	0.06 UJ	0.06 U	**3 UJ**	**3 U**	**1.2 UJ**	**1.2 U**	**1.2 U**	0.06 U	**30 UJ**	**6 U**	**6 UJ**	**6 U**	**30 U**	0.06 UJ	0.06 UJ	0.06 UJ	0.06 U	0.06 U	0.6 U	**1.5 UJ**	**1.5 U**	**1.5 UJ**
Carbon disulfide	µg/L	200	1,000	0.1 U	2.5 U	5 U	10 U	10 U	20 U	0.13 UB	0.1 U	0.1 U	0.1 UJ	0.1 U	0.1 U	5 U	5 U	2 UJ	2 U	2 U	0.1 U	50 U	10 U	10 UJ	10 U	50 U	0.12 J	0.1 U	0.1 U	0.1 U	0.1 U	1 U	2.5 UJ	2.5 U	2.5 U
Carbon tetrachloride	µg/L	0.5	5	0.05 U	**1.3 U**	**2.5 U**	**5 U**	**5 U**	**8 U**	0.05 U	0.05 U	0.05 UJ	0.05 UJ	0.04 U	0.05 U	**2.5 U**	**2.5 U**	**1 U**	**1 U**	**0.8 U**	0.05 U	**25 U**	**5 U**	**5 U**	**5 U**	**20 U**	0.05 UJ	0.05 U	0.04 U	0.05 U	0.05 U	**0.5 U**	**1.3 UJ**	**1.3 U**	**1 U**
Chlorobenzene	µg/L	N/A	N/A	0.05 U	1.3 U	2.5 U	5 U	5 U	12 U	0.05 U	0.05 U	0.05 UJ	0.05 U	0.06 U	3.5	3 J	5.7 J	2.3 J	2.8 J	3.4 J	0.073 J	25 U	5 U	5 U	5 U	30 U	0.05 U	0.05 U	0.06 U	0.6	0.58	0.98 J	1.3 U	1.3 U	1.5 U
Chloroethane	µg/L	80	400	0.06 U	1.5 U	3 U	6 U	6 U	10 U	0.06 U	0.06 U	0.06 UJ	0.06 UJ	0.05 U	0.37 J	3 U	3 U	1.2 U	1.2 U	1 U	0.98 J	30 U	6 U	6 U	6 U	25 U	0.06 UJ	0.066 J	0.05 U	0.06 U	0.06 U	0.6 U	1.5 UJ	1.5 U	1.3 U
Chloroform	µg/L	0.6	6	0.07 U	**1.8 U**	**3.5 U**	**7 U**	**7 U**	**8 U**	0.07 U	0.07 U	0.07 UJ	0.07 U	0.04 U	0.24 UB	**3.5 U**	**3.5 U**	**1.4 U**	**1.4 U**	**0.8 U**	**1.2 UB**	**35 U**	**7 U**	**7 U**	**7 U**	**20 U**	0.07 U	0.07 U	0.04 U	0.07 U	0.07 U	**0.7 U**	**1.8 U**	**1.8 U**	**1 U**
Chloromethane	µg/L	0.3	3	0.05 U	**1.3 U**	**2.5 U**	**5 U**	**5 U**	**10 U**	0.05 U	0.05 U	0.05 UJ	0.05 U	**0.39 U**	0.05 U	**2.5 U**	**2.5 U**	**1 U**	**1 U**	**1 U**	0.05 U	**25 U**	**5 U**	**5 U**	**5 U**	**25 U**	0.05 U	0.05 UJ	**0.41 U**	0.05 U	0.05 U	**0.5 U**	**1.3 U**	**1.3 U**	**1.3 U**
cis-1,2-Dichloroethene	µg/L	7	70	**190**	**330**	**790**	**570**	**820**	**1,300**	0.18 J	0.15 J	**12 J**	**7.6**	**26**	**21**	**47 J**	**59**	**58**	**42**	**30**	**360**	**280 J**	**270**	**220**	**170**	**65**	0.18 J	0.23	0.23	**58**	**69**	**160**	**130**	**90**	**280**
cis-1,3-Dichloropropene	µg/L	0.02	0.2	0.016 U	**0.4 U**	**0.8 U**	**1.6 U**	**1.6 U**	**3.4 U**	0.016 U	0.016 U	0.016 UJ	0.016 U	0.017 U	0.016 U	**0.8 U**	**0.8 U**	**0.32 U**	**0.32 U**	**0.34 U**	0.016 U	**8 U**	**1.6 U**	**1.6 U**	**1.6 U**	**8.5 U**	0.016 U	0.016 U	0.017 U	0.016 U	0.016 U	**0.16 U**	**0.4 U**	**0.4 U**	**0.43 U**
Dibromochloromethane	µg/L	6	60	0.09 U	2.3 U	4.5 U	**9 U**	**9 U**	5.8 U	0.09 U	0.09 U	0.09 UJ	0.09 U	0.029 U	0.09 U	4.5 U	4.5 U	1.8 U	1.8 U	0.58 U	0.09 U	**45 U**	**9 U**	**9 U**	**9 U**	**15 U**	0.09 U	0.09 U	0.029 U	0.09 U	0.09 U	0.9 U	2.3 U	2.3 U	0.73 U
Dichlorodifluoromethane	µg/L	200	1,000	0.06 U	1.5 U	3 U	6 U	6 U	10 U	0.06 U	0.06 U	0.06 U	0.06 U	0.05 U	0.06 U	3 UJ	3 U	1.2 U	1.2 U	1 U	0.06 U	30 UJ	6 U	6 U	6 U	25 U	0.06 U	0.06 U	0.05 U	0.06 U	0.06 U	0.6 U	1.5 U	1.5 U	1.3 U
Ethylbenzene	µg/L	140	700	0.05 U	1.3 U	2.5 U	5 U	5 U	10 U	0.05 U	0.05 U	0.05 UJ	0.05 U	0.05 U	0.05 U	2.5 U	2.5 U	1 U	1 U	1 U	0.05 U	25 U	5 U	5 U	5 U	25 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.5 U	1.3 U	1.3 U	1.3 U
Isopropylbenzene	µg/L	N/A	N/A	0.03 U	0.75 U	1.5 U	3 U	3 U	10 U	0.03 U	0.03 U	0.03 U	0.03 U	0.05 U	0.03 U	1.5 U	1.5 U	0.6 U	0.6 U	1 U	0.03 U	15 U	3 U	3 U	3 U	25 U	0.03 U	0.03 U	0.05 U	0.03 U	0.03 U	0.3 U	0.75 U	0.75 U	1.3 U
m,p-Xylene (sum of isomers)	µg/L	1,000	10,000	0.12 U	3 U	6 U	12 U	12 U	18 U	0.12 U	0.12 U	0.12 U	0.12 U	0.09 U	0.12 U	6 U	6 U	2.4 U	2.4 U	1.8 U	0.12 U	60 U	12 U	12 U	12 U	45 U	0.12 U	0.12 U	0.09 U	0.12 U	0.12 U	1.2 U	3 U	3 U	2.3 U
Methyl tert-butyl ether	µg/L	12	60	0.05 U	1.3 U	2.5 U	5 U	5 U	10 U	0.29 J	0.24	0.45 J	0.23	1.1	0.05 U	2.5 U	2.5 U	1 U	1 U	1 U	0.05 U	**25 U**	5 U	5 U	5 U	**25 U**	0.05 U	0.05 U	0.05 U	0.17 J	0.33 J	0.5 U	1.3 U	1.3 U	1.3 U
Methylene chloride	µg/L	0.5	5	0.11 UJ	**2.8 UJ**	**130 J**	**200 J**	**21 UJ**	**30 UJ**	0.11 UJ	0.11 UJ	0.11 UJ	0.11 R	0.15 R	0.11 UJ	**5.5 UJ**	**120 J**	**2.2 UJ**	**19 J**	**3 UJ**	0.11 UJ	**55 UJ**	**270 J**	**11 UJ**	**11 UJ**	**75 UJ**	0.11 UJ	0.11 R	0.15 UJ	0.11 UJ	0.11 UJ	**31 J**	**2.8 R**	**2.8 UJ**	**3.8 UJ**
o-Xylene	µg/L	N/A	N/A	0.04 U	1 U	2 U	4 U	4 U	10 U	0.04 U	0.04 U	0.04 U	0.04 U	0.05 U	0.04 U	2 U	2 U	0.8 U	0.8 U	1 U	0.04 U	20 U	4 U	4 U	4 U	25 U	0.04 U	0.04 U	0.05 U	0.04 U	0.04 U	0.4 U	1 U	1 U	1.3 U
Styrene	µg/L	10	100	0.04 U	1 U	2 U	4 U	4 U	**10 U**	0.04 U	0.04 U	0.04 UJ	0.04 U	0.05 U	0.04 U	2 U	2 U	0.8 U	0.8 U	1 U	0.04 U	**20 U**	4 U	4 U	4 U	**25 U**	0.04 U	0.04 UJ	0.05 U	0.04 U	0.04 U	0.4 U	1 U	1 U	1.3 U
Tetrachloroethene	µg/L	0.5	5	0.05 U	**1.3 U**	**2.5 U**	**5 U**	**5 U**	**10 U**	0.05 U	0.05 U	0.05 UJ	0.05 U	0.05 U	**1.4**	**2.5 U**	**2.5 U**	**1.7 J**	**1.4 J**	**2.5 J**	0.05 U	**25 U**	**5 U**	**5 U**	**5 U**	**25 U**	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	**0.5 U**	**1.3 U**	**1.3 U**	**1.3 U**
Toluene	µg/L	200	1,000	0.08 U	2 U	4 U	8 U	8 U	10 U	0.08 U	0.08 U	0.08 UJ	0.08 U	0.05 U	0.08 U	4 U	4 U	1.6 U	1.6 U	1 U	0.08 U	40 U	8 U	8 U	8 U	25 U	0.08 U	0.08 U	0.05 U	0.08 U	0.08 U	0.8 U	2 U	2 U	1.3 U
trans-1,2-Dichloroethene	µg/L	20	100	5	6.2 J	7.9	6.8 J	14	**28 J**	0.04 U	0.04 U	0.6 J	0.51	1.5	0.35 J	2 U	2 U	1.3 J	1.2 J	1.4 J	5.5	**20 U**	4 U	4 U	4 U	**30 U**	0.04 U	0.04 U	0.06 U	0.71 J	1.6	1.8	1 U	1 U	2.8 J
trans-1,3-Dichloropropene	µg/L	0.02	0.2	0.015 U	**0.38 U**	**0.75 U**	**1.5 U**	**1.5 U**	**3.8 U**	0.015 U	0.015 U	0.015 UJ	0.015 U	0.019 U	0.015 U	**0.75 U**	**0.75 U**	**0.3 U**	**0.3 U**	**0.38 U**	0.015 U	**7.5 U**	**1.5 U**	**1.5 U**	**1.5 U**	**9.5 U**	0.015 U	0.015 U	0.019 U	0.015 U	0.015 U	**0.15 U**	**0.38 U**	**0.38 U**	**0.48 U**
Trichloroethene	µg/L	0.5	5	0.03 U	**0.75 J**	**1.5 U**	**3 U**	**3 U**	**10 U**	0.03 U	0.046 J	**0.76 J**	**0.63**	**1**	**200**	**230**	**340**	**130**	**140**	**230**	**2,200**	**2,000**	**2,200**	**1,900**	**1,700**	**1,100**	0.09 J	0.069 J	0.066 J	**63**	**76**	**41**	**18**	**33**	**290**
Vinyl chloride	µg/L	0.02	0.2	**85**	**58**	**170**	**260**	**83**	**35**	0.018 U	**0.036 J**	0.018 U	0.018 U	**0.11**	**0.4**	**0.9 U**	**1.2 J**	**0.36 U**	**0.62 J**	**0.56 J**	**2.9**	**9 U**	**4.1 J**	**1.8 U**	**1.8 U**	**9 U**	**0.059**	**0.092 J**	**0.043 J**	**2.3**	**2.3**	**3.7**	**3.2**	**3.3**	**11**

J indicates that the value was between the method detection limit and the limit of quantitation and, therefore, is estimated.
U indicates that the constituent was not detected above the method detection limit.
UJ indicates that the constituent was not detected above the estimated method detection limit.
R indicates that the initial calibration report associated with this SDG contained relative response factors (RRFs) lower than 0.05 for acetone, 2-Butanone and 1,2-dibromo-3-chloropropane.
Non-detected concentrations were qualified and flagged "R" as rejected.
UB indicates that the constiuent is considered to be below the detection limit listed due to blank contamination.
Bolded values indicate attainment or exceedance of the Wisconsin Administrative Code (WAC) NR 140 Preventative Action Limit (PAL).
Shaded values indicate attainment or exceedance of the Wisconsin Administrative Code (WAC) NR 140 Enforcement Standard (ES).

TABLE 4

Field and Analytical Results—Groundwater Monitoring Well Sampling

October 2004, July 2005, October 2005, January 2006, March 2006, and January

2007 Annual Groundwater Report and Evaluation of Monitored Natural Attenuatior

OECI Site

				MW-105D						MW-106S			MW-106D			MW-107S		MW-107D	
Constituent	**Units**	**WAC NR 140 PAL**	**WAC NR 140 ES**	**05CA05-23, 24 Oct 04**	**04CA40-33, 34 Jul 05**	**06CA01-17, 18 Oct 05**	**06CD09-12, 13 Jan 06**	**06CD16-16, 17 Mar 06**	**07CE18-61, 62 Jan 07**	**05CA40-07 Jul 05**	**06CD09-23 Jan 06**	**07CE18-75 Jan 07**	**05CA40-12 Jul 05**	**06CD09-15 Jan 06**	**07CE18-74 Jan 07**	**06CD16-34, 35 Mar 06**	**07CE18-79 Jan 07**	**06CD16-32, 33 Mar 06**	**07CE18-81 Jan 07**
Field Parameters																			
Dissolved Oxygen (DO)	mg/L			6.09	1.04	0.48	0.93	0.59	NR	10.1%	1.54	NR	0.97	0.49	NR	0.97	NR	0.29	7.3
Oxidation Reduction Potential (ORP)	millivolts			-56.3	-15.3	-67.1	-16.0	-92.3	-323.4	23.1	87.0	-352.9	-66.7	48.9	-339.2	-88.6	-329.1	-83.8	-63.8
pH	pH units			7.34	5.86	6.69	6.89	7.09	7.09	6.79	7.59	7.25	7.09	7.24	7.29	7.36	7.43	7.11	7.21
Specific Conductivity	mmhos/cm			1.299	1.411	1.472	1.290	1.706	1.407	0.960	1.444	0.985	1.231	0.765	1.227	0.828	0.842	1.185	1.304
Temperature	deg c			12.10	11.08	13.93	8.50	9.44	8.50	11.81	7.04	8.47	10.94	8.48	8.70	6.20	5.72	7.90	7.78
Depth to water	feet			5.01	5.51	6.27	4.20	3.08	2.88	5.80	4.51	3.69	5.40	4.45	2.90	3.10	3.02	2.81	2.68
Natural Attenuation Parameters																			
Alkalinity, total (as CaCO3)	mg/L	N/A	N/A	362	400	420	400	400	410							340		370	
Chloride (as Cl)	mg/L	125	250	**159**	**200**	**250**	**230**	**290**	**200**							40		**140**	
Ethane	µg/L	N/A	N/A	0.62 J	0.5 U	1.4 J	1.4 J	0.5 U	0.4 UJ							0.5 U		0.5 U	
Ethene	µg/L	N/A	N/A	0.8 J	0.5 U	1.5	1.1 J	0.5 U	0.5 U							0.5 U		0.5 U	
Iron, total	µg/L	150	300	**845 J**	**1,090**	**1,050**	**1,760**	**1,810 J**	**1,600**							**875 J**		**1,520**	
Iron, dissolved	µg/L	150	300	**863 J**	**984**	**974**	**1,510**	**1,620 J**	**1,360**							**668 J**		**1,160**	
Manganese, total	µg/L	25	50		**69.5**	**81.6 J**	**89.2**	**71**	**67.5**							**78**		24.1	
Manganese, dissolved	µg/L	25	50	**67.5**	**66.4**	**82.2 J**	**82.2**	**65.6**	**61.2**							**71.5**		18.6	
Methane	µg/L	N/A	N/A	1,900	170	150	270	78	46 J							1.5 U		0.5 U	
Nitrogen, nitrate (as N)	mg/L	2	10	0.06 UJ	0.05 J	0.04 U	0.04 U	0.06 U	0.06 U							0.06 U		0.06 U	
Sulfate (as SO4)	mg/L	125	250	75.9	58	74	68	59	65							83		89	
Sulfide	mg/L	N/A	N/A	1 UJ	1 J	1 U	1 U	1 U	1 U							1 U		1 U	
Total Organic Carbon	mg/L	N/A	N/A	4.1	3.7	3.5	1.7 J	1.5 J	4.7							0.7 U		2.3 J	
VOCs																			
1,1,1-Trichloroethane	µg/L	40	200	0.5 J	1.4 U	1.4 U	7 U	1.8 U	0.2 U	0.07 U	0.07 U	0.04 U	0.07 U	0.07 U	0.04 U	0.07 U	0.04 U	0.07 U	0.04 U
1,1,2,2-Tetrachloroethane	µg/L	0.02	0.2	0.018 U	**0.36 U**	**0.36 U**	**1.8 U**	**0.45 U**	**0.09 U**	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U
1,1,2-Trichloroethane	µg/L	0.5	5	0.09 U	**1.8 U**	**1.8 U**	**9 U**	**2.3 U**	0.2 U	0.09 U	0.09 U	0.04 U	0.09 U	0.09 U	0.04 U	0.09 U	0.04 U	0.09 U	0.04 U
1,1-Dichloroethane	µg/L	85	850	16	15 J	**140**	**180**	12	8.4	0.031 U	0.031 U	0.06 U	0.031 U	0.031 U	0.06 U	0.031 U	0.06 U	0.031 U	0.06 U
1,1-Dichloroethene	µg/L	0.7	7	**2.6**	**2.4 J**	**14**	**36**	**2 J**	**1.5**	0.06 U	0.06 U	0.04 U	0.06 U	0.06 U	0.04 U	0.06 U	0.04 U	0.06 U	0.04 U
1,2,3-Trichlorobenzene	µg/L	N/A	N/A	0.08 U	1.6 U	1.6 U	8 U	2 U	0.4 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U
1,2,4-Trichlorobenzene	µg/L	14	70	0.06 U	1.2 U	1.2 U	6 U	1.5 U	0.5 U	0.06 U	0.06 U	0.1 U	0.06 U	0.06 U	0.1 U	0.06 U	0.1 U	0.06 U	0.1 U
1,2-Dibromo-3-chloropropane	µg/L	0.02	0.2	**0.026 U**	**0.52 U**	**0.52 UJ**	**2.6 U**	**0.65 U**	**0.2 U**	**0.026 U**	**0.026 U**	**0.04 U**	**0.026 U**	**0.026 U**	**0.04 U**	**0.026 U**	**0.04 U**	**0.026 U**	**0.04 U**
1,2-Dibromoethane	µg/L	0.5	5	0.023 U	0.46 U	0.46 U	**2.3 U**	**0.58 U**	0.15 U	0.023 U	0.023 U	0.03 U	0.023 U	0.023 U	0.03 U	0.023 U	0.03 U	0.023 U	0.03 U
1,2-Dichlorobenzene	µg/L	60	600	0.04 U	0.8 U	0.8 U	4 U	1 U	0.2 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U
1,2-Dichloroethane	µg/L	0.5	5	0.17 J	**0.8 U**	**0.8 U**	**4 U**	**1 U**	0.15 U	0.04 U	0.04 U	0.03 U	0.04 U	0.04 U	0.03 U	0.04 U	0.03 U	0.04 U	0.03 U
1,2-Dichloropropane	µg/L	0.5	5	0.06 U	**1.2 U**	**1.2 U**	**6 U**	**1.5 U**	0.25 U	0.06 U	0.06 U	0.05 U	0.06 U	0.06 U	0.05 U	0.06 U	0.05 U	0.06 U	0.05 U
1,3-Dichlorobenzene	µg/L	125	1,250	0.04 U	0.8 U	0.8 U	4 U	1 U	0.25 U	0.04 U	0.04 U	0.05 U	0.04 U	0.04 U	0.05 U	0.04 U	0.05 U	0.04 U	0.05 U
1,4-Dichlorobenzene	µg/L	15	75	0.05 U	1 U	1 U	5 U	1.3 U	0.3 U	0.05 U	0.05 U	0.06 U	0.05 U	0.05 U	0.06 U	0.05 U	0.06 U	0.05 U	0.06 U
2-Butanone	µg/L	N/A	N/A	0.4 UJ	8 R	8 UJ	40 R	10 U	2.5 U	0.4 R	0.4 R	0.5 U	0.4 R	0.4 R	0.5 U	0.4 U	0.5 U	0.4 U	0.5 U
2-Hexanone	µg/L	N/A	N/A	0.5 U	10 U	10 U	50 R	13 U	4 U	0.5 U	0.5 R	0.8 U	0.5 U	0.5 R	0.8 U	0.5 U	0.8 U	0.5 U	0.8 U
4-Methyl-2-pentanone	µg/L	N/A	N/A	0.6 U	12 U	12 U	60 R	15 U	2 U	0.6 U	0.6 R	0.4 U	0.6 U	0.6 R	0.4 U	0.6 U	0.4 U	0.6 U	0.4 U
Acetone	µg/L	200	1,000	1.5 UJ	30 R	30 UJ	150 R	38 U	6.5 UJ	1.5 R	1.5 R	1.3 UJ	3.4 J	1.5 R	1.3 UJ	1.5 U	1.3 UJ	1.5 U	1.3 UJ
Benzene	µg/L	0.5	5	0.05 U	**1 U**	**1 U**	**5 U**	**1.3 U**	0.2 U	0.05 U	0.05 U	0.04 U	0.05 U	0.05 U	0.04 U	0.05 U	0.04 U	0.05 U	0.04 U
Bromochloromethane	µg/L	N/A	N/A	0.05 U	1 U	1 U	5 U	1.3 U	0.25 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Bromodichloromethane	µg/L	0.06	0.6	0.04 U	**0.8 U**	**1.1 J**	**4 U**	**1.7 J**	**0.2 U**	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U
Bromoform	µg/L	0.44	4.4	0.07 U	**1.4 UJ**	**1.4 U**	**7 UJ**	**1.8 U**	0.2 U	0.07 U	0.07 UJ	0.04 U	0.07 U	0.07 UJ	0.04 U	0.07 U	0.04 U	0.07 U	0.04 U
Bromomethane	µg/L	1	10	0.06 U	**1.2 U**	**1.2 U**	**6 UJ**	**1.5 U**	0.3 UJ	0.06 UJ	0.06 UJ	0.06 UJ	0.06 UJ	0.06 UJ	0.06 UJ	0.06 U	0.06 UJ	0.06 U	0.06 UJ
Carbon disulfide	µg/L	200	1,000	0.1 U	2 U	2 U	10 UJ	2.5 U	0.5 U	0.1 U	0.1 UJ	0.1 U	0.1 U	0.1 UJ	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Carbon tetrachloride	µg/L	0.5	5	0.05 U	**1 U**	**1 U**	**5 UJ**	**1.3 U**	0.2 U	0.05 U	0.05 U	0.04 U	0.05 U	0.05 UJ	0.04 U	0.05 U	0.04 U	0.05 U	0.04 U
Chlorobenzene	µg/L	N/A	N/A	0.05 U	1 U	1 U	5 U	1.3 U	0.3 U	0.05 U	0.05 U	0.06 U	0.05 U	0.05 U	0.06 U	0.05 U	0.06 U	0.05 U	0.06 U
Chloroethane	µg/L	80	400	0.06 U	1.2 U	1.7 J	6 UJ	1.5 U	0.25 U	0.06 U	0.06 U	0.05 U	0.06 U	0.06 UJ	0.05 U	0.06 U	0.05 U	0.06 U	0.05 U
Chloroform	µg/L	0.6	6	0.07 U	**1.4 U**	**1.4 U**	**7 U**	**1.8 U**	0.2 U	0.07 U	0.07 U	0.04 U	0.07 U	0.07 U	0.04 U	0.07 U	0.04 U	0.07 U	0.04 U
Chloromethane	µg/L	0.3	3	0.05 U	**1 U**	**1 U**	**5 U**	**1.3 U**	**0.51 U**	0.05 U	0.05 UJ	**0.42 U**	0.05 UJ	0.086 J	**0.3 U**	0.05 U	**0.37 U**	0.088 J	**0.55 U**
cis-1,2-Dichloroethene	µg/L	7	70	**56**	**29**	**350**	**460**	**38**	**39**	0.06 U	0.06 U	0.03 U	0.06 U	0.06 U	0.03 U	0.06 U	0.03 U	0.06 U	0.03 U
cis-1,3-Dichloropropene	µg/L	0.02	0.2	0.016 U	**0.32 U**	**0.32 U**	**1.6 U**	**0.4 U**	**0.085 U**	0.016 U	0.016 U	0.017 U	0.016 U	0.016 U	0.017 U	0.016 U	0.017 U	0.016 U	0.017 U
Dibromochloromethane	µg/L	6	60	0.09 U	1.8 U	1.8 U	**9 U**	2.3 U	0.15 U	0.09 U	0.09 U	0.029 U	0.09 U	0.09 U	0.029 U	0.09 U	0.029 U	0.09 U	0.029 U
Dichlorodifluoromethane	µg/L	200	1,000	0.06 U	1.2 U	1.2 U	6 U	1.5 U	0.25 U	0.06 U	0.06 U	0.05 U	0.06 U	0.06 U	0.05 U	0.06 U	0.05 U	0.06 U	0.05 U
Ethylbenzene	µg/L	140	700	0.05 U	1 U	1 U	5 U	1.3 U	0.25 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Isopropylbenzene	µg/L	N/A	N/A	0.03 U	0.6 U	0.6 U	3 U	0.75 U	0.25 U	0.03 U	0.03 U	0.05 U	0.03 U	0.03 U	0.05 U	0.03 U	0.05 U	0.03 U	0.05 U
m,p-Xylene (sum of isomers)	µg/L	1,000	10,000	0.12 U	2.4 U	2.4 U	12 U	3 U	0.45 U	0.12 U	0.12 U	0.09 U	0.12 U	0.12 U	0.09 U	0.12 U	0.09 U	0.12 U	0.09 U
Methyl tert-butyl ether	µg/L	12	60	0.05 U	1 U	1 U	5 U	1.3 U	0.25 J	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Methylene chloride	µg/L	0.5	5	0.11 UJ	**2.2 UJ**	**52 J**	**11 R**	**22 UJ**	**0.75 UJ**	0.11 UJ	0.11 R	0.15 UJ	0.11 UJ	0.11 R	0.15 UJ	0.11 U	0.15 UJ	0.11 U	0.15 UJ
o-Xylene	µg/L	N/A	N/A	0.04 U	0.8 U	0.8 U	4 U	1 U	0.25 U	0.04 U	0.04 U	0.05 U	0.04 U	0.04 U	0.05 U	0.04 U	0.05 U	0.04 U	0.05 U
Styrene	µg/L	10	100	0.04 U	0.8 U	0.8 U	4 U	1 U	0.25 U	0.04 U	0.04 U	0.05 U	0.04 U	0.04 U	0.05 R	0.04 U	0.05 U	0.04 U	0.05 U
Tetrachloroethene	µg/L	0.5	5	0.05 U	**1 U**	**1 U**	**5 U**	**1.3 U**	0.25 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Toluene	µg/L	200	1,000	0.08 U	1.6 U	1.6 U	8 U	2 U	0.25 U	0.08 U	0.08 U	0.05 U	0.08 U	0.08 U	0.05 U	0.08 U	0.05 U	0.08 U	0.05 U
trans-1,2-Dichloroethene	µg/L	20	100	2.6	1	11	15	1.4 J	1.4	0.04 U	0.04 U	0.06 U	0.04 U	0.04 U	0.06 U	0.04 U	0.06 U	0.04 U	0.06 U
trans-1,3-Dichloropropene	µg/L	0.02	0.2	0.015 U	**0.3 UJ**	**0.3 U**	**1.5 U**	**0.38 U**	**0.095 U**	0.015 U	0.015 U	0.019 U	0.015 U	0.015 U	0.019 U	0.015 U	0.019 U	0.015 U	0.019 U
Trichloroethene	µg/L	0.5	5	**240**	**130**	**470**	**2,100**	**160**	**42**	0.03 U	0.03 U	0.05 U	0.03 U	0.039 J	0.05 U	0.03 U	0.05 U	0.03 U	0.05 U
Vinyl chloride	µg/L	0.02	0.2	**1.5**	**1.1**	**9.2**	**21**	**0.96 J**	**0.7**	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U

J indicates that the value was between the method detection limit and the limit of quantitation and, therefore, is estimated.

U indicates that the constituent was not detected above the method detection limit.

UJ indicates that the constituent was not detected above the estimated method detection limit.

R indicates that the initial calibration report associated with this SDG contained relative response factors (RRFs) lower than 0.05 for acetone, 2-Butanone and 1,2-dibromo-3-chloropropane.

Non-detected concentrations were qualified and flagged "R" as rejected.

UB indicates that the constiuent is considered to be below the detection limit listed due to blank contamination.

Bolded values indicate attainment or exceedance of the Wisconsin Administrative Code (WAC) NR 140 Preventative Action Limit (PAL).

Shaded values indicate attainment or exceedance of the Wisconsin Administrative Code (WAC) NR 140 Enforcement Standard (ES).

TABLE 5

Field and Analytical Results—Groundwater Private Well Sampling

October 2004, July 2005, October 2005, January 2006, March 2006, and January 2007

2007 Annual Groundwater Report and Evaluation of Monitored Natural Attenuatior

OECI Site

				PW-01			PW-02			PW-03				PW-04				PW-05				PW-07				PW-08			PW-09			
Constituent	Units	WAC NR 140 PAL	WAC NR 140 ES	05CA40-48 Jul 05	06CD09-41 Jan 06	07CE18-33 Jan 07	05CA40-49 Jul 05	06CD09-67 Jan 06	07CE18-34 Jan 07	05CA40-56 Jul 05	06CD09-62 Jan 06	06CD16-50 Mar 06	07CE18-35 Jan 07	05CA40-50 Jul 05	06CD09-39 Jan 06	06CD16-37 Mar 06	07CE18-36 Jan 07	05CA40-51 Jul 05	06CD09-52 Jan 06	06CD16-38 Mar 06	07CE18-76 Jan 07	05CA40-52 Jul 05	06CD09-68 Jan 06	06CD16-48 Mar 06	07CE18-37 Jan 07	05CA40-57 Jul 05	06CD09-43 Jan 06	06CD16-39 Mar 06	05CA40-53 Jul 05	06CD09-40 Jan 06	06CD16-36 Mar 06	07CE18-38 Jan 07
Field Parameters																																
Dissolved Oxygen (DO)	mg/L			4.5			2.94			5.51				9.2				4.69				2.79				3.41			6.27			
Oxidation Reduction Potential (ORP)	millivolts			-80.8			-77.2			-101.8				-82.7				-62.1				-90				-70.9			-82.6			
pH	pH units			6.8			6.77			7.02				7.28				7.16				6.92				6.73			6.97			
Specific Conductivity	mmhos/cm			0.674			0.64			0.985				1.033				0.962				1.237				1.243			1.101			
Temperature	deg c			14.36			15.66			12.89				13.75				12.98				14.09				13.79			14.33			
Depth to water	feet																															
VOCs																																
1,1,1-Trichloroethane	µg/L	40	200	0.07 U	0.07 U	0.04 U	0.07 U	0.07 U	0.04 U	0.07 U	0.07 UJ	0.07 UJ	0.04 U	0.07 U	0.07 U	0.07 U	0.04 U	0.07 U	0.07 U	0.07 U	0.04 U	0.07 U	0.07 U	0.07 U	0.04 U	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U	0.04 U
1,1,2,2-Tetrachloroethane	µg/L	0.02	0.2	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 UJ	0.018 UJ	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U
1,1,2-Trichloroethane	µg/L	0.5	5	0.09 U	0.09 U	0.04 U	0.09 U	0.09 U	0.04 U	0.09 U	0.09 UJ	0.09 UJ	0.04 U	0.09 U	0.09 U	0.09 U	0.04 U	0.09 U	0.09 U	0.09 U	0.04 U	0.09 U	0.09 U	0.09 U	0.04 U	0.09 U	0.09 U	0.09 U	0.09 U	0.09 U	0.09 U	0.04 U
1,1-Dichloroethane	µg/L	85	850	0.039	0.041 J	0.06 U	0.031 U	0.031 U	0.06 U	0.031 U	0.031 UJ	0.031 UJ	0.06 U	0.031 U	0.031 U	0.031 U	0.06 U	0.031 U	0.031 U	0.031 U	0.06 U	0.031 U	0.031 U	0.031 U	0.06 U	0.031 U	0.031 U	0.031 U	0.031 U	0.031 U	0.031 U	0.06 U
1,1-Dichloroethene	µg/L	0.7	7	0.06 U	0.06 U	0.04 U	0.06 U	0.06 U	0.04 U	0.06 U	0.06 UJ	0.06 UJ	0.04 U	0.06 U	0.06 U	0.06 U	0.04 U	0.06 U	0.06 U	0.06 U	0.04 U	0.06 U	0.06 U	0.06 U	0.04 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.04 U
1,2,3-Trichlorobenzene	µg/L	N/A	N/A	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 UJ	0.08 UJ	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U
1,2,4-Trichlorobenzene	µg/L	14	70	0.06 U	0.06 U	0.1 U	0.06 U	0.06 U	0.1 U	0.06 U	0.06 UJ	0.06 UJ	0.1 U	0.06 U	0.06 U	0.06 U	0.1 U	0.06 U	0.06 U	0.06 U	0.1 U	0.06 U	0.06 U	0.06 U	0.1 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.1 U
1,2-Dibromo-3-chloropropane	µg/L	0.02	0.2	**0.026 U**	**0.026 U**	**0.04 U**	**0.026 U**	**0.026 U**	**0.04 U**	**0.026 U**	**0.026 UJ**	**0.026 UJ**	**0.04 U**	**0.026 U**	**0.026 U**	**0.026 U**	**0.04 U**	**0.026 U**	**0.026 U**	**0.026 U**	**0.04 U**	**0.026 U**	**0.026 U**	**0.026 U**	**0.04 U**	**0.026 U**	**0.026 U**	**0.026 U**	**0.026 U**	**0.026 U**	**0.026 U**	**0.04 U**
1,2-Dibromoethane	µg/L	0.5	5	0.023 U	0.023 U	0.03 U	0.023 U	0.023 U	0.03 U	0.023 U	0.023 UJ	0.023 UJ	0.03 U	0.023 U	0.023 U	0.023 U	0.03 U	0.023 U	0.023 U	0.023 U	0.03 U	0.023 U	0.023 U	0.023 U	0.03 U	0.023 U	0.023 U	0.023 U	0.023 U	0.023 U	0.023 U	0.03 U
1,2-Dichlorobenzene	µg/L	60	600	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 UJ	0.04 UJ	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U
1,2-Dichloroethane	µg/L	0.5	5	0.13 J	0.21	0.34	0.04 U	0.04 U	0.03 U	0.04 U	0.04 UJ	0.041 J	0.03 U	0.04 U	0.05 J	0.04 U	0.03 U	0.04 U	0.083 J	0.04 U	0.03 U	0.04 U	0.04 U	0.04 U	0.054 J	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.059 J	0.072 J
1,2-Dichloropropane	µg/L	0.5	5	0.06 U	0.06 U	0.05 U	0.06 U	0.06 U	0.05 U	0.06 U	0.06 UJ	0.06 UJ	0.05 U	0.06 U	0.06 U	0.06 U	0.05 U	0.06 U	0.06 U	0.06 U	0.05 U	0.06 U	0.06 U	0.06 U	0.05 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.05 U
1,3-Dichlorobenzene	µg/L	125	1,250	0.04 U	0.04 U	0.05 U	0.04 U	0.04 U	0.05 U	0.04 U	0.04 UJ	0.04 UJ	0.05 U	0.04 U	0.04 U	0.04 U	0.05 U	0.04 U	0.04 U	0.04 U	0.05 U	0.04 U	0.04 U	0.04 U	0.05 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.05 U
1,4-Dichlorobenzene	µg/L	15	75	0.05 U	0.05 U	0.06 U	0.05 U	0.05 U	0.06 U	0.05 U	0.05 UJ	0.05 UJ	0.06 U	0.05 U	0.05 U	0.05 U	0.06 U	0.05 U	0.05 U	0.05 U	0.06 U	0.05 U	0.05 U	0.05 U	0.06 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.06 U
2-Butanone	µg/L	N/A	N/A	0.4 R	0.4 R	0.5 U	0.4 R	0.4 R	0.5 U	0.4 R	0.4 R	0.4 UJ	0.5 U	0.4 R	0.4 R	0.4 U	0.5 U	0.4 R	0.4 R	0.4 U	0.5 U	0.4 R	0.4 R	0.46 U	0.5 U	0.4 R	0.4 R	0.4 U	0.4 R	0.4 R	0.4 U	0.5 U
2-Hexanone	µg/L	N/A	N/A	0.5 UJ	0.5 R	0.8 U	0.5 U	0.5 U	0.8 U	0.5 U	0.5 UJ	0.5 UJ	0.8 U	0.5 U	0.5 R	0.5 U	0.8 U	0.5 U	0.5 U	0.5 U	0.8 U	0.5 U	0.5 U	0.5 U	0.8 U	0.5 U	0.5 R	0.5 U	0.5 U	0.5 R	0.5 U	0.8 U
4-Methyl-2-pentanone	µg/L	N/A	N/A	0.6 UJ	0.6 R	0.4 U	0.6 U	0.6 U	0.4 U	0.6 U	0.6 UJ	0.6 UJ	0.4 U	0.6 U	0.6 R	0.6 U	0.4 U	0.6 U	0.6 U	0.6 U	0.4 U	0.6 U	0.6 U	0.6 U	0.4 U	0.6 U	0.6 R	0.6 U	0.6 U	0.6 R	0.6 U	0.4 U
Acetone	µg/L	200	1,000	1.5 R	1.5 R	1.3 UJ	1.5 R	1.5 R	1.3 UJ	1.5 R	3.8 J	1.5 UJ	1.3 UJ	1.5 R	1.5 R	1.5 U	1.3 UJ	1.5 R	1.5 R	1.5 U	1.3 UJ	1.5 R	1.5 R	1.5 U	1.3 UJ	1.5 R	1.5 R	1.5 U	1.5 R	1.5 R	1.5 U	1.3 UJ
Benzene	µg/L	0.5	5	0.05 U	0.05 U	0.04 U	0.05 U	0.05 U	0.04 U	0.05 U	0.05 UJ	0.05 UJ	0.04 U	0.05 U	0.05 U	0.05 U	0.04 U	0.05 U	0.05 U	0.05 U	0.04 U	0.05 U	0.05 U	0.05 U	0.04 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.04 U
Bromochloromethane	µg/L	N/A	N/A	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 UJ	0.05 UJ	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Bromodichloromethane	µg/L	0.06	0.6	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 UJ	0.04 UJ	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U
Bromoform	µg/L	0.44	4.4	0.07 U	0.07 U	0.04 U	0.07 U	0.07 U	0.04 U	0.07 U	0.07 UJ	0.07 UJ	0.04 U	0.07 U	0.07 UJ	0.07 U	0.04 U	0.07 U	0.07 U	0.07 U	0.04 U	0.07 U	0.07 U	0.07 U	0.04 U	0.07 U	0.07 UJ	0.07 U	0.07 U	0.07 U	0.07 U	0.04 U
Bromomethane	µg/L	1	10	0.06 U	0.06 U	0.06 UJ	0.06 UJ	0.06 U	0.06 UJ	0.06 U	0.06 UJ	0.06 UJ	0.06 UJ	0.06 UJ	0.06 UJ	0.06 U	0.06 UJ	0.06 UJ	0.06 U	0.06 U	0.06 UJ	0.06 UJ	0.06 U	0.06 U	0.06 UJ	0.06 U	0.06 UJ	0.06 U	0.06 UJ	0.06 U	0.06 U	0.06 UJ
Carbon disulfide	µg/L	200	1,000	0.1 U	0.1 U	0.1 U	0.21 J	0.1 U	0.1 J	0.1 U	0.1 UJ	0.1 UJ	0.1 U	0.13 J	0.1 UJ	0.1 U	0.1 U	0.11 J	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 UJ	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Carbon tetrachloride	µg/L	0.5	5	0.05 U	0.05 U	0.04 U	0.05 U	0.05 U	0.04 U	0.05 UJ	0.05 UJ	0.05 UJ	0.04 U	0.05 U	0.05 UJ	0.05 U	0.04 U	0.05 U	0.05 U	0.05 U	0.04 U	0.05 U	0.05 U	0.05 U	0.04 U	0.05 UJ	0.05 UJ	0.05 U	0.05 U	0.05 U	0.05 U	0.04 U
Chlorobenzene	µg/L	N/A	N/A	0.05 U	0.05 U	0.06 U	0.05 U	0.05 U	0.06 U	0.05 U	0.05 UJ	0.05 UJ	0.06 U	0.05 U	0.05 U	0.05 U	0.06 U	0.05 U	0.05 U	0.05 U	0.06 U	0.05 U	0.05 U	0.05 U	0.06 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.06 U
Chloroethane	µg/L	80	400	0.06 U	0.06 U	0.05 U	0.06 U	0.06 U	0.05 U	0.06 U	0.06 UJ	0.06 UJ	0.05 U	0.06 U	0.06 UJ	0.06 U	0.05 U	0.06 U	0.06 U	0.06 U	0.05 U	0.06 U	0.06 U	0.06 U	0.05 U	0.06 U	0.06 UJ	0.06 U	0.06 U	0.06 U	0.06 U	0.05 U
Chloroform	µg/L	0.6	6	0.07 U	0.07 U	0.04 U	0.07 U	0.07 U	0.04 U	0.07 U	0.07 UJ	0.07 UJ	0.04 U	0.18 J	0.17 J	0.11 J	0.04 U	0.07 U	0.07 U	0.07 U	0.04 U	0.07 U	0.07 U	0.07 U	0.04 U	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U	0.074 J	0.1 J
Chloromethane	µg/L	0.3	3	0.05 U	0.07 J	0.12 U	0.05 U	0.05 U	0.22 U	0.064 J	0.17 J	0.05 UJ	0.19 U	0.05 U	0.081 J	0.05 U	0.25 U	0.05 U	0.05 U	0.05 U	0.15 U	0.05 U	0.13 J	0.24 U	0.19 U	0.05 U	0.19	0.24	0.05 U	**0.56 J**	0.14 J	0.17 U
cis-1,2-Dichloroethene	µg/L	7	70	0.06 U	0.06 U	0.03 U	0.06 U	0.06 U	0.03 U	0.58 J	0.54 J	0.57 J	0.62	0.97 J	3.2	1.4	1.1	1.4	2.5	1.1	0.47	2.3	1.4	2.5	4.5	1.3	0.7	0.83	4.4	2.5	4.1	5.7
cis-1,3-Dichloropropene	µg/L	0.02	0.2	0.016 U	0.016 U	0.017 U	0.016 U	0.016 U	0.017 U	0.016 U	0.016 UJ	0.016 UJ	0.017 U	0.016 U	0.016 U	0.016 U	0.017 U	0.016 U	0.016 U	0.016 U	0.017 U	0.016 U	0.016 U	0.016 U	0.017 U	0.016 U	0.016 U	0.016 U	0.016 U	0.016 U	0.016 U	0.017 U
Dibromochloromethane	µg/L	6	60	0.09 U	0.09 U	0.029 U	0.09 U	0.09 U	0.029 U	0.09 U	0.09 UJ	0.09 UJ	0.029 U	0.09 U	0.09 U	0.09 U	0.029 U	0.09 U	0.09 U	0.09 U	0.029 U	0.09 U	0.09 U	0.09 U	0.029 U	0.09 U	0.09 U	0.09 U	0.09 U	0.09 U	0.09 U	0.029 U
Dichlorodifluoromethane	µg/L	200	1,000	0.06 U	0.06 U	0.05 U	0.06 U	0.06 U	0.05 U	0.06 U	0.06 UJ	0.06 UJ	0.05 U	0.06 U	0.06 U	0.06 U	0.05 U	0.06 U	0.06 U	0.06 U	0.05 U	0.06 U	0.06 U	0.06 U	0.05 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.05 U
Ethylbenzene	µg/L	140	700	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 UJ	0.05 UJ	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Isopropylbenzene	µg/L	N/A	N/A	0.03 U	0.03 U	0.05 U	0.19 J	0.03 U	0.098 J	0.03 U	0.03 UJ	0.03 UJ	0.05 U	0.03 U	0.03 U	0.03 U	0.05 U	0.03 U	0.03 U	0.03 U	0.05 U	0.03 U	0.03 U	0.03 U	0.05 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.05 U
m,p-Xylene (sum of isomers)	µg/L	1,000	10,000	0.12 U	0.12 U	0.09 U	1.3 J	0.12 U	0.45 U	0.12 U	0.12 UJ	0.12 UJ	0.09 U	0.12 U	0.12 U	0.12 U	0.09 U	0.12 U	0.12 U	0.12 U	0.09 U	0.12 U	0.12 U	0.12 U	0.09 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.09 U
Methyl tert-butyl ether	µg/L	12	60	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.64	0.48 J	0.52 J	0.57	0.6	0.47	0.55	0.59	1	1.1	0.73	0.67	0.57	0.57	0.61	0.69	0.6	0.25	0.43	0.74	0.55	0.64	0.77
Methylene chloride	µg/L	0.5	5	0.11 UJ	0.11 UJ	0.15 R	0.11 UJ	0.11 UJ	0.15 R	0.11 UJ	0.11 UJ	0.41 UJ	0.15 R	0.11 UJ	0.11 R	0.11 U	0.15 R	0.11 UJ	0.11 UJ	0.11 U	0.15 UJ	0.11 UJ	0.11 UJ	0.28 UJ	0.15 R	0.11 UJ	0.11 R	0.11 U	0.11 UJ	0.11 UJ	0.11 U	0.15 R
o-Xylene	µg/L	N/A	N/A	0.04 U	0.04 U	0.05 U	1.6 J	0.04 U	0.58	0.04 U	0.04 UJ	0.04 UJ	0.05 U	0.04 U	0.04 U	0.04 U	0.05 U	0.04 U	0.04 U	0.04 U	0.05 U	0.04 U	0.04 U	0.04 U	0.05 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.05 U
Styrene	µg/L	10	100	0.04 U	0.04 U	0.05 U	0.04 U	0.04 U	0.05 U	0.04 U	0.04 UJ	0.04 UJ	0.05 U	0.04 U	0.04 U	0.04 U	0.05 U	0.04 U	0.04 U	0.04 U	0.05 U	0.04 U	0.04 U	0.04 U	0.05 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.05 U
Tetrachloroethene	µg/L	0.5	5	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 UJ	0.05 UJ	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Toluene	µg/L	200	1,000	0.08 U	0.08 U	0.05 U	0.08 U	0.08 U	0.05 U	0.08 U	0.08 UJ	0.08 UJ	0.05 U	0.08 U	0.08 U	0.08 U	0.05 U	0.08 U	0.08 U	0.08 U	0.05 U	0.08 U	0.08 U	0.08 U	0.05 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.05 U
trans-1,2-Dichloroethene	µg/L	20	100	0.04 U	0.04 U	0.06 U	0.04 U	0.04 U	0.06 U	0.04 U	0.062 J	0.068 J	0.075 J	0.075 J	0.21	0.12 J	0.09 J	0.12 J	0.21	0.11 J	0.06 U	0.19 J	0.13 J	0.2	0.33	0.078 J	0.052 J	0.075 J	0.36 J	0.15	0.32	0.36
trans-1,3-Dichloropropene	µg/L	0.02	0.2	0.015 U	0.015 U	0.019 U	0.015 U	0.015 U	0.019 U	0.015 U	0.015 UJ	0.015 UJ	0.019 U	0.015 U	0.015 U	0.015 U	0.019 U	0.015 U	0.015 U	0.015 U	0.019 U	0.015 U	0.015 U	0.015 U	0.019 U	0.015 U	0.015 U	0.015 U	0.015 U	0.015 U	0.015 U	0.019 U
Trichloroethene	µg/L	0.5	5	0.03 U	0.03 U	0.05 U	0.03 U	0.03 U	0.05 U	0.42	0.36 J	0.37 J	**0.5**	0.03 U	0.052 J	0.034 J	0.074 J	0.11 J	0.1 J	0.083 J	0.084 J	0.03 U	0.041 J	0.031 J	0.076 J	0.17 J	0.11 J	0.083 J	0.064 J	0.051 J	0.047 J	0.11 J
Vinyl chloride	µg/L	0.02	0.2	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 UJ	0.018 UJ	0.018 U	0.018 U	**0.069**	0.018 U	**0.021 J**	0.018 U	**0.042 J**	0.018 U	0.018 U	**0.042 J**	**0.056 J**	**0.056 J**	**0.046 J**	0.018 U	0.018 U	**0.032 J**	**0.05 J**	**0.061**	**0.052 J**	**0.04 J**

J indicates that the value was between the method detection limit and the limit of quantitation and, therefore, is estimated.

U indicates that the constituent was not detected above the method detection limit.

UJ indicates that the constituent was not detected above the estimated method detection limit.

R indicates that the initial calibration report associated with this SDG contained relative response factors (RRFs) lower than 0.05 for acetone, 2-Butanone and 1,2-dibromo-3-chloropropane.

Non-detected concentrations were qualified and flagged "R" as rejected.

UB indicates that the constiuent is considered to be below the detection limit listed due to blank contamination.

Bolded values indicate attainment or exceedance of the Wisconsin Administrative Code (WAC) NR 140 Preventative Action Limit (PAL).

Shaded values indicate attainment or exceedance of the Wisconsin Administrative Code (WAC) NR 140 Enforcement Standard (ES).

TABLE 5
Field and Analytical Results—Groundwater Private Well Samplinç
October 2004, July 2005, October 2005, January 2006, March 20
2007 Annual Groundwater Report and Evaluation of Monitored N:
OECI Site

Constituent	Units	WAC NR 140 PAL	WAC NR 140 ES	PW-10				PW-11				DW-01
				05CA40-54 Jul 05	06CD09-54 Jan 06	06CD16-49 Mar 06	07CE18-87 Jan 07	05CA40-58 Jul 05	06CD09-53 Jan 06	06CD16-52 Mar 06	07CE18-69 Jan 07	07CE18-43 Jan 07
Field Parameters												
Dissolved Oxygen (DO)	mg/L			6.22				3.29				
Oxidation Reduction Potential (ORP)	millivolts			-32.6				-74.4				
pH	pH units			6.76				6.62				
Specific Conductivity	mmhos/cm			1.069				0.989				
Temperature	deg c			15.61				13.63				
Depth to water	feet											
VOCs												
1,1,1-Trichloroethane	µg/L	40	200	0.07 U	0.07 U	0.07 U	0.04 U	0.07 U	0.07 U	0.07 U	0.04 U	0.04 U
1,1,2,2-Tetrachloroethane	µg/L	0.02	0.2	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U
1,1,2-Trichloroethane	µg/L	0.5	5	0.09 U	0.09 U	0.09 U	0.04 U	0.09 U	0.09 U	0.09 U	0.04 U	0.04 U
1,1-Dichloroethane	µg/L	85	850	0.031 U	0.031 U	0.031 U	0.06 U	0.031 U	0.031 U	0.031 U	0.06 U	0.06 U
1,1-Dichloroethene	µg/L	0.7	7	0.06 U	0.06 U	0.06 U	0.04 U	0.06 U	0.06 U	0.06 U	0.04 U	0.04 U
1,2,3-Trichlorobenzene	µg/L	N/A	N/A	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U
1,2,4-Trichlorobenzene	µg/L	14	70	0.06 U	0.06 U	0.06 U	0.1 U	0.06 U	0.06 U	0.06 U	0.1 U	0.1 U
1,2-Dibromo-3-chloropropane	µg/L	0.02	0.2	**0.026 U**	**0.026 U**	**0.026 U**	**0.04 U**	**0.026 U**	**0.026 U**	**0.026 U**	**0.04 U**	0.04 U
1,2-Dibromoethane	µg/L	0.5	5	0.023 U	0.023 U	0.023 U	0.03 U	0.023 U	0.023 U	0.023 U	0.03 U	0.03 U
1,2-Dichlorobenzene	µg/L	60	600	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U
1,2-Dichloroethane	µg/L	0.5	5	0.04 U	0.04 U	0.04 U	0.03 U	0.04 U	0.04 U	0.04 U	0.03 U	0.03 U
1,2-Dichloropropane	µg/L	0.5	5	0.06 U	0.06 U	0.06 U	0.05 U	0.06 U	0.06 U	0.06 U	0.05 U	0.05 U
1,3-Dichlorobenzene	µg/L	125	1,250	0.04 U	0.04 U	0.04 U	0.05 U	0.04 U	0.04 U	0.04 U	0.05 U	0.05 U
1,4-Dichlorobenzene	µg/L	15	75	0.05 U	0.05 U	0.05 U	0.06 U	0.05 U	0.05 U	0.05 U	0.06 U	0.06 U
2-Butanone	µg/L	N/A	N/A	0.4 R	0.4 R	0.4 U	0.5 U	0.4 R	0.4 R	0.4 U	0.5 U	0.5 UJ
2-Hexanone	µg/L	N/A	N/A	0.5 U	0.5 U	0.5 U	0.8 U	0.5 U	0.5 U	0.5 U	0.8 U	0.8 U
4-Methyl-2-pentanone	µg/L	N/A	N/A	0.6 U	0.6 U	0.6 U	0.4 U	0.6 U	0.6 U	0.6 U	0.4 U	0.4 U
Acetone	µg/L	200	1,000	1.5 R	1.5 R	1.5 U	1.3 U	1.5 R	1.5 R	1.5 U	1.3 UJ	1.3 UJ
Benzene	µg/L	0.5	5	0.05 U	0.05 U	0.05 U	0.04 U	0.05 U	0.05 U	0.05 U	0.04 U	0.04 U
Bromochloromethane	µg/L	N/A	N/A	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Bromodichloromethane	µg/L	0.06	0.6	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U
Bromoform	µg/L	0.44	4.4	0.07 U	0.07 U	0.07 U	0.04 U	0.07 U	0.07 U	0.07 U	0.04 U	0.04 U
Bromomethane	µg/L	1	10	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 UJ	0.06 UJ
Carbon disulfide	µg/L	200	1,000	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Carbon tetrachloride	µg/L	0.5	5	0.05 UJ	0.05 U	0.05 U	0.04 U	0.05 UJ	0.05 U	0.05 U	0.04 U	0.04 U
Chlorobenzene	µg/L	N/A	N/A	0.05 U	0.05 U	0.05 U	0.06 U	0.05 U	0.05 U	0.05 U	0.06 U	0.06 U
Chloroethane	µg/L	80	400	0.06 U	0.06 U	0.06 U	0.05 U	0.06 U	0.06 U	0.06 U	0.05 U	0.05 U
Chloroform	µg/L	0.6	6	0.07 U	0.07 U	0.07 U	0.04 U	0.07 U	0.07 U	0.07 U	0.04 U	0.04 U
Chloromethane	µg/L	0.3	3	0.05 U	0.05 U	0.05 U	0.079 J	0.05 U	0.05 U	0.065 U	0.23 U	0.33 U
cis-1,2-Dichloroethene	µg/L	7	70	0.06 U	0.06 U	0.06 U	0.03 U	0.41 J	0.62	0.56	0.62	0.03 U
cis-1,3-Dichloropropene	µg/L	0.02	0.2	0.016 U	0.016 U	0.016 U	0.017 U	0.016 U	0.016 U	0.016 U	0.017 U	0.017 U
Dibromochloromethane	µg/L	6	60	0.09 U	0.09 U	0.09 U	0.029 U	0.09 U	0.09 U	0.09 U	0.029 U	0.029 U
Dichlorodifluoromethane	µg/L	200	1,000	0.06 U	0.06 U	0.06 U	0.05 U	0.06 U	0.06 U	0.06 U	0.05 U	0.05 U
Ethylbenzene	µg/L	140	700	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Isopropylbenzene	µg/L	N/A	N/A	0.03 U	0.03 U	0.03 U	0.05 U	0.03 U	0.03 U	0.03 U	0.05 U	0.05 U
m,p-Xylene (sum of isomers)	µg/L	1,000	10,000	0.12 U	0.12 U	0.12 U	0.09 U	0.12 U	0.12 U	0.12 U	0.09 U	0.09 U
Methyl tert-butyl ether	µg/L	12	60	0.13 J	0.087 J	0.14 J	0.23	0.74	0.64	0.68	0.95	0.05 U
Methylene chloride	µg/L	0.5	5	0.11 UJ	0.11 UJ	0.2 UJ	0.15 UJ	0.11 UJ	0.11 UJ	0.36 UJ	0.15 UJ	0.15 UJ
o-Xylene	µg/L	N/A	N/A	0.04 U	0.04 U	0.04 U	0.05 U	0.04 U	0.04 U	0.04 U	0.05 U	0.05 U
Styrene	µg/L	10	100	0.04 U	0.04 U	0.04 U	0.05 UJ	0.04 U	0.04 U	0.04 U	0.05 U	0.05 U
Tetrachloroethene	µg/L	0.5	5	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Toluene	µg/L	200	1,000	0.08 U	0.08 U	0.08 U	0.05 U	0.08 U	0.08 U	0.08 U	0.05 U	0.05 U
trans-1,2-Dichloroethene	µg/L	20	100	0.04 U	0.04 U	0.04 U	0.06 U	0.043 J	0.063 J	0.062 J	0.066 J	0.06 U
trans-1,3-Dichloropropene	µg/L	0.02	0.2	0.015 U	0.015 U	0.015 U	0.019 U	0.015 U	0.015 U	0.015 U	0.019 U	0.019 U
Trichloroethene	µg/L	0.5	5	0.03 U	0.03 U	0.03 U	0.05 U	0.03 U	0.03 U	0.03 U	0.05 U	0.05 U
Vinyl chloride	µg/L	0.02	0.2	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	**0.024 J**	**0.023 J**	0.018 U

J indicates that the value was between the method detection limit and the limit of quantitation and, therefore, is estimated.
U indicates that the constituent was not detected above the method detection limit.
UJ indicates that the constituent was not detected above the estimated method detection limit.
R indicates that the initial calibration report associated with this SDG contained relative response factors (RRFs) lower than 0.05 for acetone, 2-Butanone and 1,2-dibromo-3-chloropropane.
Non-detected concentrations were qualified and flagged "R" as rejected.
UB indicates that the constiuent is considered to be below the detection limit listed due to blank contamination.
Bolded values indicate attainment or exceedance of the Wisconsin Administrative Code (WAC) NR 140 Preventative Action Limit (PAL).
Shaded values indicate attainment or exceedance of the Wisconsin Administrative Code (WAC) NR 140 Enforcement Standard (ES).

TABLE 6

Field and Analytical Results—Surface Water Sampling
October 2004, July 2005, October 2005, January 2006, March 2006, and January 2007
2007 Annual Groundwater Report and Evaluation of Monitored Natural Attenuation
OECI Site

				SW-01		SW-03		
Constituent	**Units**	**WAC NR 140 PAL**	**WAC NR 140 ES**	**06CD09-63, 64 Jan 06**	**06CD16-41, 42 Mar 06**	**06CD09-65, 66 Jan 06**	**06CD16-46, 47 Mar 06**	**07CE18-44, 45 Jan 07**
Field Parameters								
Dissolved Oxygen (DO)	mg/L							
Oxidation Reduction Potential (ORP)	millivolts							
pH	pH units							
Specific Conductivity	mmhos/cm							
Temperature	deg c							
Depth to water	feet							
Natural Attenuation Parameters								
Alkalinity, total (as CaCO3)	mg/L	N/A	N/A	210	230	210	220	380
Chloride (as Cl)	mg/L	125	250	48	38	53	53	44
Ethane	µg/L	N/A	N/A	0.5 U	0.5 U	0.5 U	0.5 U	0.4 UJ
Ethene	µg/L	N/A	N/A	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Iron, total	µg/L	150	300	42.6 J	46.7 J	33.7 J	60.8 J	**161**
Iron, dissolved	µg/L	150	300	25 U	20.5 J	25 U	44 J	99.7
Manganese, total	µg/L	25	50	**25.2**	1.7 U	12.8	1.7 U	**49.6**
Manganese, dissolved	µg/L	25	50	21.3	1.5 U	11	1.5 U	**49.3**
Methane	µg/L	N/A	N/A	0.68 J	0.5 U	0.5 U	1.5 U	1.5 U
Nitrogen, nitrate (as N)	mg/L	2	10	**7.2**	1.9	**7.4**	1.5	1.4
Sulfate (as SO4)	mg/L	125	250	**190**	100	**210**	120	46
Sulfide	mg/L	N/A	N/A	1 U	1 U	1 U	1 U	1 U
Total Organic Carbon	mg/L	N/A	N/A	13	15	13	14	12
VOCs								
1,1,1-Trichloroethane	µg/L	40	200	0.07 U	0.07 U	0.07 U	0.07 U	0.089 J
1,1,2,2-Tetrachloroethane	µg/L	0.02	0.2	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U
1,1,2-Trichloroethane	µg/L	0.5	5	0.09 U	0.09 U	0.09 U	0.09 U	0.04 U
1,1-Dichloroethane	µg/L	85	850	0.031 U	0.031 U	0.031 U	0.034 J	0.06 U
1,1-Dichloroethene	µg/L	0.7	7	0.06 U	0.06 U	0.06 U	0.06 U	0.04 U
1,2,3-Trichlorobenzene	µg/L	N/A	N/A	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U
1,2,4-Trichlorobenzene	µg/L	14	70	0.06 U	0.06 U	0.06 U	0.06 U	0.1 U
1,2-Dibromo-3-chloropropane	µg/L	0.02	0.2	**0.026 U**	**0.026 U**	**0.026 U**	**0.026 U**	**0.04 U**
1,2-Dibromoethane	µg/L	0.5	5	0.023 U	0.023 U	0.023 U	0.023 U	0.03 U
1,2-Dichlorobenzene	µg/L	60	600	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U
1,2-Dichloroethane	µg/L	0.5	5	0.04 U	0.04 U	0.04 U	0.04 U	0.03 U
1,2-Dichloropropane	µg/L	0.5	5	0.06 U	0.06 U	0.06 U	0.06 U	0.05 U
1,3-Dichlorobenzene	µg/L	125	1,250	0.04 U	0.04 U	0.04 U	0.04 U	0.05 U
1,4-Dichlorobenzene	µg/L	15	75	0.05 U	0.05 U	0.05 U	0.05 U	0.06 U
2-Butanone	µg/L	N/A	N/A	0.4 R	0.4 U	0.4 R	0.4 U	0.5 U
2-Hexanone	µg/L	N/A	N/A	0.5 U	0.5 U	0.5 U	0.5 U	0.8 U
4-Methyl-2-pentanone	µg/L	N/A	N/A	0.6 U	0.6 U	0.6 U	0.6 U	0.4 U
Acetone	µg/L	200	1,000	3.9 J	1.5 U	1.5 R	1.5 U	1.3 UJ
Benzene	µg/L	0.5	5	0.05 U	0.05 U	0.05 U	0.05 U	0.04 U
Bromochloromethane	µg/L	N/A	N/A	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Bromodichloromethane	µg/L	0.06	0.6	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U
Bromoform	µg/L	0.44	4.4	0.07 U	0.07 U	0.07 U	0.07 U	0.04 U

TABLE 6

Field and Analytical Results—Surface Water Sampling

October 2004, July 2005, October 2005, January 2006, March 2006, and January 2007

2007 Annual Groundwater Report and Evaluation of Monitored Natural Attenuation

OECI Site

				SW-01		SW-03		
Constituent	**Units**	**WAC NR 140 PAL**	**WAC NR 140 ES**	**06CD09-63, 64 Jan 06**	**06CD16-41, 42 Mar 06**	**06CD09-65, 66 Jan 06**	**06CD16-46, 47 Mar 06**	**07CE18-44, 45 Jan 07**
Bromomethane	µg/L	1	10	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U
Carbon disulfide	µg/L	200	1,000	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Carbon tetrachloride	µg/L	0.5	5	0.05 U	0.05 U	0.05 U	0.05 U	0.04 U
Chlorobenzene	µg/L	N/A	N/A	0.05 U	0.05 U	0.05 U	0.05 U	0.06 U
Chloroethane	µg/L	80	400	0.06 U	0.06 U	0.06 U	0.06 U	0.05 U
Chloroform	µg/L	0.6	6	0.07 U	0.07 U	0.07 U	0.07 U	0.04 U
Chloromethane	µg/L	0.3	3	0.05 U	0.05 U	0.05 U	0.053 J	0.05 U
cis-1,2-Dichloroethene	µg/L	7	70	0.06 U	0.06 U	0.06 U	0.1 J	0.29
cis-1,3-Dichloropropene	µg/L	0.02	0.2	0.016 U	0.016 U	0.016 U	0.016 U	0.017 U
Dibromochloromethane	µg/L	6	60	0.09 U	0.09 U	0.09 U	0.09 U	0.029 U
Dichlorodifluoromethane	µg/L	200	1,000	0.06 U	0.06 U	0.06 U	0.06 U	0.074 J
Ethylbenzene	µg/L	140	700	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Isopropylbenzene	µg/L	N/A	N/A	0.03 U	0.03 U	0.03 U	0.03 U	0.05 U
m,p-Xylene (sum of isomers)	µg/L	1,000	10,000	0.12 U	0.12 U	0.12 U	0.12 U	0.09 U
Methyl tert-butyl ether	µg/L	12	60	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Methylene chloride	µg/L	0.5	5	0.11 UJ	**1 UJ**	0.11 UJ	**0.85 U**	0.15 UJ
o-Xylene	µg/L	N/A	N/A	0.04 U	0.04 U	0.04 U	0.04 U	0.05 U
Styrene	µg/L	10	100	0.04 U	0.04 U	0.04 U	0.04 U	0.05 U
Tetrachloroethene	µg/L	0.5	5	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Toluene	µg/L	200	1,000	0.08 U	0.08 U	0.08 U	0.08 U	0.05 U
trans-1,2-Dichloroethene	µg/L	20	100	0.04 U	0.04 U	0.04 U	0.04 U	0.06 U
trans-1,3-Dichloropropene	µg/L	0.02	0.2	0.015 U	0.015 U	0.015 U	0.015 U	0.019 U
Trichloroethene	µg/L	0.5	5	0.03 U	0.03 U	0.03 U	0.17	**0.51**
Vinyl chloride	µg/L	0.02	0.2	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U

J indicates that the value was between the method detection limit and the limit of quantitation and, therefore, is estimated.

U indicates that the constituent was not detected above the method detection limit.

UJ indicates that the constituent was not detected above the estimated method detection limit.

Non-detected concentrations were qualified and flagged "R" as rejected.

Bolded values indicate attainment or exceedance of the Wisconsin Administrative Code (WAC) NR 140 Preventative Action Limit (PAL).

Shaded values indicate attainment or exceedance of the Wisconsin Administrative Code (WAC) NR 140 Enforcement Standard (ES).

[redacted] [redacted] [redacted]

TABLE 7

Screening for Anaerobic Biodegradation Processes and Interpretation of Screening Results
2007 Annual Groundwater Report and Evaluation of Monitored Natural Attenuation
OECI Site

				Hydrogeologic Unit		
Analysis	**Preferred Concentration Indicating Anaerobic Biodegradation**[a]	**Interpretation**[a]	**Value**[a]	**Shallow**	**Deep**	**Bedrock**
Oxygen (mg/L)	< 0.5 mg/L	Tolerated, suppresses the reductive pathway at higher concentrations.	3	0	0	0
Oxygen (mg/L)	> 5 mg/L	Not tolerated, however, VC may be oxidized aerobically.	-3	0	0	0
Nitrate (mg/L)	< 1 mg/L	At higher concentrations, may compete with reductive pathway.	2	2	2	2
Iron II [d]	> 1 mg/L	Reductive pathway possible; VC may be oxidized under Fe (III)-reducing conditions.	3	3	3	3
Sulfate (mg/L)	< 20 mg/L	At higher concentrations, may compete with reductive pathway.	2	0	0	0
Sulfide (mg/L)	> 1 mg/L	Reductive pathway possible.	3	0	0	0
Methane (mg/L)	< 0.5 mg/L	VC oxidizes.	0	0	0	0
Methane (mg/L)	> 0.5 mg/L	Ultimate reductive daughter product, VC accumulates.	3	0	0	0
Oxidation Reduction Potential (mV)	< 50 mV	Reductive pathway possible.	1	1	1	1
Oxidation Reduction Potential (mV)	< -100 mV	Reductive pathway likely.	2	0	0	0
pH	5 < pH < 9	Optimal range for reductive pathway.	0	0	0	0
pH	5 > pH > 9	Outside optimal range for reductive pathway.	-2	0	0	0
TOC (mg/L)	> 20 mg/L	Carbon and energy source; drives dechlorination; can be natural or anthropogenic.	2	0	0	0
Temperature (degrees Celsius)	> 20C	At T .20C, biochemical process is accelerated.	1	0	0	0
Alkalinity (mg/L)	> 2x background	Results from interaction between CO2 and aquifer materials.	1	0	0	0
Chloride (mg/L)	> 2x background	Daughter product of organic chlorine.	2	2	0	2
BTEX (mg/L)	> 0.1 mg/L	Carbon and energy source; drives dechlorination.	2	2	2	0
Trichloroethene (mg/L)	Not applicable	Material released.	0	0	0	0
Dichloroethene (mg/L)	Not applicable	Daughter product of TCE; If cis is > 80% of total DCE it is likely a daughter product, 1,1DCE can be chemical reaction product of TCA.	2	2	2	2
Vinyl chloride (mg/L)	Not applicable	Daughter product of DCE.	2	2	2	2
1,1,1-trichloroethane (mg/L)	Not applicable	Material released.	0	0	0	0
1,1-dichloroethane (mg/L)	Not applicable	Daughter product of TCA under reducing conditions.	2	2	2	0
Chloroethane (mg/L)	Not applicable	Daughter product of DCA or VC under reducing conditions.	2	0	0	0
Ethene/Ethane (mg/L)	> 0.01 mg/L	Daughter product of VC/ethene.	2	2	2	2
Ethene/Ethane (mg/L)	> 0.1 mg/L	Daughter product of VC/ethene.	3	3	3	3
			SCORE:[a,e]	21	19	17

[a] See Table 2.3 in Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Ground Water, EPA/600/R-98/128.

[b] See Tables4 and 5 of this report for study area constituent values.

[c] Points awarded only when 50 percent or more of results for a particular parameter for the wells sampled were at the preferred concentration. The total number of wells did NOT include upgradient wells for a given hydrogeologic unit.

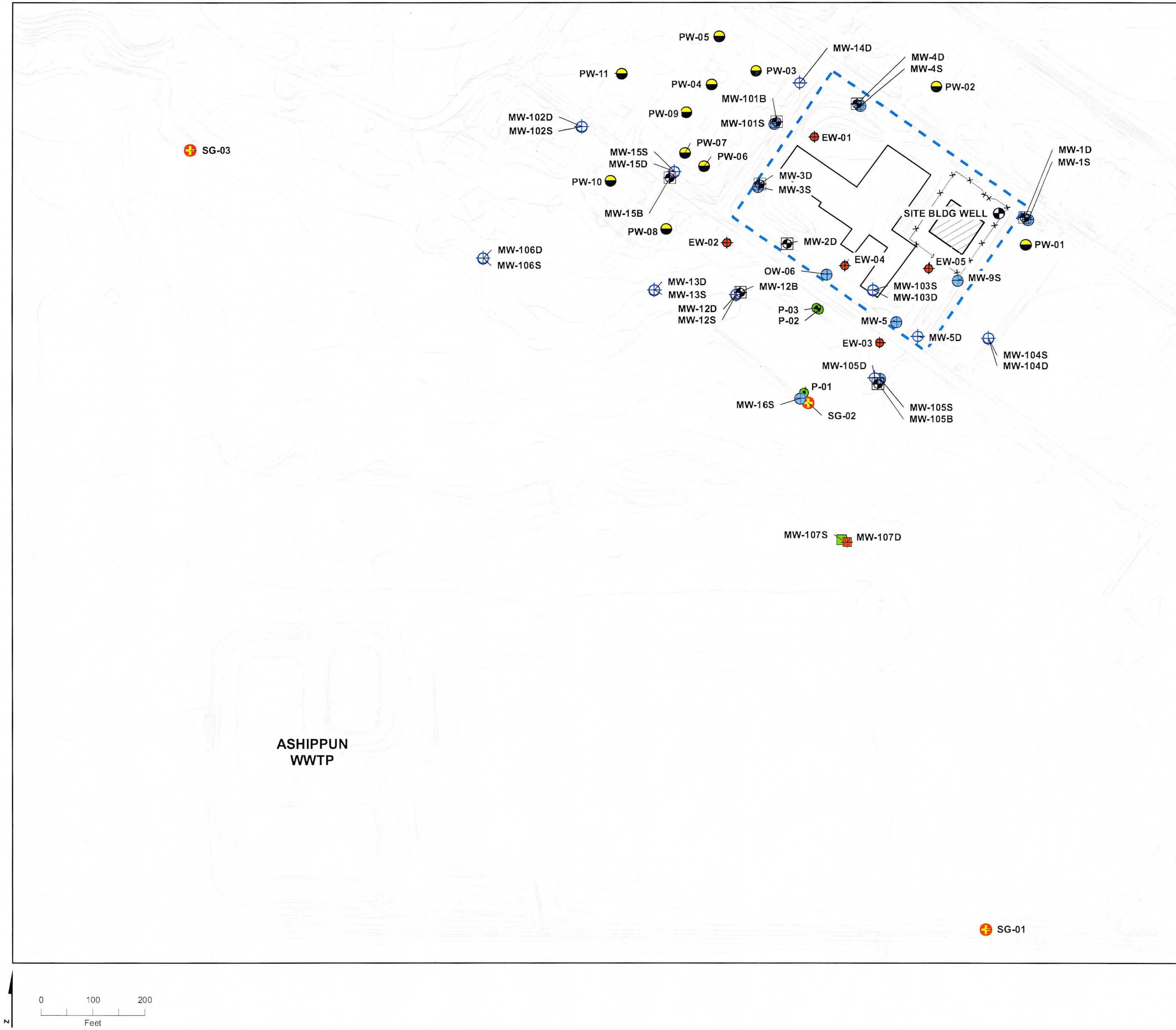
[d] Sampled for dissolved iron. Compared values to background concentrations (>2x background).

[e] Scores of 15 to 20 = Adequate evidence for anaerobic biodegradation of CVOCs.

TABLE 8
BIOCHLOR Input Parameters
2007 Annual Groundwater Report and Evaluation of Monitored Natural Attenuation
OECI Site

Model Input	Value	Source	Specific Reference (If applicable)
Hydraulic Conductivity (K)	0.0011 cm/sec	Pump Test data from extraction well EW-4.	RMT 2004. *Hydrogeologic Investigation and Groundwater Extraction System Evaluation*. February 2004.
Hydraulic Gradient	0.003 ft/ft	CH2M HILL January 2007 field measurements.	
Effective Porosity	0.2	Within range of literature values for silty sand aquifers; value used in RMT flow modeling.	Sanders, Laura L. *Manual of Field Hydrogeology*. 1998.
Alpha (x)	35 ft	Calculated from using BIOCHLOR Option 2 (Pickens & Grisnak, 1981) for an estimated plume length of 350 feet.	Aziz et al. BIOCHLOR Natural Attenuation Decision Support System User's Manual 1.0. 1998
Alpha y/alpha x	0.1	BIOCHLOR default	Aziz et al. BIOCHLOR Natural Attenuation Decision Support System User's Manual 1.0. 1998
Alpha z/alpha x	1.00E-99	BIOCHLOR default	Aziz et al. BIOCHLOR Natural Attenuation Decision Support System User's Manual 1.0. 1998
Soil Bulk Density	1.6 Kg/L	Based on an measured wet density for site soil.	RMT 2004. *Hydrogeologic Investigation and Groundwater Extraction System Evaluation*. February 2004.
Partition Coefficient (Koc)		BIOCHLOR default values	Aziz et al. BIOCHLOR Natural Attenuation Decision Support System User's Manual 1.0. 1998
TCE	130 L/Kg		
cis-1,2-DCE	125 L/Kg		
VC	30 L/Kg		
Fraction Organic Carbon	0.02	Based on TOC concentrations in the unconsolidated aquifer.	RMT 2004. *Hydrogeologic Investigation and Groundwater Extraction System Evaluation*. February 2004.
Solute Half-Life		Determined based on trial and error to match existing TCE, cis-1,2-DCE, and VC data to model results along flowpath. Half-lifes fall within range of published literature values.	
TCE	1.25 yrs		
cis-1,2-DCE	1.33 yrs		
VC	2.00 yrs		
Simulation time for calibration	50 years	Time from potential release start data (i.e. Site operations began in 1957) to current January 2007 field data used for model calibration.	
Source Thickness in Saturated Zone	26 ft	Assumed to be entire saturated thickness of the unconsolidated aquifer.	RMT 2004. *Hydrogeologic Investigation and Groundwater Extraction System Evaluation*. February 2004.
Source Width	150 ft	Based on estimates of source area dimensions from 2004 RMT Report.	RMT 2004. *Hydrogeologic Investigation and Groundwater Extraction System Evaluation*. February 2004.

Figures



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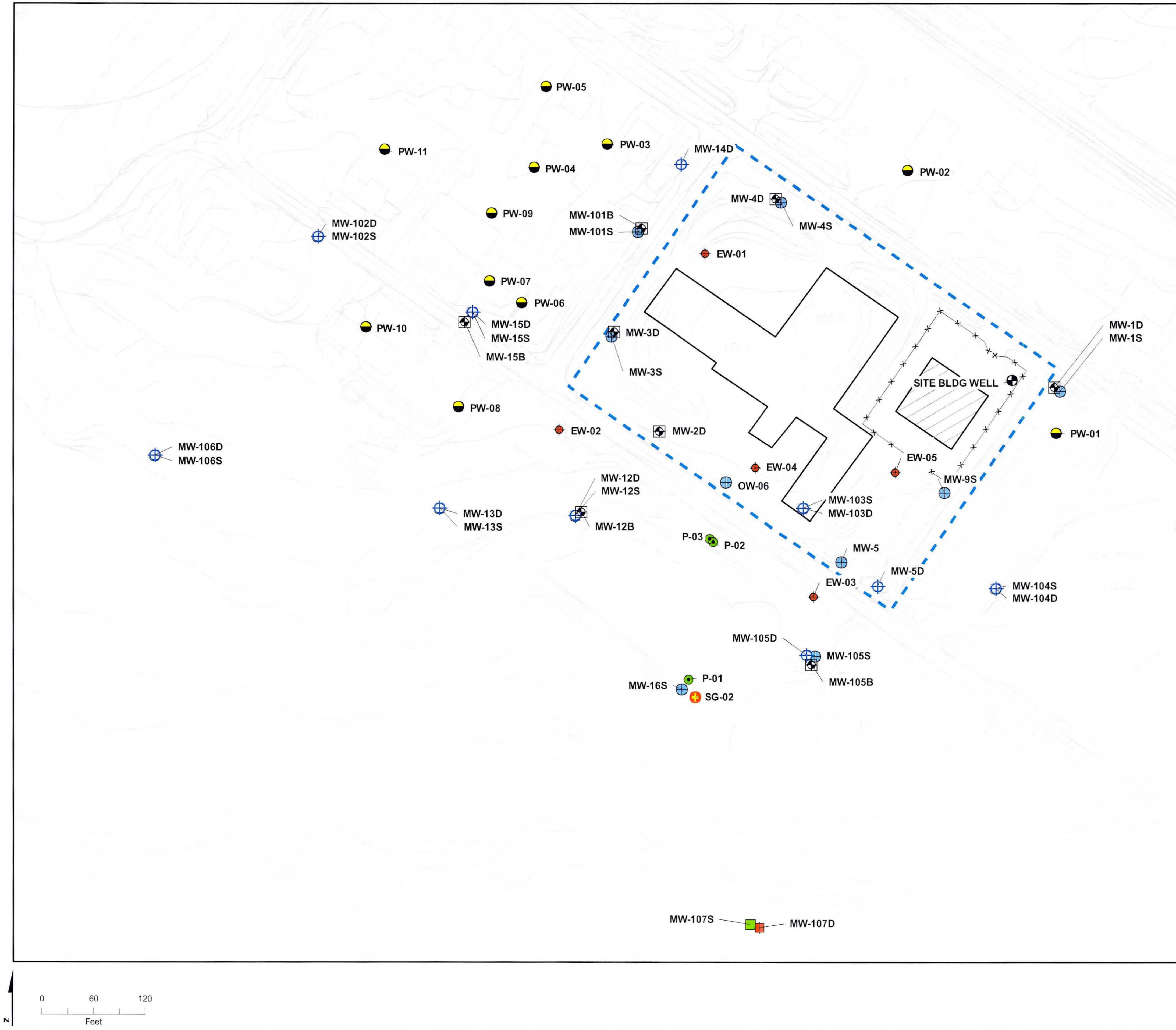
LEGEND

SITE INSTRUMENTATION

⊠	BEDROCK MONITORING WELL
⊕	DEEP UNCONSOLIDATED MONITORING WELL
⊕	SHALLOW UNCONSOLIDATED MONITORING WELL
⊙	DRIVE POINT WELL
⊕	EXTRACTION WELL
◐	SITE BUILDING WELL (DW-01)
◓	RESIDENTIAL WELL
▣	DEEP UNCONSOLIDATED SENTINEL WELL
🟩	SHALLOW UNCONSOLIDATED SENTINEL WELL
⊕	STAFF GAUGE
▨	CURRENT SITE BUILDING
▭	FORMER OECI SITE BUILDING
- - - -	FORMER OECI SITE BOUNDARY
—×—×—	FENCED AREA
	ELEVATION CONTOUR (FT ABOVE MEAN SEA LEVEL) CONTOUR INTERVAL = 2FT

FIGURE 1
Site Monitoring Locations
2007 Annual Groundwater Report and Evaluation of Monitored Natural Attenuation
OECI Site

CH2MHILL



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LEGEND

SITE INSTRUMENTATION

- ⊠ BEDROCK MONITORING WELL
- ⊕ DEEP UNCONSOLIDATED MONITORING WELL
- ⊕ SHALLOW UNCONSOLIDATED MONITORING WELL
- ◉ DRIVE POINT WELL
- ✚ EXTRACTION WELL
- ◑ SITE BUILDING WELL (DW-01)
- ◒ RESIDENTIAL WELL
- 🟥 DEEP UNCONSOLIDATED SENTINEL WELL
- 🟩 SHALLOW UNCONSOLIDATED SENTINEL WELL
- ✚ STAFF GAUGE
- ▨ CURRENT SITE BUILDING
- ☐ FORMER OECI SITE BUILDING
- ---- FORMER OECI SITE BOUNDARY
- -x-x- FENCED AREA
- ELEVATION CONTOUR (FT ABOVE MEAN SEA LEVEL) CONTOUR INTERVAL = 2FT

FIGURE 2
Site Monitoring Well Locations
2007 Annual Groundwater Report and Evaluation of Monitored Natural Attenuation
OECI Site

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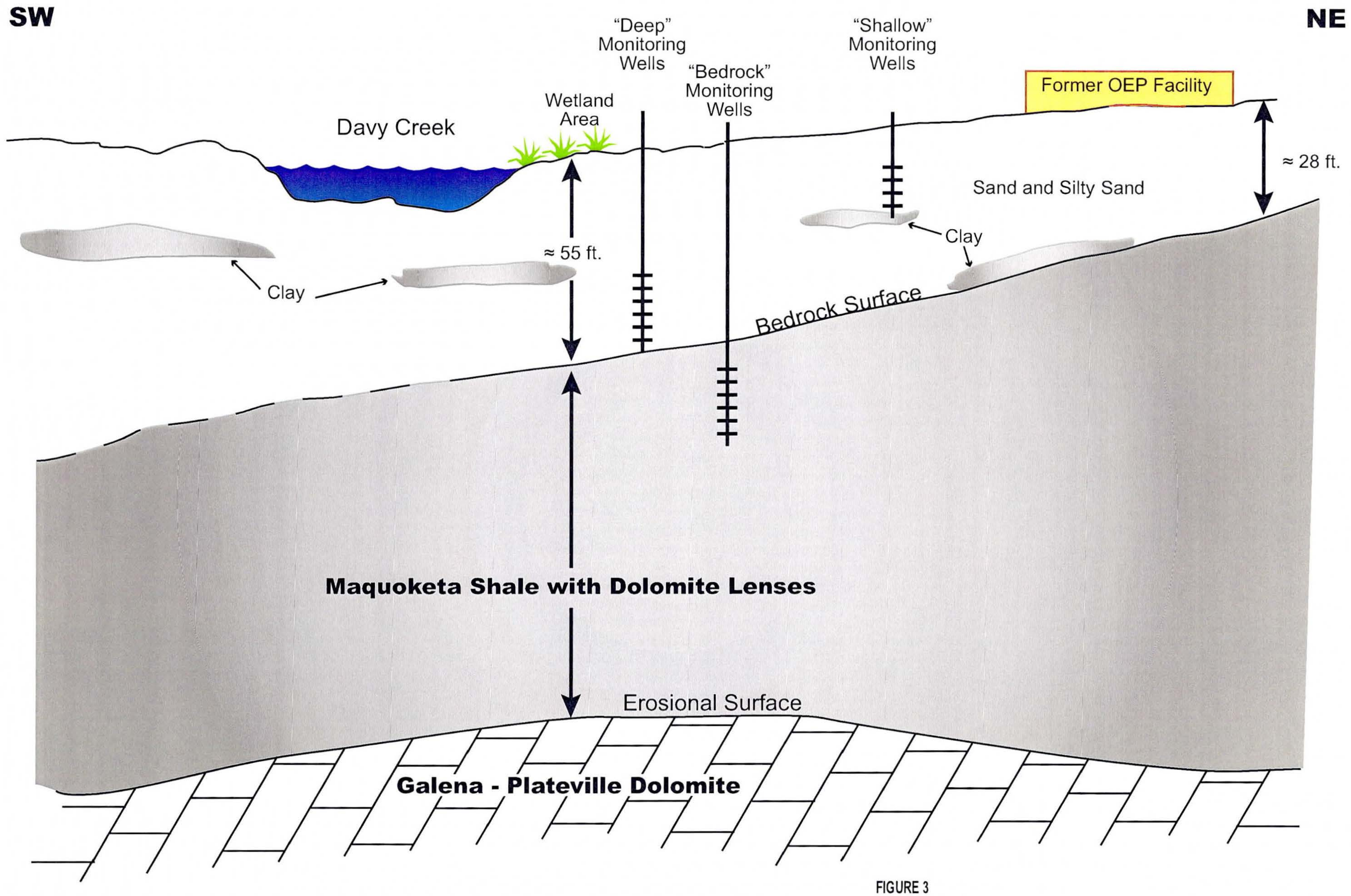
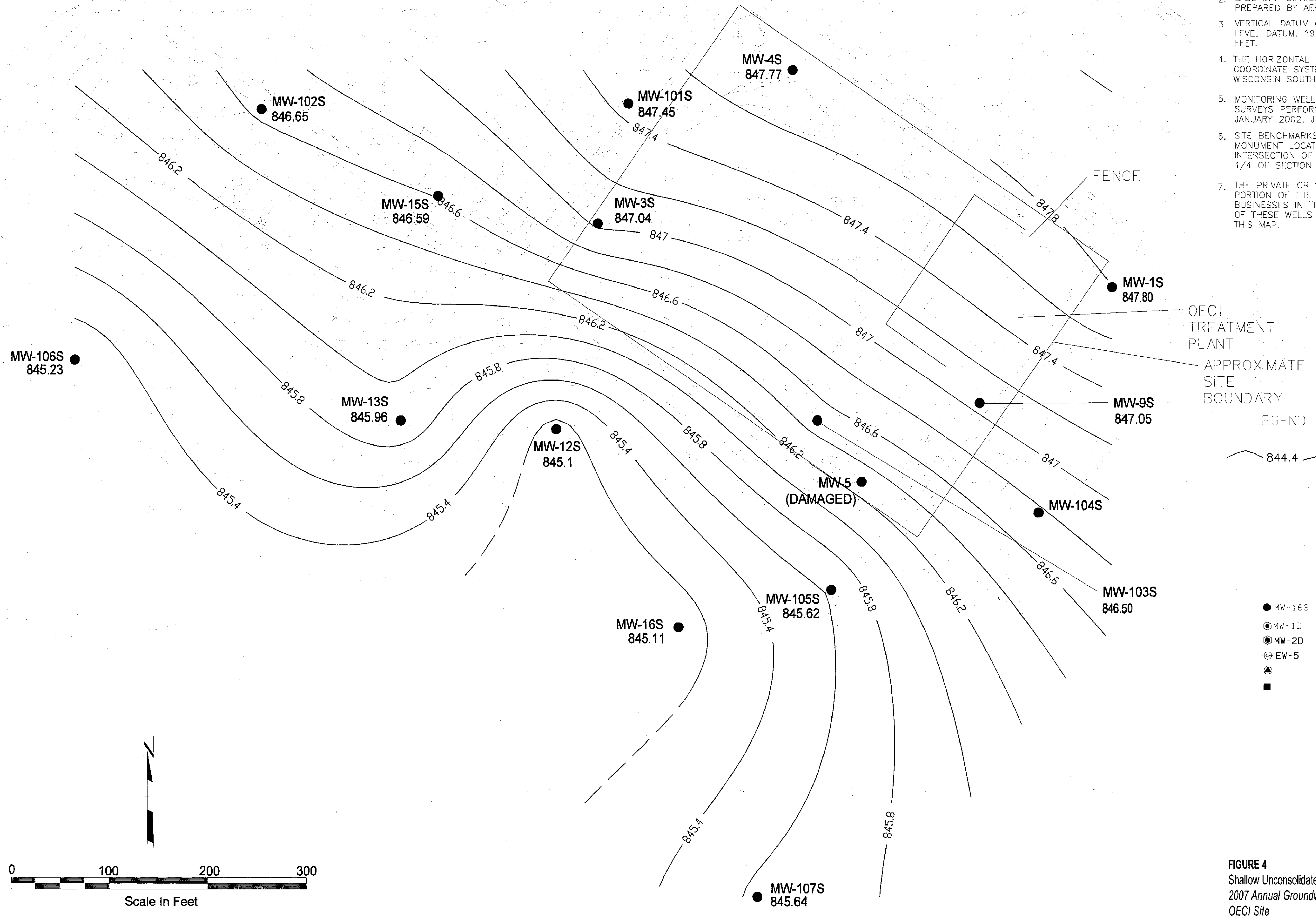


- NOT TO SCALE -

FIGURE 3
Conceptual Depiction of Site Aquifer Units and Well Placement
2007 Annual Groundwater Report and Evaluation of Monitored Natural Attenuation
OECI Site



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LEGEND

844.4	ESTIMATED GROUNDWATER ELEVATION CONTOUR (0.2 CONTOUR INTERVAL)
	EXISTING 2' TOPOGRAPHIC CONTOUR
	EXISTING SPOT ELEVATION
	EXISTING DEPRESSION
	EXISTING TREE LINE
	EXISTING WETLAND AREA
	EXISTING EDGE OF WATER
● MW-16S	WATER TABLE WELL
◉ MW-1D	PIEZOMETER
◉ MW-2D	BEDROCK WELL
⊕ EW-5	EXTRACTION WELL
▲	RESIDENTIAL WELL
■	ACTUAL LOCATION BEING SURVEYED

FIGURE 4
Shallow Unconsolidated Aquifer Groundwater Elevations – January 2007
2007 Annual Groundwater Report and Evaluation of Monitored Natural Attenuation
OECI Site

CH2MHILL

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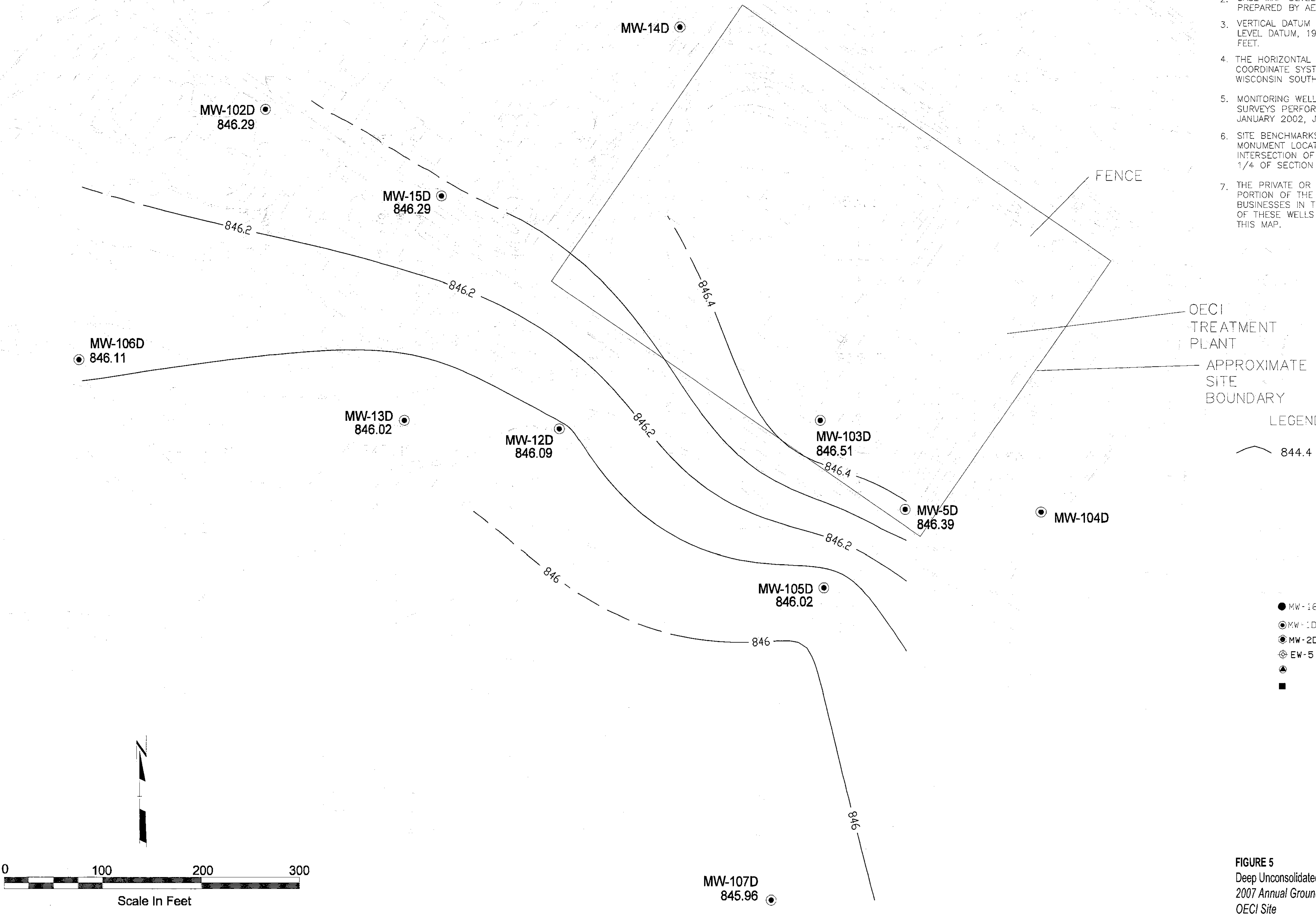

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● MW-16S	WATER TABLE WELL
◉ MW-1D	PIEZOMETER
◉ MW-2D	BEDROCK WELL
⊕ EW-5	EXTRACTION WELL
▲	RESIDENTIAL WELL
■	ACTUAL LOCATION BEING SURVEYED

FIGURE 5
Deep Unconsolidated Aquifer Groundwater Elevations – January 2007
2007 Annual Groundwater Report and Evaluation of Monitored Natural Attenuation
OECI Site

CH2MHILL

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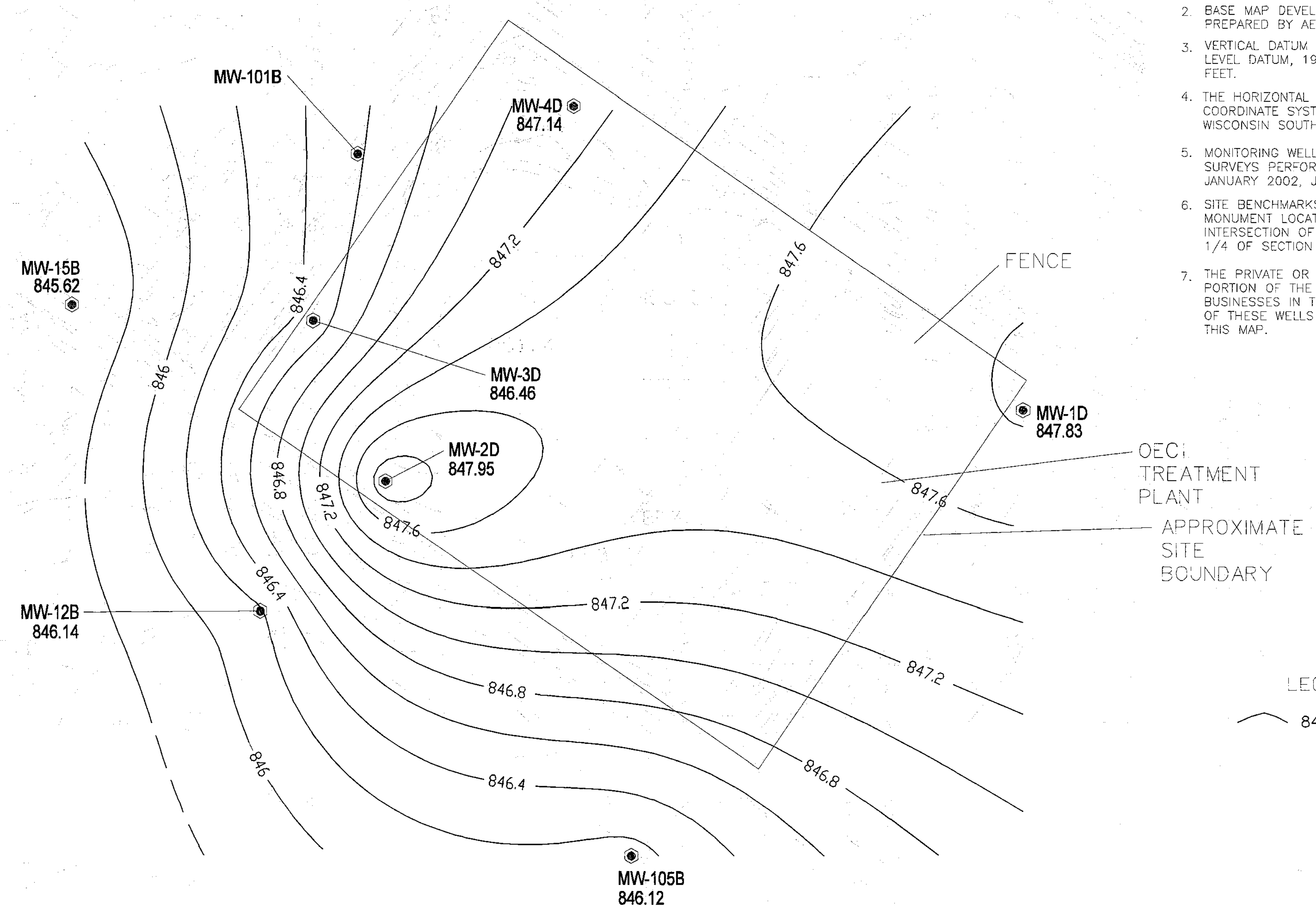

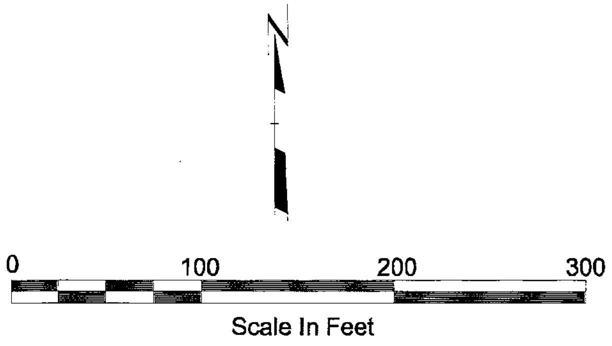

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EXISTING EDGE OF WATER
● MW-16S WATER TABLE WELL
◉ MW-1D PIEZOMETER
◉ MW-2D BEDROCK WELL
⊕ EW-5 EXTRACTION WELL
▲ RESIDENTIAL WELL

FIGURE 6
Bedrock Aquifer Groundwater Elevations – January 2007
2007 Annual Groundwater Report and Evaluation of Monitored Natural Attenuation
OECI Site

CH2MHILL

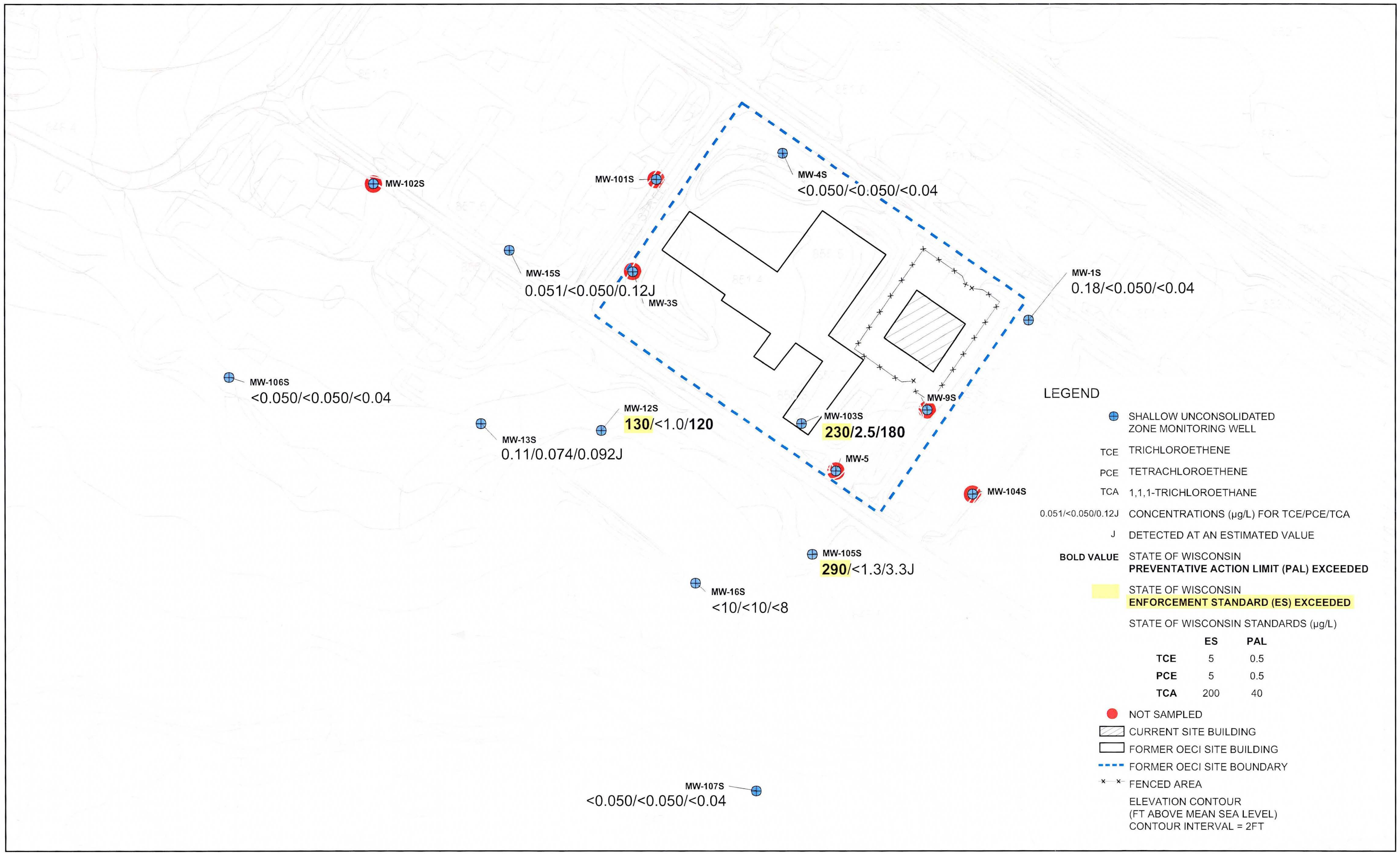


FIGURE 7

Groundwater TCE, PCE and TCA Concentrations in Shallow Unconsolidated Wells – January 2007

2007 Annual Groundwater Report and Evaluation of Monitored Natural Attenuation

OECI Site

ES052007001CVO-OECI_TCE_PCE_TCA_Shallow

CH2MHILL

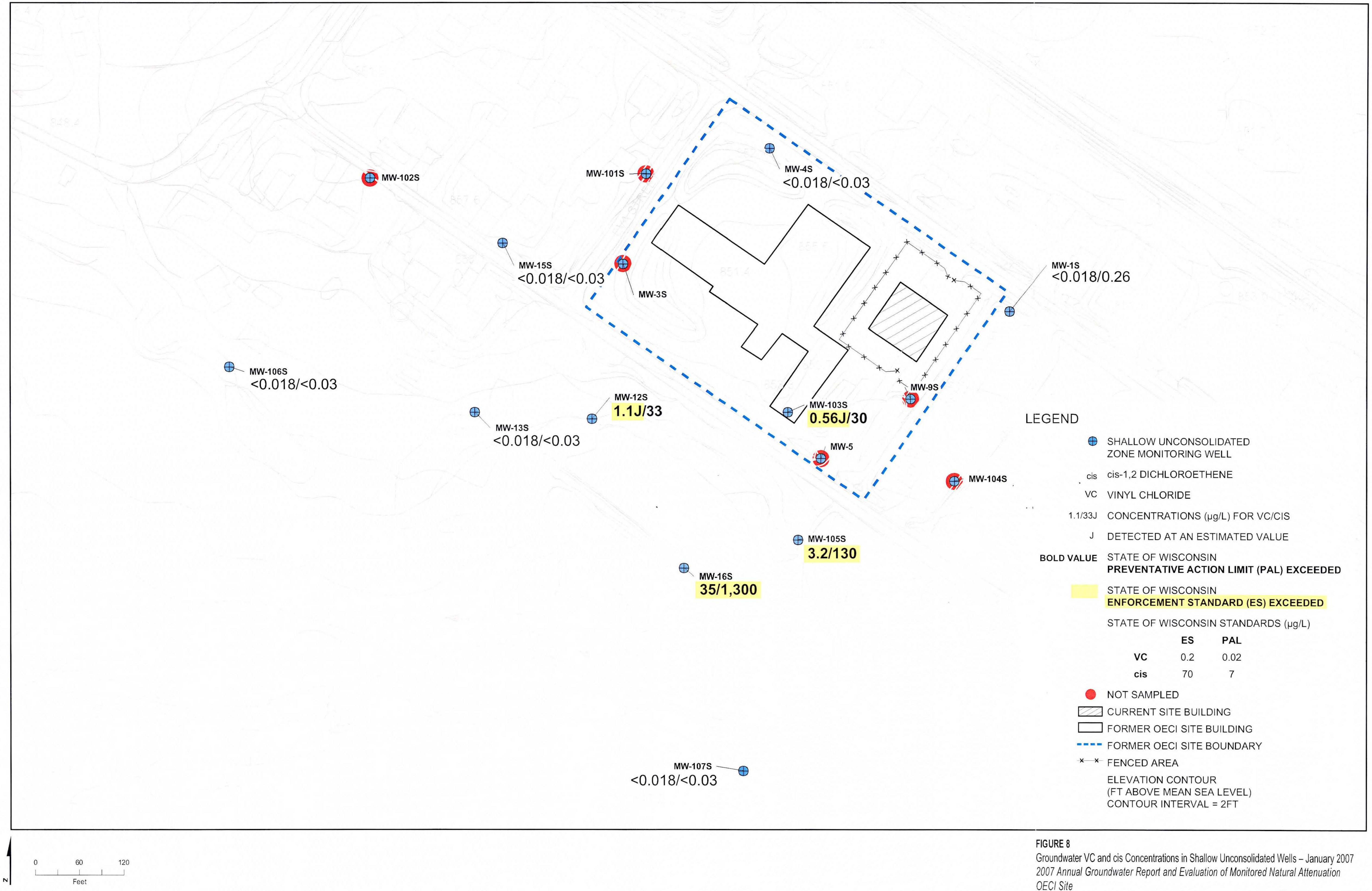


FIGURE 8
Groundwater VC and cis Concentrations in Shallow Unconsolidated Wells – January 2007
2007 Annual Groundwater Report and Evaluation of Monitored Natural Attenuation
OECI Site

CH2MHILL

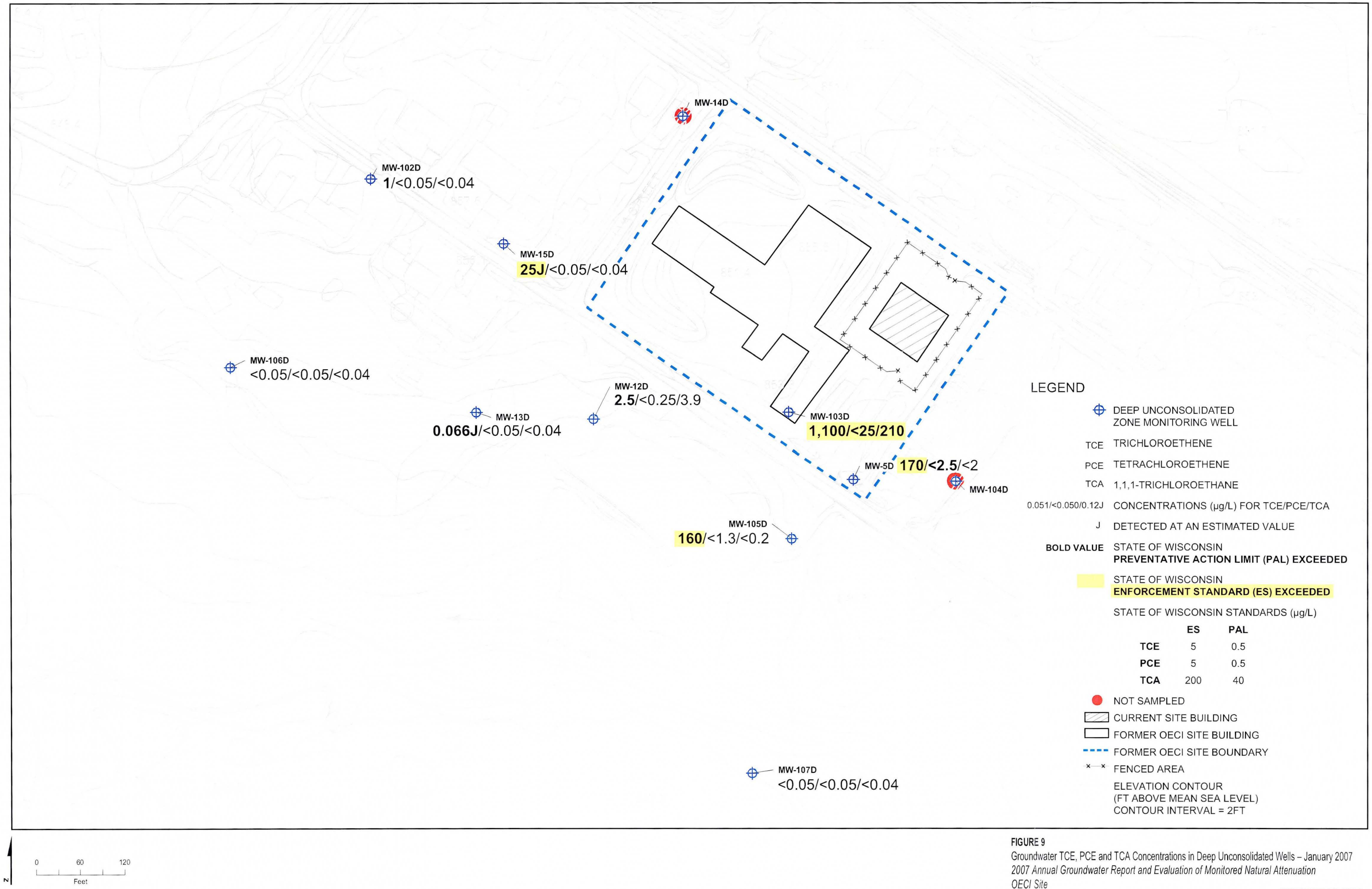


FIGURE 9

Groundwater TCE, PCE and TCA Concentrations in Deep Unconsolidated Wells – January 2007

2007 Annual Groundwater Report and Evaluation of Monitored Natural Attenuation

OECI Site

CH2MHILL

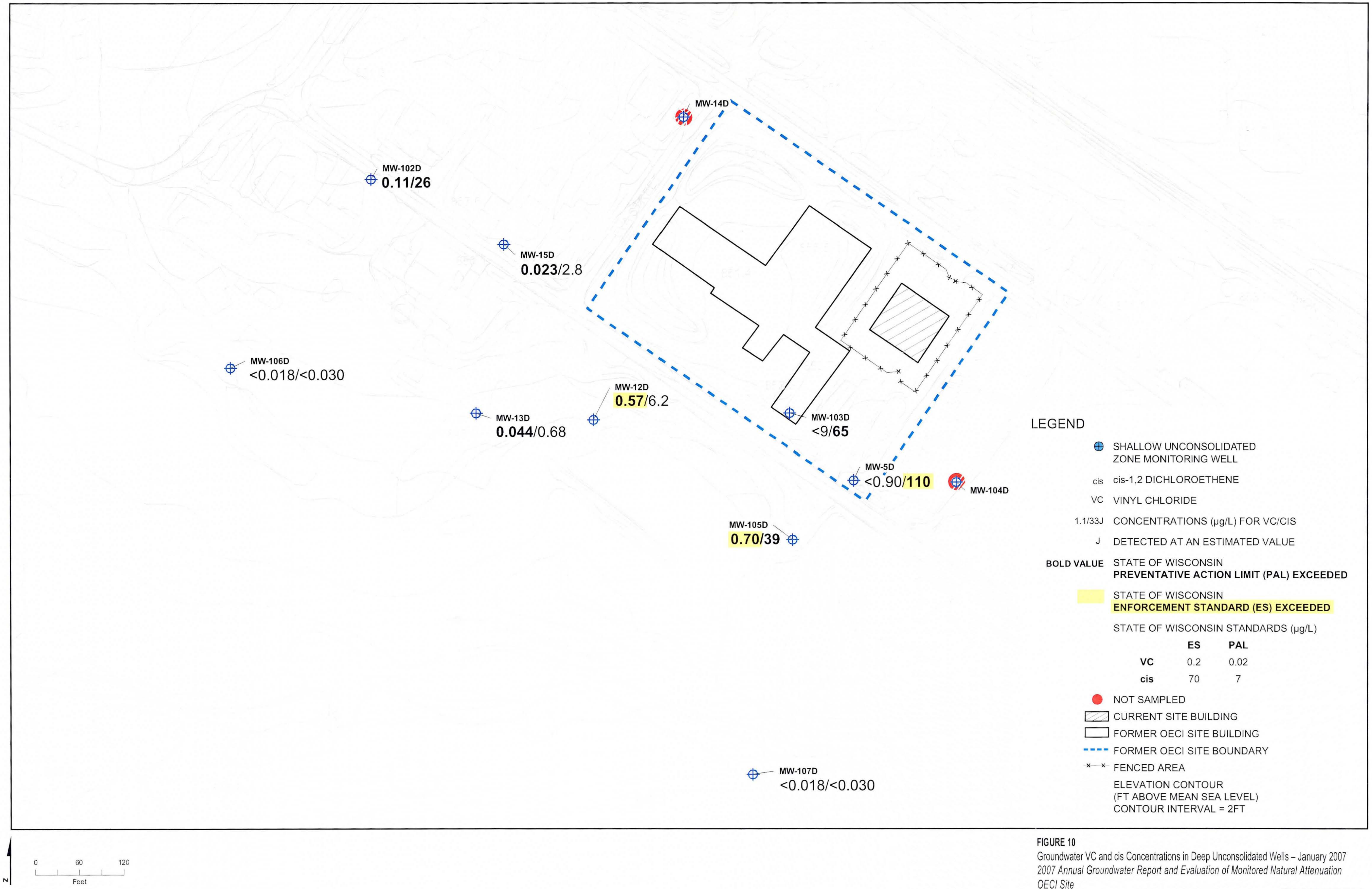
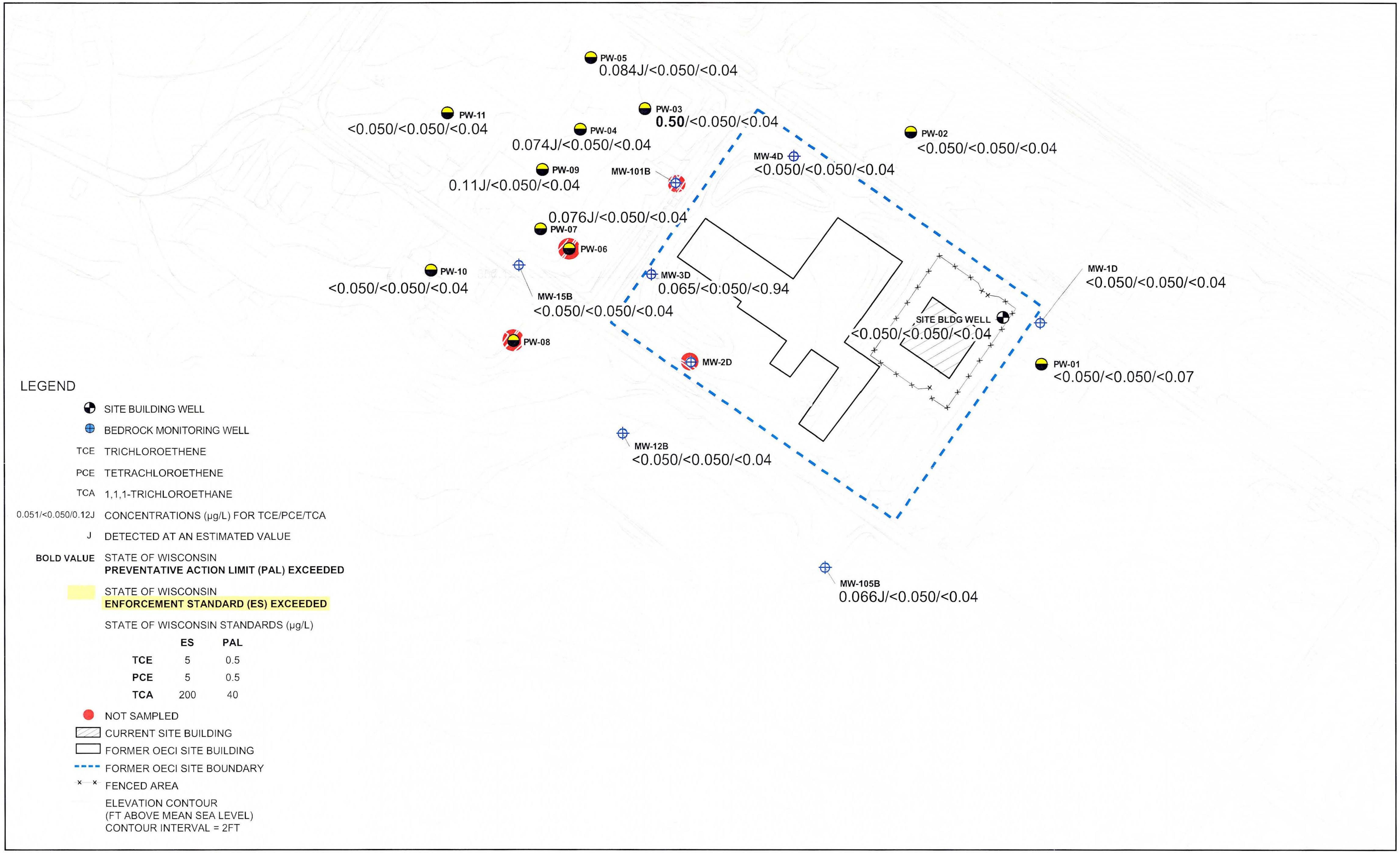


FIGURE 10

Groundwater VC and cis Concentrations in Deep Unconsolidated Wells – January 2007

2007 Annual Groundwater Report and Evaluation of Monitored Natural Attenuation OECI Site

CH2MHILL



	ES	PAL
TCE	5	0.5
PCE	5	0.5
TCA	200	40

N

0 60 120
Feet

FIGURE 11
Groundwater TCE, PCE and TCA Concentrations in Bedrock Wells – January 2007
2007 Annual Groundwater Report and Evaluation of Monitored Natural Attenuation
OECI Site

CH2MHILL

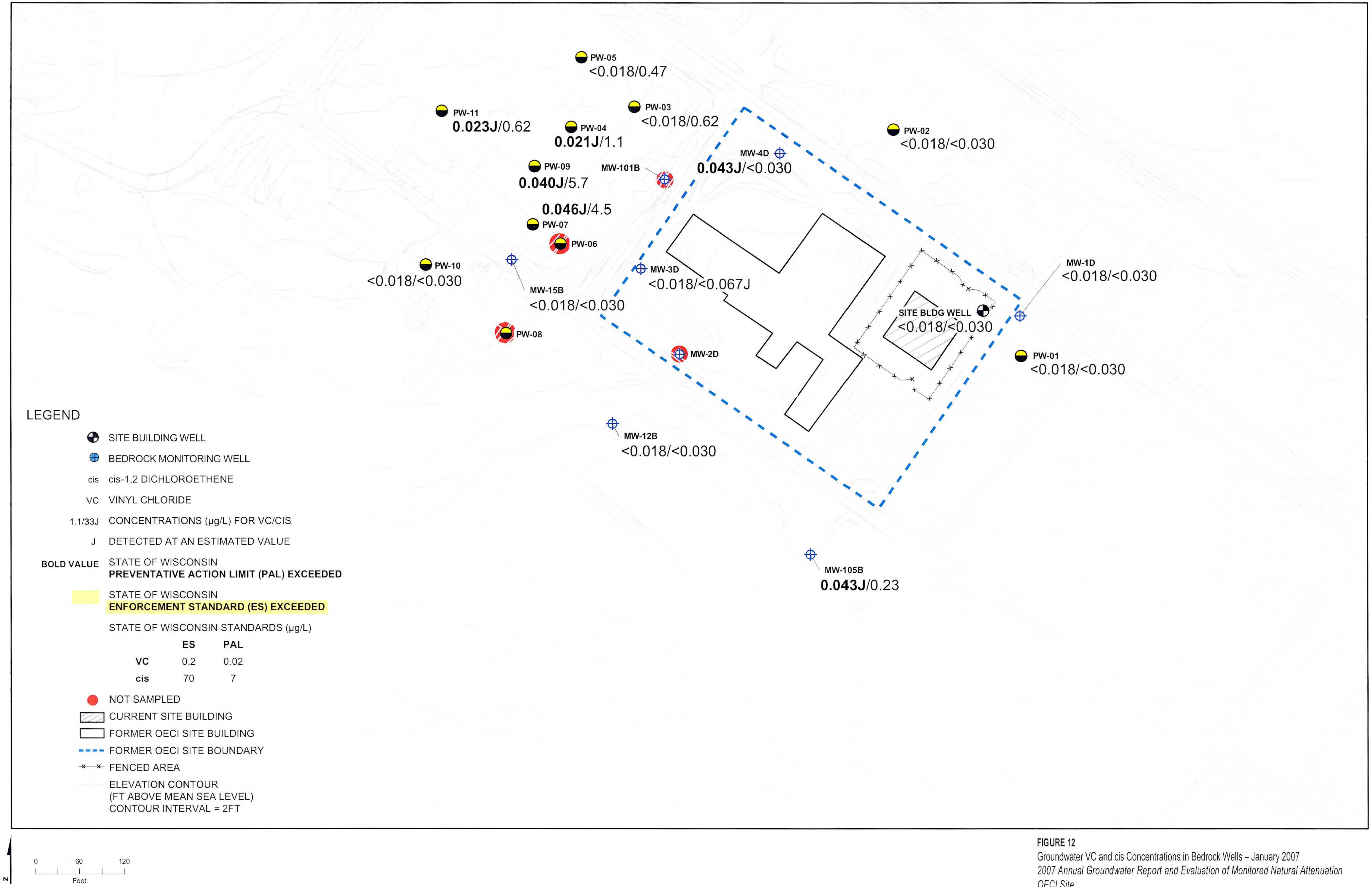


FIGURE 12
Groundwater VC and cis Concentrations in Bedrock Wells – January 2007
2007 Annual Groundwater Report and Evaluation of Monitored Natural Attenuation
OECI Site

CH2MHILL

ES052007001CVO-OECI_VCcis_Bedrock

Appendix A

Data Validation Memorandums

Data Usability Evaluation
Oconomowoc Electroplating Company, Inc. Site, Ashippun, Wisconsin
WA No. 003-LRLR-05M8, Contract No. EP-S5-06-01

PREPARED FOR:	William Ryan/US EPA
PREPARED BY:	Heather Hodach/CH2M HILL
COPIES:	Matt Boekenhauer/CH2M HILL
DATE:	May 22, 2007

This memorandum presents a review of the results within Sample Delivery Group (SDG) 52850 from groundwater and surface water samples collected at the Oconomowoc Electroplating Company, Inc. site in Ashippun, Wisconsin during March 2006. Compliance and natural attenuation (NA) samples were collected, analyzed, and validated. All of the samples were analyzed by CT Laboratories (CTL) of Baraboo, Wisconsin. The NA data were reviewed by CH2M HILL and the compliance data were reviewed by the U.S. Environmental Protection Agency (USEPA) ESAT contractor, TechLaw, (Attachment A) to assess the accuracy, precision, and completeness using the criteria established in the *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review* (October 1999) and *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (July 2002).

Data quality control (QC) summary forms and data reports were reviewed. Data qualifiers were added when the QC data indicated a bias. These changes and comments are noted below.

A total of 52 groundwater and surface water samples were collected, including QC samples, and analyzed for one or more of the following USEPA approved methods:

- Volatile organic compounds (VOCs) by USEPA SW-846 Method 8260
- Alkalinity by USEPA 310.2
- Ammonia by USEPA 350.1
- Chloride by USEPA SW-846 Method 9056
- Methane, ethane, and ethene by RSK 175
- Nitrate by USEPA SW-846 Method 9056
- Ortho phosphate by USEPA SW-846 Method 9056
- Sulfate by USEPA SW-846 Method 9056
- Sulfide by USEPA 376.1
- Total organic carbon by USEPA SW-846 Method 9060
- Total metals by USEPA SW-846 Method 6010B
- Dissolved metals by USEPA SW-846 Method 6010B

The analytical data were reviewed against the following quality assurance (QA)/QC parameters:

- Completeness (were all the samples analyzed for the requested analytical parameters)
- Holding times prior to extractiona and analysis
- Initial and continuing calibration precision and accuracy
- Blank results
- Laboratory control sample (LCS) precision and accuracy
- Matrix spike/matrix spike duplicate (MS/MSD) precision and accuracy
- Field duplicate precision
- Overall assessment of the data

Standard data qualifiers were used as a means of classifying the data as to their conformance to QC requirements. The applied data qualifiers are defined as follows:

[U] The sample target was analyzed for, but was not detected above the level of the associated limit of detection or quantitation.

[J] The associated value is an estimated quantity. This qualifier is appended when the data indicated the presence of a specific target analyte but was below the stated reporting (or quantitation) limit, and/or when quality control statistics alluded to an analytical bias.

[UJ] The component was analyzed for but not detected at a level equal to or greater than the level of detection or quantification (often the reporting limit). This flag is used when QC measurements indicate a possible low bias in the analytical data.

[R] Rejected. The data are of insufficient quality to be deemed acceptable as reported or otherwise qualified.

Volatile Organic Compounds by SW-846 8260

Initial Calibration

The initial calibration report associated within this SDG demonstrated response factors lower than 0.05 for acetone, 2-butanone, and 1,2-dibromo-3-chloropropane. Detected concentrations in samples associated with this continuing calibration report were qualified and flagged "J" while nondetected concentrations were qualified and flagged "R" as rejected. The following samples and corresponding analytes were qualified and flagged:

- OEP-MW-103D, OEP-MW-103S, OEP-MW-103SFR, OEP-MW-013D, OEP-MW-001S, OEP-MW-14D, OEP-PW-08FR
  - Acetone (R)
  - 2-butanone (R)
  - 1,2-dibromo-3-chloropropane (R)

Continuing Calibration

The continuing calibration report associated with this SDG demonstrated percent differences (%D) outside the QC limit of ± 30 percent for 1,2,4-trichlorobenzene. Detected concentrations of these analytes within the field samples were qualified and flagged "J" as detected and estimated in quantity. Nondetected sample results were qualified and flagged "UJ" as undetected and estimated in quantity. The following samples and corresponding analytes were qualified and flagged:

- OEP-MW-103D, OEP-MW-103S, OEP-MW-103SFR, OEP-MW-013D, OEP-MW-001S, OEP-MW-14D, OEP-PW-08FR
  - 1,2,4-trichlorobenzene (UJ)

Laboratory Control Samples

The LCS associated with this SDG exhibited a percent recovery (%R) for methylene chloride of 136 percent, which was above the upper QC limit of 130 percent. Detected concentrations were qualified and flagged "J" as detected and estimated in quantity. Nondetected sample results were qualified and flagged "UJ" as undetected and estimated in quantity. The following samples and corresponding analytes were qualified and flagged:

- OEP-MW-103D, OEP-PW-08FR
  - Methylene chloride (UJ)
  - OEP-MW-103S, OEP-MW-103SFR, OEP-MW-013D, OEP-MW-001S, OEP-MW-14D
  - Methylene chloride (J)

Blanks

The method blank associated with this SDG contained measurable concentrations of chloromethane of 0.0909 micrograms per liter (µg/L). Detected samples that did not exceed the 95 percent confidence interval (five times the blank concentration) of 0.4545 µg/L for chloromethane were qualified and flagged "U" as nondetect due to blank contamination. The following samples and corresponding analytes were qualified and flagged:

- OEP-MW-013D, OEP-MW-001S, OEP-PW-08FR
  - Chloromethane (U)

Duplicate Precision

The field duplicate for OEP-PW-08, exhibited a relative percent difference (RPD) for vinyl chloride of 37 percent when compared to the native sample. This duplicate RPD exceeded the QC limit of 30 percent for aqueous samples. The native and duplicate samples both reported detected concentrations of the affected analyte. Therefore, the native result (OEP-PW-08) was qualified and flagged "J" as detected and estimated in quantity.

Dissolved Gases by RSK-175

Duplicate Precision

The field duplicate for OEP-MW-103S exhibited an RPD for methane of 35.08 percent when compared to the native sample, which exceeded the QC limit of 30 percent for aqueous samples. The native and duplicate samples both reported detected concentrations of the affected analyte. Therefore, the native result (OEP-MW-103S) was qualified and flagged "J" as detected and estimated in quantity.

Matrix Spike/ Matrix Spike Duplicates

The MS/MSD associated with field sample OEP-MW-103D exhibited RPDs outside the QC limit of ± 30 percent for methane (42 percent), ethane (100 percent), and ethane (47 percent). An RPD outside the QC limits for an MS/MSD demonstrates possible poor precision due to matrix interference. Detected concentrations of methane, ethane, and ethene in parent sample OEP-MW-103D were qualified and flagged "J" while nondetected concentrations were qualified and flagged "UJ" as estimated in quantity. The following samples and corresponding analytes were qualified and flagged:

- OEP-MW-103D
  - Methane (J)
- OEP-MW-103D
  - Ethane (UJ)
  - Ethene (UJ)

Blanks

The initial calibration blank associated with this SDG contained measurable concentrations of methane and ethane at 1.13 µg/L and 2.20 µg/L, respectively. Detected samples that did not exceed the 95 percent confidence interval (five times the blank concentration) of 5.65 µg/L and 11.015 µg/L for methane and ethane, respectively, were qualified and flagged "U" as nondetect due to blank contamination. The following samples and corresponding analytes were qualified and flagged:

- OEP-MW-015S, OEP-MW-107S, OEP-MW-14D, OEP-SW-03
  - Methane (U)
- OEP-MW-105S, OEP-MW-016S
  - Ethane (U)

Metals by SW-846 6010

Calibration

The continuing calibration verifications (CCVs) associated with CCV batches 380174, 380184, 380189, and 380191 in this SDG demonstrated %R for iron greater than the QC limits of 90 to 110 percent. This affects both total and dissolved iron concentrations in the samples. Detected concentrations were qualified and flagged "J" as detected and estimated in quantity. Nondetected sample results were not qualified. The following samples and corresponding analytes were qualified and flagged:

- OEP-MW-103S, OEP-MW-103SFR, OEP-MW-012D, OEP-MW-012S, OEP-MW-105D, OEP-MW-105DFR, OEP-105S, OEP-MW-013D, OEP-MW-013DFR, OEP-MW-107S, OEP-MW-SW01, OEP-SW-03
  - Total iron (J)
- OEP-MW-103S, OEP-MW-103SFR, OEP-MW-012D, OEP-MW-105D, OEP-MW-105DFR, OEP-105S, OEP-MW-013DFR, OEP-MW-107S, OEP-MW-SW01, OEP-MW-016S, OEP-SW-03,
  - Dissolved iron (J)

The initial calibration blank associated with this SDG contained measurable concentrations of manganese at 1.9 µg/L. Detected samples that did not exceed the 95 percent confidence interval (five times the blank concentration) of 9.5 µg/L for manganese were qualified and flagged "U" as nondetect due to blank contamination. The following samples and corresponding analytes were qualified and flagged:

- OEP-MW-015D, OEP-MW-SW01, OEP-MW-SW03
  - Manganese (U)

General Chemistry by USEPA 310.2, EPA 376.1, SW-846 9056, and SW-846 9060

Matrix Spike/ Matrix Spike Duplicates

The MSD associated with field sample OEP-MW-103D exhibited a 54 percent recovery for alkalinity, which is below the lower QC limit of 60 percent. An RPD below the lower QC limits for an MS/MSD demonstrates possible poor precision due to matrix interference. The parent sample, OEP-MW-103D, contained a detected concentration of alkalinity, and therefore was qualified and flagged "J" as esimated in quantity.

Conclusions

The rejection of the acetone, 2-butanone, and 1,2-dibromo-3-chloropropane in four samples was due was due to extremely low response factors. A response factor of less than 0.05 indicates poor response of a compound on the instrument, and therefore, the laboratory cannot, with confidence, report that the related compounds are or are not present in the sample. Therefore, nondetect results were rejected and must be considered "unusable" by the data user.

The USEPA validation reports for the compliance data were verified to comply with the applicable National Functional Guidelines for Data Review. This verification confirmed that the validation performed by USEPA was complete for the data set analyzed by CTL. Qualified data, if not rejected, are considered usuable for the project decision-making process. The project data quality objectives (DQOs) established a completeness goal for the project at 90 percent. The percent completeness for these groundwater data was 100 percent and met the established DQOs set forth in the quality assurance project plan (CH2M HILL, October 2004).

Overall, the analytical results are acceptable as reported unless otherwise qualified herein; therefore, the validated analytical results can be used to make project decisions.

Attachment A – USEPA Region 5 CLP Review

Regional Transmittal Form

UNITED STATED ENVIROMENTAL PROTECTION AGENCY
REGION V
SUPERFUND DIVISION

DATE:

SUBJECT: Review of Region V CLP Data
Received for review on 04-27-2006

FROM: Stephen L. Ostrodka, Chief (SRT-4J)
Superfund Field Service Section

TO: Data User: CH2MHILL

We have reviewed the data for the following case:

Site Name: Oconomowoc Electroplating (WI)

Case Number: 06CD16 SDG Number: 52850-VOA

Number and Type of Samples: 20 water samples (VOA & Methane, Ethane, Ethene)

Sample Numbers: 06CD16-08, 10, 12, 14, 16, 18, 28, 32, 34, 36-39, 41, 44, 46, 48-50, 52

Laboratory: CT Laboratories Hrs for review:

Following are our findings:

CC: Howard Pham
Region 5 TPO
Mail Code: SRT-4J

Below is a summary of the out-of –control audits and the possible effects on the data for this case:

Twenty (20) water samples (identified in the following table) were collected 03/28-30/2006:

EPA ID	Lab ID	Station Loc.	Analysis
06CD16-08	378424	OEP-MW-012D	VOA, MEE
06CD16-10	378426	OEP-MW-012S	VOA, MEE
06CD16-12	378430	OEP-MW-015D	VOA, MEE
06CD16-14	378428	OEP-MW-015S	VOA, MEE
06CD16-16	378432	OEP-MW-105D	VOA, MEE
06CD16-18	378434	OEP-MW-105S	VOA, MEE
06CD16-28	378829	OEP-MW-013D	VOA, MEE
06CD16-32	378850	OEP-MW-107D	VOA, MEE
06CD16-34	378833	OEP-MW-107S	VOA, MEE
06CD16-36	378863	OEP-PW-09	VOA
06CD16-37	378877	OEP-PW-04	VOA
06CD16-38	378878	OEP-PW-05	VOA
06CD16-39	378879	OEP-PW-08	VOA
06CD16-41	378835	OEP-SW-01	VOA, MEE
06CD16-44	379367	OEP-MW-016S	VOA, MEE
06CD16-46	379369	OEP-SW-03	VOA, MEE
06CD16-48	379371	OEP-PW-07	VOA
06CD16-49	379372	OEP-PW-10	VOA
06CD16-50	379373	OEP-PW-03	VOA
06CD16-52	379375	OEP-PW-11	VOA

The laboratory received the samples on 03/29-31/2006. All samples were properly preserved to the pH <2 from the field. Twelve (12) samples; 06CD16-08, 06CD16-10, 06CD16-12, 06CD16-14, 06CD16-16, 06CD16-18, 06CD16-44, 06CD16-46, 06CD16-48, 06CD16-49, 06CD16-50 and 06CD16-52 were received in good condition. The temperatures of the coolers for the remaining samples ranged from 0.1°C to 1.7 °C upon receipt. All samples were analyzed for the following forty-six (46) volatile analytes according to SW-846, Method 8260B and the SAS contract for samples collected from June 2005 through July 2006:

Chloromethane	Carbon Tetrachloride	Chlorobenzene
Bromomethane	Bromodichloromethane	Ethylbenzene
Vinyl chloride	1,2-Dichloropropane	Styrene
1,3-Dichlorobenzene	1,2,4-Trichlorobenzene	m & p-Xylenes
Chloroethane	cis-1,3-Dichlopropene	1,2,3-Trichlorobenzene
1,4-Dichlorobenzene	Trichloroethene	1,2-Dibromo-3-chloropropane
Methylene chloride	Dibromochloromethane	1,2-Dibromoethane
1,2-Dichlorobenzene	1,1,2-Trichloroethane	Bromochloromethane
Acetone	Benzene	cis-1,2-Dichloroethene
Carbon Disulfide	trans-1,3-Dichlopropene	Dichlorodifluoromethane
1,1-Dichloroethene	Bromoform	Isopropylbenzene
1,1-Dichloroethane	4-Methyl-2-Pentanone	Methyl tert-butyl ether
Chloroform	2-Hexanone	o-Xylenes
1,2-Dichloroethane	Tetrachloroethene	trans-1,2-Dichloroethene
2-Butanone	1,1,2,2-Tetrachloroethane	
1,1,1-Trichloroethane	Toluene	

In addition to the VOA analysis, twelve (12) samples; 06CD16-08, 06CD16-10, 06CD16-12, 06CD16-14, 06CD16-16, 06CD16-18, 06CD16-28, 06CD16-32, 06CD16-34, 06CD16-41, 06CD16-44 and 06CD16-46, were analyzed for Methane, Ethene and Ethane by Method RSK-175 (Dissolved Gas Analysis in Water Samples Using a GC Headspace Equilibration Technique). The SAS for Methane, Ethene and Ethane was not available for data review at this time; therefore, QC recommendations from Methods 8000B and Method RSK-175 will be used to validate the Methane, Ethene and Ethane data.

Samples 06CD16-28 and 06CD16-39 were identified as field duplicate samples. However, their duplicated samples were not with this SDG. None of the samples in this sample delivery group were identified as field banks or trip blanks.

For the VOA fraction, sample ID numbers 379965, 382827, 380458 and 382829 were identified as the method blanks. Samples 06CD16-01 and 06CD16-41 were used as the matrix spike/matrix spike duplicates. Sample 06CD16-01 is not a part of this sample delivery group. Sample ID numbers 379964/380352 and 380457/380691 were identified as the laboratory control sample and laboratory control sample duplicate pairs.

For the Methane, Ethene and Ethane fraction, MBW-380478 was identified as the method blank. Sample 06CD16-01 was used as the matrix spike/matrix spike duplicate (this sample is not part of this data set). LCSW-380477 and LCSDW-380484 were identified as the laboratory control sample and laboratory control sample duplicate.

The VOA samples were analyzed on 04/03-05/2006 which was within the Method holding time of fourteen (14) days from the date samples were collected; therefore, the results are acceptable. The Methane, Ethene and Ethane samples were analyzed on 04/04/2006, well within seven (7) days of collection; therefore, the results are acceptable.

Reviewed by: Steffanie Tobin (TECHLAW/ESAT)
Date: May 24, 2006

1. HOLDING TIME

Twenty (20) water samples (identified in the following table) were collected 03/28-30/2006:

EPA ID	Lab ID	Station Loc.	Analysis
06CD16-08	378424	OEP-MW-012D	VOA, MEE
06CD16-10	378426	OEP-MW-012S	VOA, MEE
06CD16-12	378430	OEP-MW-015D	VOA, MEE
06CD16-14	378428	OEP-MW-015S	VOA, MEE
06CD16-16	378432	OEP-MW-105D	VOA, MEE
06CD16-18	378434	OEP-MW-105S	VOA, MEE
06CD16-28	378829	OEP-MW-013D	VOA, MEE
06CD16-32	378850	OEP-MW-107D	VOA, MEE
06CD16-34	378833	OEP-MW-107S	VOA, MEE
06CD16-36	378863	OEP-PW-09	VOA
06CD16-37	378877	OEP-PW-04	VOA
06CD16-38	378878	OEP-PW-05	VOA
06CD16-39	378879	OEP-PW-08	VOA
06CD16-41	378835	OEP-SW-01	VOA, MEE
06CD16-44	379367	OEP-MW-016S	VOA, MEE
06CD16-46	379369	OEP-SW-03	VOA, MEE
06CD16-48	379371	OEP-PW-07	VOA
06CD16-49	379372	OEP-PW-10	VOA
06CD16-50	379373	OEP-PW-03	VOA
06CD16-52	379375	OEP-PW-11	VOA

The laboratory received the samples on 03/29-31/2006. All samples were properly preserved to the pH <2 from the field. Twelve (12) samples; 06CD16-08, 06CD16-10, 06CD16-12, 06CD16-14, 06CD16-16, 06CD16-18, 06CD16-44, 06CD16-46, 06CD16-48, 06CD16-49, 06CD16-50 and 06CD16-52 were received in good condition. The temperatures of the coolers for the remaining samples ranged from 0.1°C to 1.7 °C upon receipt. All samples were analyzed for the following forty-six (46) volatile analytes according to SW-846, Method 8260B and the SAS contract for samples collected from June 2005 through July 2006:

Chloromethane	Carbon Tetrachloride	Chlorobenzene
Bromomethane	Bromodichloromethane	Ethylbenzene
Vinyl chloride	1,2-Dichloropropane	Styrene
1,3-Dichlorobenzene	1,2,4-Trichlorobenzene	m & p-Xylenes
Chloroethane	cis-1,3-Dichlopropene	1,2,3-Trichlorobenzene
1,4-Dichlorobenzene	Trichloroethene	1,2-Dibromo-3-chloropropane
Methylene chloride	Dibromochloromethane	1,2-Dibromoethane
1,2-Dichlorobenzene	1,1,2-Trichloroethane	Bromochloromethane
Acetone	Benzene	cis-1,2-Dichloroethene
Carbon Disulfide	trans-1,3-Dichlopropene	Dichlorodifluoromethane
1,1-Dichloroethene	Bromoform	Isopropylbenzene
1,1-Dichloroethane	4-Methyl-2-Pentanone	Methyl tert-butyl ether
Chloroform	2-Hexanone	o-Xylenes
1,2-Dichloroethane	Tetrachloroethene	trans-1,2-Dichloroethene
2-Butanone	1,1,2,2-Tetrachloroethane	
1,1,1-Trichloroethane	Toluene	

In addition to the VOA analysis, twelve (12) samples; 06CD16-08, 06CD16-10, 06CD16-12, 06CD16-14, 06CD16-16, 06CD16-18, 06CD16-28, 06CD16-32, 06CD16-34, 06CD16-41, 06CD16-44 and 06CD16-46, were analyzed for Methane, Ethene and Ethane by Method RSK-175 (Dissolved Gas Analysis in Water Samples Using a GC Headspace Equilibration Technique). The SAS for Methane, Ethene and Ethane was not available for data review at this time; therefore, QC recommendations from Methods 8000B and Method RSK-175 will be used to validate the Methane, Ethene and Ethane data.

The VOA samples were analyzed on 04/03-05/2006 which was within the Method holding time of fourteen (14) days from the date samples were collected; therefore, the results are acceptable. The Methane, Ethene and Ethane samples were analyzed on 04/04/2006, well within seven (7) days of collection; therefore, the results are acceptable.

2. GC/MS PERFORMANCE

For the VOA fraction, GC/MS tuning complied with the mass list and ion abundance criteria for BFB. All samples were analyzed within the twelve (12) hour periods for instrument performance checks; therefore, the results are acceptable.

For the Methane, Ethane, Ethene fraction, GC/FID was properly optimized for resolution of the target analytes and sensitivity. All samples were analyzed within the twelve (12) hour periods for instrument performance checks; therefore, the results are acceptable.

3. CALIBRATION

For the VOA fraction, a 7-point calibration curve was generated on 04/01/2006. The continuing standards and samples were analyzed on 04/03-05/2006. The SAS RSDs for the initial calibration standard are ≤30% for CCC and ≤15% for the remaining analytes. 1,1-Dichloroethene, Chloroform, 1,2-Dichloropropane, Toluene, Ethylbenzene and Vinylchloride are CCC according to SW-846, Method 8260B page 18, section 7.3.6.3. The continuing calibration was evaluated for %Ds ± 20% (SW-846, Method 8260B page 19, section 7.4.5.2). All analyte RRFs should be greater than 0.05.

For Methane, Ethene and Ethane, a 7-pt initial calibration curve was calibrated on 05/09/2005. The initial standards were evaluated for a coefficient of the determination of ∃0.995. The laboratory QC limits of # 20% were used to evaluate the continuing standards.

The initial calibration and continuing calibration of the VOA and Methane, Ethene, Ethane analytes were evaluated and outliers are recorded on the outlier form included as part of this narrative.

4. METHOD BLANKS

For the VOA fraction, sample ID numbers 379965, 382827, 380458 and 382829 were identified as the method blanks. Form Is for the method blanks were not submitted with the data package. The results from raw data (pages 607 – 641) were used to validate the samples results. Copies of page 1 of the Quantitation Reports are included with the hard copy validation package. The results for the method blanks are summarized in the following table:

Analytes Units	379965	382827	380458	382829
	Φg/L	Φg/L	Φg/L	Φg/L
Chloromethane	0.10	0.09	ND	ND
Chloroethane	ND	ND	0.08	ND
Acetone	3.70	5.76	2.39	4.69
Carbon disulfide	ND	0.17	0.17	0.13
Methylene chloride	0.20	0.65	0.91	ND
2-Butanone	0.76	0.42	0.53	ND
1,2-Dichloropropane	ND	ND	0.06	ND

Based on the analytical dates and times the method blank summaries were revised to demonstrate the following associations:

04/03/2006 12:53	04/04/2006 10:18	04/04/2006 23:19	04/05/2006 10:26
MB-379965	MB-382827	MB-380458	MB-382829
06CD16-10	06CD16-08	06CD16-14 (1:5)	06CD16-32
06CD16-18	06CD16-12	06CD16-28	06CD16-34
LCSW-379964	06CD16-14 (1:1)	06CD16-41	06CD16-36
	06CD16-16	06CD16-46	06CD16-37
	06CD16-44	LCSW-380457	06CD16-38
	06CD16-48		06CD16-39
	06CD16-49		MSW-380692
	06CD16-50		MSDW-380693
	06CD16-52		LCSD-380691
	MSW-380350		
	MSDW-380351		
	LCSDW-380352		

Methylene chloride and 2-Butanone are common laboratory contaminants. The presence of Methylene chloride and/or 2-Butanone in the associated samples is flagged as a non-detect when the sample result is less than 10X the blank result. The presence of Methylene chloride in samples 06CD16-08, 06CD16-16, 06CD16-41 and 06CD16-44 was less than 10X the associated method blank (corrected for sample dilution); therefore the sample values are qualified as non-detects and flagged "U". The presence of Methylene chloride in samples 06CD16-12, 06CD16-14, 06CD16-28, 06CD16-46, 06CD16-48, 06CD16-49, 06CD16-50 and 06CD16-52 was less than the associated method blank; therefore the sample values are qualified as non-detects and flagged "U". The presence of 2-Butanone in sample 06CD16-48 was less than 10X the associated method blank (corrected for sample dilution); therefore the sample value is qualified as a non-detect and flagged "U".

Chloromethane is not a common laboratory contaminant. The presence of Chloromethane in the associated samples is flagged as non-detects when the sample results are less than 5X the blank results. The presence of Chloromethane in samples 06CD16-14, 06CD16-50 and 06CD16-52 was less than the associated method blank; therefore the sample values are qualified as non-detects and flagged "U". The presence of Chloromethane in sample 06CD16-48 was less than 5X the associated method blank (corrected for sample dilution); therefore the sample value is qualified as a non-detect and flagged "U".

For the Methane, Ethene and Ethane fraction, MBW-380478 (raw data page 653 & 654) was identified as the method blank. Form Is for the method blank was not submitted with the data package. The results from raw data (pages 653 – 654) were used to validate the samples results. Copies of the raw data are included with the hard copy validation package. MBW-380478 contains Methane at 0.16 Φg/L. The presence of Methane in the associated samples is flagged as non-detects when the sample results are less than 5X the blank results. No samples were qualified for blank contamination. The Method Blank Summary lists the samples associated with MBW-380478.

5. SYSTEM MONITORING COMPOUND

For the VOA fraction, 1,2-Dichloroethane-d_4, Bromofluorobenzene, Dibromofluoromethane and Toluene-d_8 were used as system monitoring compounds. The SAS limits are 75% - 135% for the system monitoring compound recoveries. The recovery of Toluene-d_8 for sample 06CD16-50 (71%) was below the SAS limits. All positive results for sample 06CD16-50 should be qualified as estimated "J" and non-detects "UJ".

System monitoring compounds were not required for the Methane, Ethene and Ethane fraction.

6a. LABORATORY CONTROL SAMPLES

For the VOA fraction, sample ID numbers 379964/ 380352 and 380457/380691 were identified as the laboratory control sample and laboratory control sample duplicate pairs. The SAS limits are 60% - 130% for recoveries and < 30% for RPD. The RPD of Methylene chloride (50%) for LCS/LCSD pair 379964/ 380352 was above the SAS limits. The non-detects of Methylene chloride for samples 06CD16-08, 06CD16-10, 06CD16-12, 06CD16-14, 06CD16-16, 06CD16-18, 06CD16-44, 06CD16-48, 06CD16-49, 06CD16-50 and 06CD16-52 should be qualified "UJ".

The recovery of Methylene chloride (136%) for LCS 380457 was above the SAS limits. If Methylene chloride were present on any of the samples associated with LCS-380457 /LCSD-380691 the values would have been qualified as estimated, "J". No Methylene chloride is reported for samples 06CD16-28, 06CD16-32, 06CD16-34, 06CD16-36, 06CD16-37, 06CD16-38, 06CD16-39, 06CD16-41 and 06CD16-46; therefore, no qualifications were necessary.

For the Methane, Ethene and Ethane fraction, LCSW-380477 and LCSDW-380483 were identified as the laboratory control sample and laboratory control sample duplicate. The recoveries were within the laboratory QC limits of 60% - 130% and the RPDs were within the laboratory QC limits of <30%.

6b. MATRIX SPIKE/MATRIX SPIKE DUPLICATES

For the VOA fraction, samples 06CD16-01 (sample ID 378137) and 06CD16-41 (sample ID 378835) were used as the matrix spike/matrix spike duplicates. The SAS limits are 60% - 130% for recoveries and < 30% for RPD. The recoveries and RPDs for 06CD16-01MS and 06CD16-01MSD were within the SAS limits; therefore, the results are acceptable. The recoveries of Methylene chloride for 06CD16-41MS (36%) and 06CD16-41MSD (30%) were below the SAS limits. No Methylene chloride is reported for the unspiked sample 06CD16-41; therefore the quantitation limit is qualified "UJ".

For the Methane, Ethene and Ethane fraction, sample 06CD16-01 was used as the matrix spike/matrix spike duplicate. The laboratory QC limits of 60% - 130% for recoveries and <30%

for RPDs were used to evaluate the spike. The recoveries of Ethane (53%) and Ethene (54%) for 06CD16-01MS were below the QC limits. The recovery of Methane for 06CD16-01MS (1487%) was above the QC limits. The recoveries of Ethane (159%) and Methane (2287%) for 06CD16-01MSD were above the QC limits. The RPDs for Ethane (100%), Ethene (47%) and Methane (42%) for 06CD16-01MS and 06CD16-01MSD were above the laboratory QC limits. Since this sample is not a part of this data set, qualification of the unspiked sample will not be discussed in this data set.

7. FIELD BLANK AND FIELD DUPLICATE

Samples 06CD16-28 and 06CD16-39 were identified as field duplicate samples. However, their duplicated samples were not part of this SDG. None of the samples in this sample delivery group were identified as field banks or trip blanks. Results are not qualified based upon the results of the QC blanks or field duplicates. The results of the field duplicates are summarized in the following table:

Analytes DF, units =	06CD16-28 1, Φg/L	06CD16-39 1, Φg/L
Chloromethane	0.078	0.24
Vinyl chloride	0.084	0.032
Methylene chloride	U	U
Trichloroethene	U	0.083 J
cis-1,2-Dichloroethene	0.39	0.83
Methyl tert-butyl ether	0.26	0.43
tran-1,2-Dichloroethene	U	0.075 J
Methane	25 (1:2.5)	NA
Ethane	U	NA
Ethene	U	NA

8. INTERNAL STANDARDS

For the VOA fraction, Fluorobenzene, Chlorobenzene-d_5 and 1,4-Dichlorobenzene-d_4 were used as internal standards. The internal standards' retention times and area counts for the samples and QC samples were within the QC limits; therefore, the results are acceptable.

Internal standards were not required for the Methane, Ethene and Ethane analysis.

9. COMPOUND IDENTIFICATION

After reviewing the chromatograms it appears that the target compounds for VOA and Methane, Ethene, Ethane fractions were properly identified.

Reviewed by: Steffanie Tobin (TECHLAW/ESAT)
Date: May 24, 2006

10. COMPOUND QUANTITATION AND REPORTED DETECTION LIMITS

The results for VOA and Methane, Ethene, Ethane fractions were properly quantitated.

For the VOA fraction, the reporting limits for Vinyl chloride (0.018 µg/L), cis-1,3-Dichloropropene (0.016 µg/L), trans-1,3- Dichloropropene (0.015 µg/L), and 1,1,2,2-tetrachloroethane (0.018 µg/L) did not meet the SAS requiring limits of 0.010 µg/L. The reporting limits for the remaining VOA analytes were within the SAS limits; therefore, the results are acceptable.

The reporting limits for Methane, Ethene and Ethane met Method RSK-175 reporting limits of 0.50 µg/L; therefore, the results are acceptable.

11. SYSTEM PERFORMANCE

GC/MS baseline indicated acceptable performance. GC/FID baseline was acceptable.

12. ADDITIONAL INFORMATION

Condition 6 of the SAS contract requires that analytical results be submitted within 21 days of receipt of samples. The samples were received on 03/29-31/2006. CT Laboratories issued the data reports on 04/10-11/2006 which was within the 21-day turnaround time.

The VOA samples were analyzed according to SW-846, Method 8260B complying with the SAS contract. The Methane, Ethene and Ethane samples were analyzed according to Method RSK-175 (EPA method 3810).

The data were reported on standard CLP forms complying with Condition 9 of the SAS contract.

All original sample tags, airbills, Chain-of-Custody records, SAS packing lists, etc should have been submitted directly to Ch2mHill as indicated in Condition 10 of the SAS contract. Photocopies of the Chain-of-Custody records, sample tags and airbills were included with this data package.

The most recent MDL studies were not included in the data package.

Some samples were analyzed at more than one dilution. The DF (dilution factors) reported in () next to the sample results in the following tables indicate the results were reported from DF different from the reported DF. The sample results are summarized in the following tables:

Analytes	06CD16-08	06CD16-10	06CD16-12	06CD16-14	06CD16-16
DF, units =	5, µg/L	20, µg/L	1, µg/L	1, µg/L	25, µg/L
Chloromethane	U	U	U	U	U
Vinyl chloride	1.3	0.84	U	0.023 J	0.96
Chloroethane	0.39	U	U	U	U
Methylene chloride	UJ	UJ	UJ	UJ	UJ
1,1-Dichloroethene	2.0	4.8	U	0.16 J	2.0 J
1,1-Dichloroethane	35	19	U	0.10 J	12
1,2-Dichloroethane	0.24	U	U	0.058 J	U
1,1,1-Trichloroethane	9.7	73	0.48	U	U
Bromodichloromethane	0.26 J	U	U	U	1.7 J
Trichloroethene	6.2	100	0.17	25 (1:5)	160
Benzene	U	U	U	0.058 J	U
Chlorobenzene	U	U	U	3.3	U
cis-1,2-Dichloroethene	8.5	24	U	4.3	38
Methyl tert-butyl ether	U	U	U	0.25 J	U
tran-1,2-Dichloroethene	2.2	16	U	0.33	1.4 J
Methane	45	57 (1:5)	U	5.4	78 (1:10)

Analytes	06CD16-18	06CD16-28	06CD16-32	06CD16-34	06CD16-36
DF, units =	25, µg/L	1, µg/L	1, µg/L	1, µg/L	1, µg/L
Chloromethane	U	0.078 J	0.088 J	U	0.14 J
Vinyl chloride	3.3	0.084	U	U	0.052 J
Methylene chloride	UJ	U	U	U	U
1,1-Dichloroethane	7.9	U	U	U	U
Chloroform	U	U	U	U	0.074 J
1,2-Dichloroethane	U	U	U	U	0.059 J
1,1,1-Trichloroethane	2.2	U	U	U	U
Trichloroethene	33	U	U	U	0.047 J
cis-1,2-Dichloroethene	90	0.39	U	U	4.1
Methyl tert-butyl ether	U	0.26	U	U	0.64
tran-1,2-Dichloroethene	U	U	U	U	0.32
Ethane	0.73 (1:1) J	U	U	U	NA
Methane	89 (1:10)	25 (1:2.5)	U	1.9	NA

Analytes	06CD16-37	06CD16-38	06CD16-39	06CD16-41	06CD16-44
DF, units =	1, µg/L	1, µg/L	1, µg/L	1, µg/L	100, µg/L
Chloromethane	U	U	0.24	U	U
Vinyl chloride	U	U	0.032	U	83
Methylene chloride	U	U	U	UJ	UJ
Chloroform	0.11 J	U	U	U	U
Bromodichloromethane	U	U	U	U	4.9
Trichloroethene	0.034 J	0.083 J	0.083 J	U	U
cis-1,2-Dichloroethene	1.4	1.1	0.83	U	820 (1:200)
Methyl tert-butyl ether	0.55	0.73	0.43	U	U
tran-1,2-Dichloroethene	0.12 J	0.11 J	0.075 J	U	14
Methane	NA	NA	NA	U	200 (1:20)
Ethane	NA	NA	NA	U	0.60 (1:1) J
Ethene	NA	NA	NA	U	4.0 (1:1)

Reviewed by: Steffanie Tobin (TECHLAW/ESAT)
Date: May 24, 2006

Analytes	06CD16-46	06CD16-48	06CD16-49	06CD16-50	06CD16-52
DF, units =	1, µg/L	1, µg/L	1, µg/L	1, µg/L	1, µg/L
Chloromethane	0.053 J	U	U	UJ	U
Vinyl chloride	U	0.056	U	UJ	0.024 J
Methylene chloride	U	UJ	UJ	UJ	UJ
1,1-Dichloroethane	0.034 J	U	U	UJ	U
1,2-Dichloroethane	U	U	U	0.041 J	U
2-Butanone	U	U	U	UJ	U
Trichloroethene	0.17	0.031 J	U	0.37 J	U
cis-1,2-Dichloroethene	0.10 J	2.5	U	0.57 J	0.56
Methyl tert-butyl ether	U	0.61	0.14 J	0.52 J	0.68
tran-1,2-Dichloroethene	U	0.20	U	0.068 J	0.062 J
Methane	1.1 J	NA	NA	NA	NA

The sample ID numbers for method blanks MB-382827 and MB-382829 were not identified on the Laboratory Form Vs. The reviewer verified the sample IDs using the analytical dates and times on the raw data pages.

The following pages were missing from the data package but the review was not affected by the missing data: pages 18 – 32, 63 – 64, 73 – 76, 81 – 86, 95 – 98, 113 – 114, 117 – 124. All pages represent raw data for samples not included in the sample delivery group.

Reviewed by: Steffanie Tobin (TECHLAW/ESAT)
Date: May 24, 2006

Laboratory: CT Laboratories
Site: Oconomowoc Electroplating (WI)

Case: 06CD16
SDG: 52850-V

CALIBRATION OUTLIER FOR VOLATILE TARGET ANALYTES

Page 1 of 2

Instrument: GC/MS 1					Column: SPB-624							
Heated Purge: (Y) / N		Initial Calibration			Continuing Cal			Continuing Cal			Continuing Cal	
Date/Time:		04-01-06 20:55			04-03-06 10:51			04-04-06 08:57			04-04-06 21:17	
TCL Analytes		RRF	%RSD	Q	RRF	%D	Q	RRF	%D	Q	RRF	%D	Q
Chloromethane	0.05												
Bromomethane	0.05												
Vinyl chloride	0.05												
1,3-Dichlorobenzene	0.05												
Chloroethane	0.05												
1,4-Dichlorobenzene	0.05												
Methylene chloride	0.05	0.801			0.433	45.9	J/UJ	0.580	27.6	J/UJ	0.616	23.1	J/UJ
1,2-Dichlorobenzene	0.05												
Acetone	0.05	0.024		J/R	0.021		J/R	0.022		J/R	0.023		J/R
Carbon Disulfide	0.05												
1,1-Dichloroethene	0.05												
1,1-Dichloroethane	0.05												
Chloroform	0.05												
1,2-Dichloroethane	0.05												
2-Butanone	0.05	0.032		J/R	0.032		J/R	0.033		J/R	0.033		J/R
1,1,1-Trichloroethane	0.05												
Carbon Tetrachloride	0.05												
Bromodichloromethane	0.05												
1,2-Dichloropropane	0.05												
1,2,4-Trichlorobenzene	0.05	0.441			0.379			0.312	29.3	J/UJ	0.347	21.3	J/UJ
cis-1,3-Dichlopropene	0.05												
Trichloroethene	0.05												
Dibromochloromethane	0.05												
1,1,2-Trichloroethane	0.05												
Benzene	0.05												
trans-1,3-Dichlopropene	0.05												
Bromoform	0.05												
4-Methyl-2-Pentanone	0.05												
2-Hexanone	0.05												
Tetrachloroethene	0.05												
1,1,2,2-Tetrachloroethane	0.05												
Toluene	0.05												

Reviewed by: Steffanie Tobin (TECHLAW/ESAT)
Date: May 24, 2006

Laboratory: CT Laboratories
Site: Oconomowoc Electroplating (WI)

Case: 06CD16
SDG: 52850-V

CALIBRATION OUTLIER FOR VOLATILE TARGET ANALYTES
Page 2 of 2

Instrument: GC/MS 1					Column: SPB-624								
Heated Purge: (Y) / N		Initial Calibration			Continuing Cal			Continuing Cal			Continuing Cal		
Date/Time:		04-01-06 20:55			04-03-06 10:51			04-04-06 08:57			04-04-06 21:17		
TCL Analytes		RRF	%RSD	Q	RRF	%D	Q	RRF	%D	Q	RRF	%D	Q
Chlorobenzene	0.05												
Ethylbenzene	0.05												
Styrene	0.05												
m & p- Xylenes	0.05												
1,2,3-Trichlorobenzene	0.05	0.332			0.305			0.253	23.8	J/UJ	0.280		
1,2-Dibromo-3-chloropropane	0.05	0.043		J/R	0.045		J/R	0.044		J/R	0.050		
1,2-Dibromoethane	0.05												
Bromochloromethane	0.05												
cis-1,2-Dichloroethene	0.05												
Dichlorodifluoromethane	0.05												
Isopropylbenzene	0.05												
Methyl tert-butyl ether	0.05												
o-Xylene	0.05												
Trans-1,2-Dichloroethene	0.05												
Bromofluorobenzene (SURR)	0.05												
Dibromofluoromethane (SURR)	0.05	0.275			0.492	78.9	J/UJ	0.458	66.5	J/UJ	0.474	72.4	J/UJ
1,2-Dichloroethane-d_4 (SURR)	0.05	0.039		J/R	0.067	71.8	J/UJ	0.064	64.1	J/UJ	0.067	71.8	J/UJ
Toluene-d_8 (SURR)	0.05	0.978			1.692	73.0	J/UJ	1.699	73.7	J/UJ	1.673	71.1	J/UJ

SAMPLES AFFECTED:		LCS 379964	MB 332827	LCS 380457
CCC RSDs ≤ 30%		MB 379965	06CD16-14 (1:1)	MB 380458
Others RSDs ≤ 15%		06CD16-08 NU	06CD16-46 NU	06CD16-46
%Ds ± 20%		06CD16-10	06CD16-48	06CD16-48 NU
RRFs > 0.05		06CD16-12 NU	06CD16-49	06CD16-14 (1:5)
		06CD16-18	06CD16-50	06CD16-28
		06CD16-44 NU	06CD16-52	06CD16-41
		06CD16-16 NU	06CD16-08	06CD16-34 NU
			06CD16-12	06CD16-32 NU
			06CD16-44	
			06CD16-16	
NU = Not Used			06CD16-01 MS	
			06CD16-01 MSD	
			LCSD 380352	

Reviewed by: Steffanie Tobin (TECHLAW/ESAT)
Date: May 24, 2006

Laboratory: CT Laboratories
Site: Oconomowoc Electroplating (WI)

Case: 06CD16
SDG: 52850-V

CALIBRATION OUTLIER FOR VOLATILE TARGET ANALYTES
Page 1 of 2

Instrument: GC/MS 1					Column: SPB-624								
Heated Purge: [✓ Y] / N		Initial Calibration			Continuing Cal			Continuing Cal			Continuing Cal		
Date/Time:		04-01-06 20:55			04-05-06 09:05								
TCL Analytes		RRF	%RSD	Q	RRF	%D	Q	RRF	%D	Q	RRF	%D	Q
Chloromethane	0.05												
Bromomethane	0.05												
Vinyl chloride	0.05												
1,3-Dichlorobenzene	0.05												
Chloroethane	0.05												
1,4-Dichlorobenzene	0.05												
Methylene chloride	0.05	0.801			0.396	50.6	J/UJ						
1,2-Dichlorobenzene	0.05												
Acetone	0.05	0.024		J/R	0.029	20.8	J/R						
Carbon Disulfide	0.05												
1,1-Dichloroethene	0.05												
1,1-Dichloroethane	0.05												
Chloroform	0.05												
1,2-Dichloroethane	0.05												
2-Butanone	0.05	0.032		J/R	0.032		J/R						
1,1,1-Trichloroethane	0.05												
Carbon Tetrachloride	0.05												
Bromodichloromethane	0.05												
1,2-Dichloropropane	0.05												
1,2,4-Trichlorobenzene	0.05	0.441			0.289	34.5	J/UJ						
cis-1,3-Dichlopropene	0.05												
Trichloroethene	0.05												
Dibromochloromethane	0.05												
1,1,2-Trichloroethane	0.05												
Benzene	0.05												
trans-1,3-Dichlopropene	0.05												
Bromoform	0.05												
4-Methyl-2-Pentanone	0.05												
2-Hexanone	0.05												
Tetrachloroethene	0.05												
1,1,2,2-Tetrachloroethane	0.05												
Toluene	0.05												

Reviewed by: Steffanie Tobin (TECHLAW/ESAT)
Date: May 24, 2006

CALIBRATION OUTLIER FOR VOLATILE TARGET ANALYTES

Page 2 of 2

Instrument: GC/MS 1					Column: SPB-624								
Heated Purge: (Y) / N		Initial Calibration			Continuing Cal			Continuing Cal			Continuing Cal		
Date/Time:		04-01-06 20:55			04-05-06 09:05								
TCL Analytes		RRF	%RSD	Q	RRF	%D	Q	RRF	%D	Q	RRF	%D	Q
Chlorobenzene	0.05												
Ethylbenzene	0.05												
Styrene	0.05												
m & p- Xylenes	0.05												
1,2,3-Trichlorobenzene	0.05	0.332			0.247	25.6	J/UJ						
1,2-Dibromo-3-chloropropane	0.05	0.043		J/R	0.048		J/R						
1,2-Dibromoethane	0.05												
Bromochloromethane	0.05												
cis-1,2-Dichloroethene	0.05												
Dichlorodifluoromethane	0.05												
Isopropylbenzene	0.05												
Methyl tert-butyl ether	0.05												
o-Xylene	0.05												
Trans-1,2-Dichloroethene	0.05												
Bromofluorobenzene (SURR)	0.05												
Dibromofluoromethane (SURR)	0.05	0.275			0.475	72.7	J/UJ						
1,2-Dichloroethane-d_4 (SURR)	0.05	0.039			0.068	74.4	J/UJ						
Toluene-d_8 (SURR)	0.05	0.978		J/R	1.702	74.	J/UJ						
SAMPLES AFFECTED:					MB 382829								
CCC RSDs ≤ 30%					06CD16-34								
Others RSDs ≤ 15%					06CD16-32								
%Ds ± 20%					06CD16-36 NU								
RRFs > 0.05					06CD16-37								
					06CD16-38								
					06CD16-39								
					06CD16-36								
					06CD16-41 MS								
					06CD16-41 MSD								
					LCSD 380691								
NU = Not Used													

Reviewed by: Steffanie Tobin (TECHLAW/ESAT)
Date: May 24, 2006

Laboratory: CT Laboratories
Site: Oconomowoc Electroplating (WI)

Case: 06CD16
SDG: 52850-V

CALIBRATION OUTLIER FOR METHANE, ETHENE & ETHANE

Instrument: PVOC4				Column:								
	Initial Calibration			Continuing Cal			Continuing Cal			Continuing Cal		
Date/Time	05-09-05 12:16			04-04-06 15:37			04-04-06 17:26			04-04-06 18:25		
TCL Analytes	RRF	%RSD	Q	RRF	%D	Q	RRF	%D	Q	RRF	%D	Q
Methane												
Ethylene												
Ethane												
SAMPLES AFFECTED:				LCSW			06CD16-18			06CD16-44		
COD > 0.995				MBW			06CD16-18 (1:10)			06CD16-44 (1:20)		
%D ≤ 20%				06CD16-01 MS			06CD16-28			06CD16-46		
				06CD16-01 MSD			06CD16-28 (1:2.5)			LCSDW		
				06CD16-08			06CD16-34					
				06CD16-08 (1:5)			06CD16-41					
				06CD16-10			06CD16-32					
				06CD16-10 (1:5)								
				06CD16-14								
				06CD16-12								
				06CD16-16								
				06CD16-16 (1:10)								

CALIBRATION OUTLIER FOR METHANE, ETHENE & ETHANE

Instrument: PVOC4				Column:								
	Initial Calibration			Continuing Cal			Continuing Cal			Continuing Cal		
Date/Time	05-09-05 12:16			04-04-06 18:56								
TCL Analytes	RRF	%RSD	Q	RRF	%D	Q	RRF	%D	Q	RRF	%D	Q
Methane												
Ethylene												
Ethane												
SAMPLES AFFECTED:												
COD > 0.995												
%D ≤ 20%												

Reviewed by: Steffanie Tobin (TECHLAW/ESAT)
Date: May 24, 2006

Data Qualifier Sheet

For the purpose of defining the flagging nomenclature utilized in this document, the following code letters and associated definitions are provided:

VALUE – if the result is a value greater than or equal to the Contract Required Quantitation Limit (CRQL).

U	Indicates that the compound was analyzed for, but not detected. The sample quantitation limit corrected for dilution and percent moisture is reported.
J	Indicates an estimated value. This flag is used either when estimating a concentration for a tentatively identified compound or when the data indicates the presence of a compound but the result is less than the sample quantitation limit, but greater than zero. The flag is also used to indicate a reported result having an associated QC problem.
N	Indicates presumptive evidence of a compound. This flag is only used for a tentatively identified compound (TIC), where the identification is based on a mass spectral library search.
R	Indicates the data are unusable. (The compound may or may not be present.)
P	Indicates a pesticide/Aroclor target analyte when there is greater than 25% difference for the detect concentrations between the two GC columns. The lower of the two results is reported.
C	Indicates pesticide results that have been confirmed by GC/MS.
B	Indicates the analyte is detected in the associated method blank as well as the sample.
E	Indicates compounds whose concentrations exceeded the calibration range of the instrument.
D	Indicates an identified compound in an analysis has been diluted. This flag alert the data user to any difference between the concentrations reported in the two analyses.
A	Indicates TICs that are suspected to be aldol condensation products.
G	Indicates the TCLP Matrix Spike Recovery was greater than the upper limit of the analytical method.
L	Indicates the TCLP Matrix Spike Recovery was less than the lower limit of the analytical method.
T	Indicates the analyte is found in the associated TCLP extraction blank as well as in the sample.

X, Y, Z are reserved for laboratory defined flags.

Data Usability Evaluation
Oconomowoc Electroplating Company, Inc. Site, Ashippun, Wisconsin
WA No. 003-LRLR-05M8, Contract No. EP-S5-06-01

PREPARED FOR:	U.S. Environmental Protection Agency
PREPARED BY:	Adrienne Unger/CH2M HILL
DATE:	May 17, 2007

This memorandum presents the data usability evaluation of the groundwater samples collected during the field investigation conducted at the Oconomowoc Electroplating Company, Inc. site in Ashippun, Wisconsin during January 2007. The sampling was performed by CH2M HILL. The analyses were performed by CT Laboratories, Inc. (CTL), of Baraboo, Wisconsin.

A total of 61 groundwater and surface water samples were collected and analyzed for one or more of the following U.S. Environmental Protection Agency (USEPA)-approved methods:

- Volatile organic compounds (VOCs) by USEPA SW-846 method 8260
- Alkalinity by USEPA 310.2
- Ammonia by USEPA 350.1
- Chloride by USEPA SW-846 Method 9056
- Methane, ethane, ethene by RSK 175
- Nitrate by USEPA SW-846 Method 9056
- Ortho phosphate by USEPA SW-846 Method 9056
- Sulfate by USEPA SW-846 Method 9056
- Sulfide by USEPA 376.1
- Total organic carbon by USEPA SW-846 Method 9060
- Total metals by USEPA SW-846 Method 6010B
- Dissolved metals by USEPA SW-846 Method 6010B

As part of the quality assurance (QA) process outlined in the sampling and analysis plan, quality control (QC) samples were collected in the field to complement the assessment of overall data quality and usability. These QC samples collected were field duplicates, aliquots for laboratory matrix spike/matrix spike duplicates, a field blank, and an equipment blank.

The data set was reviewed by USEPA (Attachment A1) to assess the accuracy and precision of the method and the matrix utilizing the criteria established in the National Functional Guidelines (NFG) for Data Review. Completeness of the data set was then derived. Data qualifiers were added by USEPA validators when the QC statistics indicated a possible bias to specific compounds or analytes associated with a particular method and sample batch.

Standard data qualifiers were used as a means of classifying the data as to their conformance to QC requirements. The applied data qualifiers are defined as follows:

[U] The sample target was analyzed for, but was not detected above the level of the associated limit of detection or quantitation.

[J] The associated value is an estimated quantity. This qualifier is appended when the data indicated the presence of a specific target analyte but was below the stated reporting (or quantitation) limit, and/or when QC statistics alluded to an analytical bias.

[UJ] The component was analyzed for but not detected at a level equal to or greater than the level of detection or quantification (often the reporting limit). This flag is used when QC measurements indicate a possible low bias in the analytical data.

[R] Rejected. The data were of insufficient quality to be deemed acceptable as reported or otherwise qualified.

Groundwater Samples

CH2M HILL conducted a review of the validation performed by USEPA for the groundwater samples in sample delivery groups (SDGs) 58355 and 58588. Table 1 lists the sample identifications (IDs) and SDGs that were reviewed (100 percent of all samples collected).

TABLE 1
Sample Summary by Laboratory ID and Sample Delivery Group
Oconomowoc Electroplating

Sample ID	SDG	Sample ID	SDG	Sample ID	SDG	Sample ID	SDG
07CE18-01	58355	07CE18-23	58355	07CE18-45	58355	07CE18-67	58355
07CE18-02	58355	07CE18-24	58355	07CE18-46	58355	07CE18-68	58355
07CE18-03	58355	07CE18-25	58355	07CE18-47	58355	07CE18-69	58355
07CE18-04	58355	07CE18-26	58355	07CE18-48	58355	07CE18-70	58355
07CE18-05	58355	07CE18-27	58355	07CE18-49	58355	07CE18-71	58355
07CE18-06	58355	07CE18-28	58355	07CE18-50	58355	07CE18-72	58355
07CE18-07	58355	07CE18-29	58355	07CE18-51	58355	07CE18-73	58355
07CE18-08	58355	07CE18-30	58355	07CE18-52	58355	07CE18-74	58355
07CE18-09	58355	07CE18-31	58355	07CE18-53	58355	07CE18-75	58355
07CE18-10	58355	07CE18-32	58355	07CE18-54	58355	07CE18-76	58355
07CE18-11	58355	07CE18-33	58355	07CE18-55	58355	07CE18-77	58355
07CE18-12	58355	07CE18-34	58355	07CE18-56	58355	07CE18-78	58355
07CE18-13	58355	07CE18-35	58355	07CE18-57	58355	07CE18-79	58355
07CE18-14	58355	07CE18-36	58355	07CE18-58	58355	07CE18-80	58355
07CE18-15	58355	07CE18-37	58355	07CE18-59	58355	07CE18-81	58355
07CE18-16	58355	07CE18-38	58355	07CE18-60	58355	07CE18-82	58355
07CE18-17	58355	07CE18-39	58355	07CE18-61	58355	07CE18-83	58355
07CE18-18	58355	07CE18-40	58355	07CE18-62	58355	07CE18-84	58355

TABLE 1
Sample Summary by Laboratory ID and Sample Delivery Group
Oconomowoc Electroplating

Sample ID	SDG	Sample ID	SDG	Sample ID	SDG	Sample ID	SDG
07CE18-19	58355	07CE18-41	58355	07CE18-63	58355	07CE18-85	58355
07CE18-20	58355	07CE18-42	58355	07CE18-64	58355	07CE18-86	58355
07CE18-21	58355	07CE18-43	58355	07CE18-65	58355	07CE18-87	58588
07CE18-22	58355	07CE18-44	58355	07CE18-66	58355	07CE18-88	58588

The USEPA validation case narratives and worksheets indicated that these sample results were biased due to applicable QC statistics or other NFG requirements; however, the data set completeness was deemed as 100 percent usable and may be used in the project decision-making process with qualification.

In addition, approximately 10 percent of the data underwent a comparative review to evaluate the accuracy between the database and the USEPA validation reports. There were no discrepancies noted.

Conclusions

The USEPA validation reports were verified to comply with the applicable National Functional Guidelines for Data Review. This verification confirmed that the validation performed by USEPA was complete for the entire data set analyzed by CTL. Qualified data, if not rejected, are considered usuable for the project decision-making process. The project data quality objectives (DQOs) established a completeness goal for the project at 90 percent. The percent completeness for these groundwater data was 100 percent and met the established DQOs set forth in the quality assurance projectpPlan (CH2M HILL, October 2004).

Data summary tables of the results have been provided as a table in the *2007 Annual Groundwater Report and Evaluation of Monitored Natural Attenuation*. An electronic file of these data also will be submitted as part of this deliverable.

Analytical Results

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION V
SUPERFUND DIVISION

DATE:

SUBJECT: Review of Data
Received for Review on: February 8, 2007

FROM: Stephen L. Ostrodka, Chief (SRT-4J)
Superfund Field Services Section

TO: Data User: Ch2m Hill

We have reviewed the data for the following case:

SITE Name: Oconomowoc Electroplating (WI)

SAS Project: 07CE18

SDG Number: 58355-VOC

Number and Type of Samples: 59 Waters (59 VOCs / 27 MEE)

Sample Numbers: 07CE18; -01, -03, -05, -06, -08, -10, -12, -14, -16, -18, -19, -20, -21, -23, -25, -27, -29, -31 thru -39, -41, -43, -44, -46, -48 thru -51, -53, -55, -57 thru -59, -61, -63, -65, -67, -69 thru -77, -79 thru -85

Laboratory: CT Laboratories

Hrs for Review:

Following are our findings:

CC: Howard Pham
Region 5 TPO
Mail Code: SRT-4J

Below is a summary of the out-of-control audits and the possible effects on the data for this case:

Fifty – nine (59) preserved water samples listed in the following table were collected January 15 - 19, 2007. The laboratory received the samples January 16 - 22, 2007 intact and in good condition. Twenty (20) samples arrived with cooler temperatures below the criteria range of 2 – 6 °C and are also identified in the following table. All pH values were less than 2. All samples were analyzed January 24 – 29, 2007 by SW-846 Method 8260 for the volatile list of organic analytes identified in the SAS contract for estimated dates of collection January 2007 through March 2011. Twenty-seven (27) samples were analyzed January 23 - 26, 2007 by RSK 175 for Methane, Ethane and Ethene as identified in the SAS contract for estimated dates of collection January 2007 through March 2011.

EPA ID	CTI Lab ID	Sample location	Date sampled	MEE Analyses	VOC Analyses	Cooler Temp, °C
07CE18-01	449938	OEP-MW-103D	01/15/07	01/23/07	01/25/07	3.6
07CE18-03	449940	OEP-MW-103S	01/15/07	01/23/07	01/25/07	3.6
07CE18-05	449942	OEP-TB-001	01/15/07		01/24/07	3.6
07CE18-06	450206	OEP-EB-01	01/16/07	01/23/07	01/24/07	1.7
07CE18-08	450208	OEP-FB-01	01/16/07	01/23/07	01/24/07	1.7
07CE18-10	450184	OEP-MW-4S	01/16/07	01/23/07	01/24/07	3.1
07CE18-12	450186	OEP-MW-4D	01/16/07	01/23/07	01/24/07	3.1
07CE18-14	450201	OEP-MW-1S	01/16/07	01/23/07	01/24/07	1.8
07CE18-16	450203	OEP-MW-1D	01/16/07	01/23/07	01/24/07	1.8
07CE18-18	450210	OEP-TB-002	01/16/07		01/27/07	1.7
07CE18-19	450205	OEP-TB-003	01/16/07		01/24/07	1.8
07CE18-20	450188	OEP-TB-004	01/16/07		01/24/07	3.1
07CE18-21	450194	OEP-MW-15B	01/16/07	01/23/07	01/25/07	1.7
07CE18-23	450196	OEP-MW-15S	01/16/07	01/23/07	01/25/07	1.7
07CE18-25	450198	OEP-MW-15SFR	01/16/07	01/23/07	01/25/07	1.7
07CE18-27	450189	OEP-MW-3D	01/16/07	01/23/07	01/24/07	3.7
07CE18-29	450191	OEP-MW-5D	01/16/07	01/23/07	01/25/07	3.7
07CE18-31	450193	OEP-TB-005	01/16/07		01/24/07	3.7
07CE18-32	450200	OEP-TB-006	01/16/07		01/25/07	1.7
07CE18-33	450397	OEP-PW-01	01/17/07		01/26/07	1.3
07CE18-34	450398	OEP-PW-02	01/17/07		01/26/07	1.3
07CE18-35	450399	OEP-PW-03	01/17/07		01/26/07	1.3
07CE18-36	450400	OEP-PW-04	01/17/07		01/26/07	1.3
07CE18-37	450401	OEP-PW-07	01/17/07		01/26/07	1.3
07CE18-38	450402	OEP-PW-09	01/17/07		01/26/07	1.3
07CE18-39	450394	OEP-MW-15D	01/17/07	01/23/07	01/26/07	1.2
07CE18-41	450389	OEP-MW-102D	01/17/07	01/23/07	01/26/07	3.3

07CE18-43	450403	OEP-DW-01	01/17/07		01/29/07	1.3
07CE18-44	450379	OEP-SW-03	01/17/07	01/23/07	01/24/07	2.9
07CE18-46	450381	OEP-SW-03FR	01/17/07	01/23/07	01/25/07	2.9
07CE18-48	450404	OEP-TB-007	01/16/07		01/26/07	1.3
07CE18-49	450396	OEP-TB-008	01/16/07		01/26/07	1.2
07CE18-50	450383	OEP-TB-009	01/17/07		01/25/07	2.9
07CE18-51	450384	OEP-MW-13S	01/17/07	01/23/07	01/26/07	2.8
07CE18-53	450386	OEP-MW-13SFR	01/17/07	01/23/07	01/25/07	2.8
07CE18-55	450391	OEP-MW-13D	01/17/07	01/23/07	01/26/07	3.3
07CE18-57	450393	OEP-TB-010	01/17/07		01/25/07	3.3
07CE18-58	450388	OEP-TB-011	01/17/07		01/25/07	2.8
07CE18-59	450630	OEP-MW-105B	01/18/07	01/23/07	01/26/07	3.6
07CE18-61	450632	OEP-MW-105D	01/18/07	01/23/07	01/27/07	3.6
07CE18-63	450634	OEP-MW-105S	01/18/07	01/23/07	01/27/07	3.6
07CE18-65	450625	OEP-MW-12D	01/18/07	01/23/07	01/25/07	5.3
07CE18-67	450627	OEP-MW-12S	01/18/07	01/23/07	01/25/07	5.3
07CE18-69	450637	OEP-PW-011	01/18/07		01/26/07	3.5
07CE18-70	450638	OEP-PW-011FR	01/18/07		01/27/07	3.5
07CE18-71	450636	OEP-TB-012	01/18/07		01/27/07	3.6
07CE18-72	450629	OEP-TB-013	01/18/07		01/27/07	5.3
07CE18-73	450639	OEP-TB-014	01/18/07		01/27/07	3.5
07CE18-74	450640	OEP-MW-106D	01/18/07		01/27/07	3.5
07CE18-75	450641	OEP-MW-106S	01/18/07		01/27/07	3.5
07CE18-76	450853	OEP-PW-05	01/18/07		01/27/07	2.3
07CE18-77	450858	OEP-MW-12B	01/19/07	01/26/07	01/24/07	2.8
07CE18-79	450854	OEP-ME-107S	01/19/07		01/27/07	2.3
07CE18-80	450855	OEP-MW-107SFR	01/19/07		01/27/07	2.3
07CE18-81	450856	OEP-MW-107D	01/19/07		01/27/07	2.3
07CE18-82	450860	OEP-TB-015	01/19/07		01/27/07	2.8
07CE18-83	450857	OEP-TB-016	01/19/07		01/27/07	2.3
07CE18-84	450861	OEP-TB-017	01/19/07		01/27/07	2.7
07CE18-85	450862	OEP-MW-16S	01/19/07	01/26/07	01/27/07	2.7

The laboratory reported the results of 46 volatile analytes. Only the following 36 volatile analytes were requested in the SAS contract and only these analytes will be discussed in the following validation report. The VOC SAS contract incorrectly identifies analyte 1,1-Dichloroethene as 1,2-Dichloroethene.

Acetone	Benzene	Bromodichloromethane
Bromoform	Bromomethane	2-Butanone (MEK)
Carbon disulfide	Carbon tetrachloride	Chlorobenzene
Chloroethane	Chloroform	Chloromethane

Dibromochloromethane	1,1-Dichloroethane	1,2-Dichloroethane
1,1-Dichloroethene	Cis-1,2-Dichloroethene	Trans-1,2-Dichloroethene
1,2-Dichloropropane	Cis-1,3-Dichloropropene	Trans-1,3-Dichloropropene
Ethylbenzene	2-Hexanone	4-Methyl-2-pentanone (MIBK)
Methylene chloride	Styrene	1,1,2,2-Tetrachloroethane
Tetrachloroethene	Toluene	1,1,1-Trichloroethane
1,1,2-Trichloroethane	Trichloroethene	Vinyl chloride
[Xylenes, total]	M & p-Xylene	o-Xylene

The VOC method blanks are MB-451480, MB-451663 and MB-451994 for the SW-846 Method 8260B analyses. The MEE method blanks are MB-451234, MB-451235, MB-451240 and MB-451961 for the Mod RSK 175 analyses.

Samples 07CE18-39, 07CE18-74 and 07CE18-77 are the parent samples used for the VOC Matrix Spike / Matrix Spike Duplicate analyses. Samples 07CE18-39, 07CE18-63 and 07CE18-77 are the parent samples used for the MEE Matrix Spike / Matrix Spike Duplicate analyses.

The VOC laboratory control samples are LCS-451479, LCS-451662 and LCS-451993. The VOC laboratory control sample duplicates are LCSD-451482, LCSD-451811 and LCSD-452019. The MEE laboratory control samples are LCS-451233, LCS-451239 and LCS-451960. The MEE laboratory control sample duplicates are LCSD-451238, LCSD-451241 and LCSD-451964.

Seventeen (17) samples; 07CE18-05, 07CE18-18, 07CE18-19, 07CE18-20, 07CE18-31, 07CE18-32, 07CE18-48, 07CE18-49, 07CE18-50, 07CE18-57, 07CE18-58, 07CE18-71, 07CE18-72, 07CE18-73, 07CE18-82, 07CE18-83 and 07CE18-84 are identified as Trip Blanks.

Sample 07CE18-06 is identified as an Equipment Blank.

Sample 07CE18-08 is identified as a Field Blank.

Sample 07CE18-25 is a field replicate of 07CE18-23. Sample 07CE18-46 is a field replicate of 07CE18-44. Sample 07CE18-53 is a field replicate of 07CE18-51. Sample 07CE18-70 is a field replicate of 07CE18-69. Sample 07CE18-80 is a field replicate of 07CE18-79.

The VOA and MEE analyses were performed within the technical holding time of 14 days after sample collection; therefore, the results are acceptable.

1. HOLDING TIME

Fifty – nine (59) preserved water samples were collected January 15 - 19, 2007. The laboratory received the samples January 16 - 22, 2007 intact and in good condition. Twenty (20) samples arrived with cooler temperatures below the criteria range of 2 – 6 °C and are also identified in the following table. All pH values were less than 2. All samples were analyzed January 24 – 29, 2007 by SW-846 Method 8260 for the volatile list of organic analytes identified in the SAS contract for estimated dates of collection January 2007 through March 2011. Twenty-seven (27) samples were analyzed January 23 - 26, 2007 by RSK 175 for Methane, Ethane and Ethene as identified in the SAS contract for estimated dates of collection January 2007 through March 2011.

The VOA and MEE analyses were performed within the technical holding time of 14 days after sample collection; therefore, the results are acceptable.

2. GC/MS TUNING AND GC INSTRUMENT PERFORMANCE

VOC: All GC/MS tuning for SW-846 Method 8260B complied with the mass list and ion abundance criteria for BFB, and all samples were analyzed within the twelve (12) hour periods for instrument performance checks.

MEE: All GC/FID calibration complied with the amount and area for the MEE (Methane-Ethane-Ethene) standards. All samples were analyzed within the twelve (12) hour periods for instrument performance checks; therefore, the results are acceptable.

3. CALIBRATION

VOC: A 7-point calibration curve (0.2, 0.4, 1.0, 2.0, 4.0, 6.0 and 8.0 µg/L) was performed on January 23, 2007. No minimum RRF values were identified in the SAS contract. The average RRFs for 2-Butanone were less than 0.05 but greater than the minimum RRF of 0.01 currently used in SOW SOM01.1. All %RSDs were less than 15%. The average RRF for surrogate 1,2-Dichloroethane-d_4 was less than 0.05 and less than the minimum RRF of 0.05 currently used in SOW SOM01.1. Sample results are not qualified based on the RRF values or %RSD of the surrogates alone.

Continuing Calibrations were conducted at the start of every analytical sequence. All analytes are evaluated for %Ds less than 20%. No minimum RRF values were identified in the SAS contract. The average RRFs for Acetone and 2-Butanone were less than 0.05 but greater than the minimum RRF of 0.01 currently used in SOW SOM01.1. The average RRFs for all surrogates 1,2-Dichloroethane-d_4, Bromofluorobenzene, Dibromofluoromethane and Toluene-d_8 were less than 0.05 and less than the minimum RRF of 0.05 currently used in SOW SOM01.1. All %Ds for these surrogates were greater than 20%. Sample results are not qualified based on the RRF values or %D of the surrogates alone.

The following samples are associated with a continuing calibration where one or more analytes has a %D greater than 20%.

Detected compounds should be qualified "J".

Bromomethane
07CE18-39MS, 07CE18-39MSD, 07CE18-74MS, 07CE18-74MSD, LCS-451993, LCSD-451811, LCSD-452019

Methylene chloride
07CE18-05, 07CE18-19, 07CE18-20, 07CE18-31, 07CE18-39MS, 07CE18-39MSD, 07CE18-74MS, 07CE18-74MSD, 07CE18-77MS, 07CE18-77MSD, LCS-451479, LCS-451662, LCS-451993, LCSD-451482, LCSD-451811, LCSD-452019

Acetone
07CE18-05, 07CE18-32, 07CE18-39MS, 07CE18-39MSD, 07CE18-74MS, 07CE18-74MSD, 07CE18-77MS, 07CE18-77MSD, LCS-451479, LCSD-451482, LCS-451662, LCS-451993, LCSD-451811, LCSD-452019

Non-detected quantitation limits should be qualified "UJ". Non-detected quantitation limits for Methylene chloride in some samples is qualified "R" due to poor recoveries in the associated LCS sample.

2-Butanone
07CE18-43

Bromomethane
07CE18-18, 07CE18-33, 07CE18-34, 07CE18-35, 07CE18-36, 07CE18-37, 07CE18-38, 07CE18-39, 07CE18-41, 07CE18-43, 07CE18-48, 07CE18-49, 07CE18-50, 07CE18-51, 07CE18-55, 07CE18-57, 07CE18-58, 07CE18-59, 07CE18-61, 07CE18-63, 07CE18-69, 07CE18-70, 07CE18-71, 07CE18-72, 07CE18-73, 07CE18-74, 07CE18-75, 07CE18-76, 07CE18-79, 07CE18-80, 07CE18-81, 07CE18-82, 07CE18-83, 07CE18-84, 07CE18-85, MB-451994

Methylene chloride
07CE18-01, 07CE18-03, 07CE18-06, 07CE18-08, 07CE18-10, 07CE18-12, 07CE18-14, 07CE18-16, 07CE18-18, 07CE18-21, 07CE18-23, 07CE18-25, 07CE18-27, 07CE18-29, 07CE18-32, 07CE18-33, 07CE18-34, 07CE18-35, 07CE18-36, 07CE18-37,

07CE18-38, 07CE18-39, 07CE18-41, 07CE18-43, 07CE18-44,
07CE18-46, 07CE18-48, 07CE18-49, 07CE18-50, 07CE18-51,
07CE18-53, 07CE18-55, 07CE18-57, 07CE18-58, 07CE18-59,
07CE18-61, 07CE18-63, 07CE18-65, 07CE18-67, 07CE18-69,
07CE18-70, 07CE18-71, 07CE18-72, 07CE18-73, 07CE18-74,
07CE18-75, 07CE18-76, 07CE18-77, 07CE18-79, 07CE18-80,
07CE18-81, 07CE18-82, 07CE18-83, 07CE18-84, 07CE18-85,
MB-451480, MB-451663, MB-451994

Acetone
07CE18-01, 07CE18-03, 07CE18-06, 07CE18-08, 07CE18-10,
07CE18-12, 07CE18-14, 07CE18-16, 07CE18-18, 07CE18-19,
07CE18-20, 07CE18-21, 07CE18-23, 07CE18-25, 07CE18-27,
07CE18-29, 07CE18-31, 07CE18-33, 07CE18-34, 07CE18-35,
07CE18-36, 07CE18-37, 07CE18-38, 07CE18-39, 07CE18-41,
07CE18-43, 07CE18-44, 07CE18-46, 07CE18-48, 07CE18-49,
07CE18-50, 07CE18-51, 07CE18-53, 07CE18-55, 07CE18-57,
07CE18-58, 07CE18-59, 07CE18-61, 07CE18-63, 07CE18-65,
07CE18-67, 07CE18-69, 07CE18-70, 07CE18-71, 07CE18-72,
07CE18-73, 07CE18-74, 07CE18-75, 07CE18-76, 07CE18-77,
07CE18-79, 07CE18-80, 07CE18-81, 07CE18-82, 07CE18-83,
07CE18-84, 07CE18-85, MB-451480, MB-451663, MB-451994

MEE: An Initial 7-pt calibration curve (2, 5, 10, 20, 50, 100 and 200 ppmV) of the Volatile standards was performed on May 9, 2005 and evaluated for a Goodness of Fit (correlation coefficient) ≥ 0.995. All %RSDs for Ethane and Methane were less than 15%. The %RSD for Ethane was greater than 15%.

The detection for Ethane in the following samples should be qualified as estimates, "J".

Ethane
07CE18-39MS, 07CE18-39MSD, 07CE18-63, 07CE18-63MS,
07CE18-63MSD, 07CE18-77MS, 07CE18-77MSD, 07CE18-85,
LCS-451233, LCS-451239, LCS-451960, LCSD-451238,
LCSD-451241, LCSD-451964

Non-detected quantitation limits for Ethane in the following samples should be qualified "UJ".

Ethane
07CE18-01, 07CE18-03, 07CE18-06, 07CE18-08, 07CE18-10,
07CE18-12, 07CE18-14, 07CE18-16, 07CE18-21, 07CE18-23,
07CE18-25, 07CE18-27, 07CE18-29, 07CE18-39, 07CE18-41,

07CE18-44, 07CE18-46, 07CE18-51, 07CE18-53, 07CE18-55, 07CE18-59, 07CE18-61, 07CE18-65, 07CE18-67, 07CE18-77, MB-451234, MB-451235, MB-451240, MB-451961

The %Ds for all continuing calibrations were ≤ 20%. No qualifications are required for this criterion.

4. BLANKS

VOC: The VOC method blanks are MB-451480, MB-451663 and MB-451994 for the SW-846 Method 8260B analyses. Method MB-451994 contained no target analytes. Method blank MB-451480 contained Chloromethane at 0.0554 µg/L. Method blank MB-451663 contained Chloromethane at 0.0901 µg/L. Chloromethane is not a common laboratory contaminant.

The concentrations of Chloromethane were less than five times (5X) the associated method blank (MB-451663) concentration in the following samples. The analyte was qualified "U" as resulting from blank contamination. The sample concentrations were greater than the laboratory's reporting limit and are regarded as the modified reporting limit for that analyte in that sample. The Volatile Method Blank Summaries list the samples associated with each method blank.

Chloromethane
07CE18-33, 07CE18-34, 07CE18-35, 07CE18-36, 07CE18-37, 07CE18-38, 07CE18-39, 07CE18-41, 07CE18-48, 07CE18-49, 07CE18-50, 07CE18-51, 07CE18-53, 07CE18-55, 07CE18-57, 07CE18-58, 07CE18-65

Samples; 07CE18-05, 07CE18-18, 07CE18-19, 07CE18-20, 07CE18-31, 07CE18-32, 07CE18-48, 07CE18-49, 07CE18-50, 07CE18-57, 07CE18-58, 07CE18-71, 07CE18-72, 07CE18-73, 07CE18-82, 07CE18-83 and 07CE18-84 are the Trip Blanks. The following analytes were detected in one or more trip blanks. These analytes are not common laboratory contaminants.

Samples that reported analyte concentrations less than five times (5X) the associated trip blank concentration should be qualified "U" as resulting from blank contamination. The sample concentrations were greater than the laboratory's reporting limit and are regarded as the modified reporting limit for that analyte in that sample.

Chloromethane
07CE18-76, 07CE18-77, 07CE18-79, 07CE18-80, 07CE18-81

Trichloroethene
07CE18-23, 07CE18-25, 07CE18-27

Tetrachloroethene
07CE18-51, 07CE18-53

M & p-Xylene
07CE18-34

Sample 07CE18-08 is the Field Blank. Sample 07CE18-08 contained Benzene at 0.077 µg/L, Toluene at 0.28 µg/L, Ethylbenzene at 0.062 µg/L, Styrene at 0.30 µg/L, m & p-Xylene at 0.18 µg/L and o-Xylene at 0.085 µg/L. These analytes are not common laboratory contaminants.

> Samples that reported analyte concentrations less than five times (5X) the associated field blank concentration should be qualified "U" as resulting from blank contamination. The sample concentrations were greater than the laboratory's reporting limit and are regarded as the modified reporting limit for that analyte in that sample.

Benzene, Toluene, Ethylbenzene, M & p-Xylene, o-Xylene
07CE18-06, 07CE18-48, 07CE18-49, 07CE18-50, 07CE18-57, 07CE18-58, 07CE18-71, 07CE18-72, 07CE18-73, 07CE18-82, 07CE18-83, 07CE18-84

Sytrene
07CE18-06, 07CE18-50, 07CE18-57, 07CE18-58, 07CE18-72

Sample 07CE18-06 is the Equipment Blank. Sample 07CE18-06 contained Chloromethane at 0.30 µg/L. Chloromethane is not a common laboratory contaminant.

> Samples that reported analyte concentrations less than five times (5X) the associated equipment blank concentration should be qualified "U" as resulting from blank contamination. The sample concentrations were greater than the laboratory's reporting limit and are regarded as the modified reporting limit for that analyte in that sample.

Chloromethane
07CE18-10, 07CE18-12, 07CE18-14, 07CE18-21, 07CE18-23, 07CE18-25, 07CE18-27, 07CE18-43, 07CE18-59, 07CE18-61, 07CE18-69, 07CE18-70, 07CE18-74, 07CE18-75

MEE: The MEE method blanks are MB-451234, MB-451235, MB-451240 and MB-451961 for the Mod RSK 175 analyses.

None of the Method Blanks had any contaminants; therefore, the results are acceptable. The Volatile Method Blank Summaries list the samples associated with each method blank.

Sample 07CE18-08 is the Field Blank. Samples that reported analyte concentrations less than five times (5X) the associated field blank concentration should be qualified "U" as resulting from blank contamination.

Methane
07CE18-06, 07CE18-10, 07CE18-23, 07CE18-25, 07CE18-44, 07CE18-46, 07CE18-51, 07CE18-53

5. SYSTEM MONITORING COMPOUND AND SURROGATE RECOVERY

VOC: All SW-846 Method 8260B volatile surrogate compounds (1,2-Dichloroethane-d_4, Bromofluorobenzene, Dibromofluoromethane, Toluene-d_8) were within the QC limits (75-135%) for all VOC samples.

MEE: Not applicable to this analysis.

6A. MATRIX SPIKE/MATRIX SPIKE DUPLICATE

VOC: Samples 07CE18-39, 07CE18-74 and 07CE18-77 are the parent samples used for the VOC Matrix Spike / Matrix Spike Duplicate analyses.

The percent recoveries for all compounds, except Bromomethane, Methylene chloride, Trichloroethene and cis-1,2-Dichloroethene, were within the QC limits (60 – 130%) for samples 07CE18-39MS and 07CE18-39MSD. All RPDs were less than 30%. The percent recoveries for Trichloroethene and cis-1,2-Dichloroethene were above the upper limit in both samples 07CE18-39MS and 07CE18-39MSD. The percent recoveries for Bromomethane and Methylene chloride were below the lower limit but greater than 20% in both samples 07CE18-39MS and 07CE18-39MSD. The detection of Trichloroethene and cis-1,2-Dichloroethene in the unspiked sample, 07CE18-39, should be qualified as estimated, "J". The quantitation limit for Bromomethane in the unspiked sample, 07CE18-39, should be qualified "UJ". The quantitation limit for Methylene chloride in the unspiked sample, 07CE18-39, should be ultimately qualified "R" due to poor LCS recoveries.

The percent recoveries for all compounds, except Methylene chloride and Styrene, were within the QC limits (60 – 130%) for samples 07CE18-74MS and 07CE18-74MSD. The percent recoveries for Methylene chloride were below the lower limit but greater than 20% in both samples 07CE18-74MS and 07CE18-74MSD. The percent recoveries for Styrene were less than 20% in both samples 07CE18-74MS and 07CE18-

74MSD. The relative percent difference (RPD) for Styrene was greater than the QC limit of 30%. Neither compound was detected in the unspiked sample. The quantitation limit for Methylene chloride in the unspiked sample, 07CE18-74, should be qualified "UJ". The quantitation limit for Styrene in the unspiked sample, 07CE18-74, should be qualified "R".

The percent recoveries for all compounds, except Styrene, were within the QC limits (60 – 130%) for samples 07CE18-77MS and 07CE18-77MSD. The percent recoveries for Styrene were less than 20% in both samples 07CE18-77MS and 07CE18-77MSD. The compound was not detected in the unspiked sample. The quantitation limit for Styrene in the unspiked sample, 07CE18-77, should be qualified "R".

MEE: Samples 07CE18-39, 07CE18-63 and 07CE18-77 are the parent samples used for the VOC and MEE Matrix Spike / Matrix Spike Duplicate analyses.

The percent recoveries and RPDs were within the QC criteria for sample 07CE18-39MS and 07CE18-39MSD.

All RPDs between 07CE18-63MS and 07CE18-63MSD were less than 30%. The percent recoveries for Ethane and Ethene were greater than 130% in both samples 07CE18-63MS and 07CE18-63MSD. The percent recoveries for Methane were less than 20% in both samples 07CE18-63MS and 07CE18-63MSD. The detection for Ethane and Methane in the unspiked sample, 07CE18-63, should be qualified as estimated, "J". The quantitation limit for Ethene in the unspiked sample, 07CE18-63, does not require any qualification for this criterion.

The percent recovery for Methane was less than 20% in sample 07CE18-77MS. The percent recovery for Methane was greater than 130% in sample 07CE18-77MSD. The relative percent difference (RPD) for Styrene was greater than the QC limit of 30%. The detection for Methane in the unspiked sample, 07CE18-77, should be qualified as estimated, "J".

6B. LABORATORY CONTROL SAMPLES

VOC: The VOC laboratory control samples are LCS-451479; LCS-451662 and LCS-451993. The VOC laboratory control sample duplicates are LCSD-451482; LCSD-451811 and LCSD-452019.

LCS-451479 and LCSD-451482 were analyzed January 25, 2007. The percent recoveries for all compounds, except Methylene chloride, were within the QC limits (60 – 130%) for both LCS-451479 and LCSD-451482. The percent recovery for Methylene chloride was above the upper limit in LCS-451479. The relative percent difference (RPD) for Methylene chloride was greater than the QC limit of 30%.

The detection of Methylene chloride in the following samples should be qualified "J".

Methylene chloride
07CE18-05, 07CE18-19, 07CE18-20, 07CE18-31, 07CE18-77MS, 07CE18-77MSD

The quantitation limits for Methylene chloride in the following samples should be qualified "UJ".

Methylene chloride
07CE18-01, 07CE18-03, 07CE18-06, 07CE18-08, 07CE18-10, 07CE18-12, 07CE18-14, 07CE18-16, 07CE18-21, 07CE18-23, 07CE18-25, 07CE18-27, 07CE18-29, 07CE18-32, 07CE18-44, 07CE18-77

LCS-451662 and LCSD-451811 were analyzed January 25, 2007. The percent recoveries for all compounds, except Methylene chloride, were within the QC limits (60 – 130%) for LCS-451662 and LCSD-451811. The percent recovery for Methylene chloride was below the lower limit but greater than 20% in LCSD-451811. The percent recovery for Methylene chloride was less than 20% in LCS-451662. The relative percent differences (RPDs) for Bromomethane and Methylene chloride were greater than the QC limit of 30%.

The detections for Bromomethane and Methylene chloride in the following samples should be qualified as estimated, "J".

Bromomethane, Methylene chloride
07CE18-39MS, 07CE18-39MSD

The quantitation limits for Bromomethane in the following samples should be qualified "UJ". The quantitation limits for Methylene chloride in the following samples should be qualified "R".

Bromomethane, Methylene chloride
07CE18-33, 07CE18-34, 07CE18-35, 07CE18-36, 07CE18-37, 07CE18-38, 07CE18-39, 07CE18-41, 07CE18-46, 07CE18-48, 07CE18-49, 07CE18-50, 07CE18-51, 07CE18-53, 07CE18-55, 07CE18-57, 07CE18-58, 07CE18-65, 07CE18-67

LCS-451993 and LCSD-452019 were analyzed January 26, 2007. The percent recoveries for all compounds, except Methylene chloride, were within the QC limits (60 – 130%) for LCS-451993 and LCSD-452019. The percent recovery for Methylene chloride was below the lower limit and greater than 20% in LCS-451993. The relative percent difference (RPD) for Methylene chloride was greater than the QC limit of 30%.

The detection of Methylene chloride in the following samples should be qualified as estimated, "J".

Methylene chloride
07CE18-74MS, 07CE18-74MSD

The quantitation limits for Methylene chloride in the following samples should be qualified "UJ".

Methylene chloride
07CE18-18, 07CE18-43, 07CE18-59, 07CE18-61, 07CE18-63,
07CE18-69, 07CE18-70, 07CE18-71, 07CE18-72, 07CE18-73,
07CE18-74, 07CE18-75, 07CE18-76, 07CE18-79, 07CE18-80,
07CE18-81, 07CE18-82, 07CE18-83, 07CE18-84, 07CE18-85

MEE: The MEE laboratory control samples are LCS-451233; LCS-451239 and LCD-451960. The MEE laboratory control sample duplicates are LCSD-451238; LCS-451241 and LCD-451964. The percent recoveries for all compounds were within the QC limits (60 – 130%) and all RPDs were less than 30%. No samples required qualification for this criterion.

7. FIELD BLANK AND FIELD DUPLICATE

Seventeen (17) samples; 07CE18-05, 07CE18-18, 07CE18-19, 07CE18-20, 07CE18-31, 07CE18-32, 07CE18-48, 07CE18-49, 07CE18-50, 07CE18-57, 07CE18-58, 07CE18-71, 07CE18-72, 07CE18-73, 07CE18-82, 07CE18-83 and 07CE18-84 are identified as Trip Blanks. Sample results are summarized in the following tables.

Analytes	**07CE18-05**	**07CE18-18**	**07CE18-19**	**07CE18-20**	**07CE18-31**	**07CE18-32**
Methylene chloride	0.23		2.4	0.18	0.33	
Acetone	2.7					3.8
Trichloroethene	0.052	0.062			0.051	0.050

Analytes	**07CE18-48**	**07CE18-49**	**07CE18-71**	**07CE18-73**	**07CE18-82**
Chloromethane					0.17
Benzene	0.090	0.081	0.096	0.086	0.091
Tetrachloroethene	0.063	0.067	0.078	0.078	0.065
Toluene	0.29	0.31	0.30	0.29	0.31
Ethylbenzene	0.065	0.061	0.066	0.060	0.057
M & p-Xylene	0.12	0.13	0.12	0.12	0.11
o-Xylene	0.050	0.065	0.062	0.056	0.057

Analytes	**07CE18-50**	**07CE18-57**	**07CE18-58**	**07CE18-72**	**07CE18-83**	**07CE18-84**
Chloromethane					0.13	0.17
Benzene	0.090	0.088	0.095	0.086	0.098	0.092
Tetrachloroethene	0.065	0.068	0.075	0.077	0.074	0.070
Toluene	0.32	0.32	0.33	0.32	0.30	0.29
Ethylbenzene	0.063	0.063	0.066	0.065	0.061	0.056
Styrene	0.12	0.054	0.075	0.068		
M & p-Xylene	0.17	0.14	0.16	0.16	0.11	0.097
o-Xylene	0.068	0.064	0.082	0.073	0.060	0.052

Sample 07CE18-25 is a field replicate of 07CE18-23. Sample 07CE18-46 is a field replicate of 07CE18-44. Sample 07CE18-53 is a field replicate of 07CE18-51. Sample 07CE18-70 is a field replicate of 07CE18-69. Sample 07CE18-80 is a field replicate of 07CE18-79. Sample results and RPDs are summarized in the following table.

Analyte	**07CE18-23**	**07CE18-25**	RPDs
Methane	1.2	0.87	32 %
Chloromethane	0.35	0.37	5.6 %
1,1,1-Trichloroethane	0.12	0.12	0 %
Trichloroethane	0.051	0.059	15 %
	07CE18-44	**07CE18-46**	
Methane	1.5	1.3	14 %
1,1-Dichloroethane	ND	0.065	200 %
1,1,1-Trichloroethane	0.089	0.11	21 %
Trichloroethane	0.51	0.53	3.9 %
Cis-1,2-Dichloroethene	0.29	0.28	3.5 %
Dichlorodifluoromethane	0.074	ND	200 %
	07CE18-51	**07CE18-53**	
Methane	0.35	0.31	12 %
1,1,1-Trichloroethane	0.092	0.086	6.7 %
Trichloroethane	0.11	0.083	28 %
Tetrachloroethene	0.074	0.062	18 %

	07CE18-69	07CE18-70	
Chloromethane	0.23	0.18	24 %
Vinyl chloride	0.023	ND	200 %
Cis-1,2-Dichloroethene	0.62	0.54	14 %
Methyl tert-butyl ether	0.95	0.87	8.8 %
Trans-1,2-Dichloroethene	0.066	ND	200 %
	07CE18-79	**07CE18-80**	
Chloromethane	0.37	0.17	74 %

Sample 07CE18-06 is identified as an Equipment Blank. Sample 07CE18-06 contained Methane at 0.80 µg/L, Chloromethane at 0.30 µg/L, Benzene at 0.077 µg/L, Toluene at 0.26 µg/L, Ethylbenzene at 0.057 µg/L, Styrene at 0.12 µg/L, m & p-Xylene at 0.16 µg/L and o-Xylene at 0.071 µg/L.

Sample 07CE18-08 is identified as a Field Blank. Sample 07CE18-08 contained Methane at 0.42 µg/L, Benzene at 0.077 µg/L, Toluene at 0.28 µg/L, Ethylbenzene at 0.062 µg/L, Styrene at 0.30 µg/L, m & p-Xylene at 0.18 µg/L and o-Xylene at 0.085 µg/L.

8. INTERNAL STANDARDS

The three internal standard's (Fluorobenzene, Chlorobenzene-d_5, 1,4-Dichlorobenzene-d_4) retention times and area counts for the VOC samples were within the QC limits; therefore, the results are acceptable.

9. COMPOUND IDENTIFICATION

After reviewing the mass spectra and chromatograms it appears that all VOC and MEE compounds were properly identified.

10. COMPOUND QUANTITATION AND REPORTED DETECTION LIMITS

All samples were waters and dilutions were run. The reporting limits for the VOC compounds were less than or equal to the reporting limits specified in the SAS contract for all analytes except cis-1,3-Dichloropropene and trans-1,3-Dichloropropene. The requested reporting limit for cis-1,3-Dichloropropene was 0.016 µg/L and the actual reporting limit was 0.017 µg/L. The requested reporting limit for trans-1,3-Dichloropropene was 0.015 µg/L and the actual reporting limit was 0.019 µg/L. Xylenes (total) was reported as m,p-Xylene and o-Xylene. The reporting limit for Methane was less than or equal to 10 µg/L as specified in the SAS contract. All target compound quantitations were properly reported. The Laboratory's Reporting Limits are equal to their Method Detection Limits (MDL) [The MDL is equivalent to the Level of Detection-LOD]. Per SW-846 Method 8260B, the Reporting Limit or Estimated Quantitation Limit is generally 5 – 10 times the MDL.

The following VOC samples reported analyte concentrations below the SAS reporting limits but above the laboratory's detection limits. The concentrations should be qualified as estimated, "J".

07CE18-03
Benzene, Tetrachloroethene, Chlorobenzene, trans-1,2-Dichloroethene

07CE18-05, 07CE18-14, 07CE18-18, 07CE18-31, 07CE18-32, 07CE18-55, 07CE18-76
Trichloroethene

07CE18-08
Benzene, Toluene, m & p-Xylene, o-Xylene

07CE18-20
Methylene chloride

07CE18-23, 07CE18-25, 07CE18-44
1,1,1-Trichloroethane

07CE18-27
Cis-1,2-Dichloroethene

07CE18-29
Bromodichloromethane

07CE18-34
Carbon disulfide

07CE18-35, 07CE18-69, 07CE18-85
Trans-1,2-Dichloroethene

07CE18-36
Trichloroethene, Trans-1,2-Dichloroethene

07CE18-37
1,2-Dichloroethane, Trichloroethene

07CE18-38
Chloroform, 1,2-Dichloroethane, Trichloroethene

07CE18-39
1,1-Dichloroethene, 1,1-Dichloroethane

07CE18-41
1,1-Dichloroethene

07CE18-46
1,1-Dichlroethane, 1,1,1-Trichloroethane

07CE18-48, 07CE18-49, 07CE18-50, 07CE18-57, 07CE18-58, 07CE18-71,
07CE18-72, 07CE18-73, 07CE18-82
Tetrachloroethene

07CE18-51, 07CE18-53
1,1,1-Trichloroethane, Trichloroethene

07CE18-59
1,1-Dichloroethane, Trichloroethene

07CE18-63
1,1,1-Trichloroethane, trans-1,2-Dichloroethene

07CE18-65
1,1,1-Trichloroethane

07CE18-83, 07CE18-84
Chloromethane, Tetrachloroethene

MB-451480, MB-451663
Chloromethane

The following RSK samples reported analyte concentrations below the SAS reporting limits but above the laboratory's detection limits. The concentrations should be qualified as estimated, "J".

07CE18-01, 07CE18-03, 07CE18-08, 07CE18-12, 07CE18-14, 07CE18-16,
07CE18-21, 07CE18-27, 07CE18-39, 07CE18-41, 07CE18-55, 07CE18-61,
07CE18-65
Methane

07CE18-63
Ethane, Methane

07CE18-85
Ethane

11. SYSTEM PERFORMANCE

GC/MS baseline indicated acceptable performance. GC/FID baseline indicated acceptable performance.

12. ADDITIONAL INFORMATION

The final shipment of samples arrived at the Laboratory on January 22, 2007. The Laboratory Case Narrative was generated on February 2, 2007 and forwarded by Ch2mHill on February 7, 2007 which is well within 21 calendar days of sample receipt.

Photocopies of the airbills were included with this package. The original sample tags, packing list and airbills should have been sent to CH2M HILL.

Copies of the most recent MDL studies were not included with this data package but MDL (LOD – Level of Detection) values are present on the Laboratory Form Is.

No raw data was submitted for the RSK analyses of samples 07CE18-77 (CT Lab ID: 450858) and 07CE18-85 (CT Lab ID: 450862).

VOC SAS Table II. QC Requirements lists the frequency of audits for method blanks as 'at least one per group of 10 or fewer samples'. The laboratory conducted the method blank audits at a frequency of one per 20 samples.

The following VOC samples had analyte concentrations that exceeded the instruments calibration range. The samples were re-analyzed at various dilutions and only the diluted results were reported for the affected samples:

1,1,1-Trichloroethane
07CE18-03

Trichloroethene
07CE18-03, 07CE18-39, 07CE18-61, 07CE18-63

Cis-1,2-Dichloroethene
07CE18-41, 07CE18-63

The following MEE samples had analyte concentrations that exceeded the instruments calibration range. The samples were re-analyzed at various dilutions and only the diluted results were reported for the affected samples:

Methane
07CE18-01, 07CE18-12, 07CE18-16, 07CE18-21, 07CE18-27, 07CE18-59,
07CE18-61, 07CE18-63, 07CE18-85

The laboratory did not report detections that were below their reporting limits (RL) and their reporting limit is equal to their method detection limit (LOD). Some analytes were quantitated but examination of the RICs demonstrated that the system integrated noise and not valid detections. Non-detects were highlighted with 'minus signs' on the raw data. A copy of the raw data for sample 07CE18-36, pgs 557 – 565, are included with the hard copy data as an example. The samples and analytes with 'false positives' are summarized in the following table.

Chloromethane
07CE18-05, 07CE18-19, 07CE18-72

2-Butanone
07CE18-05, 07CE18-20, 07CE18-23, 07CE18-27, 07CE18-65, 07CE18-74

Chloroethane
07CE18-03, 07CE18-10, 07CE18-12, 07CE18-18, 07CE18-21, 07CE18-23, 07CE18-31, 07CE18-33, 07CE18-36, 07CE18-37, 07CE18-38, 07CE18-41, 07CE18-43, 07CE18-44, 07CE18-48, 07CE18-53, 07CE18-55, 07CE18-57, 07CE18-59, 07CE18-63, 07CE18-65, 07CE18-67, 07CE18-70, 07CE18-79, 07CE18-80, 07CE18-82, 07CE18-84

Acetone
07CE18-10, 07CE18-18, 07CE18-27, 07CE18-44, 07CE18-63, 07CE18-77

Bromomethane
07CE18-16, 07CE18-25, 07CE18-27, 07CE18-36, 07CE18-53, 07CE18-55, 07CE18-71, 07CE18-84

Dichlorodifluoromethane
07CE18-19

1,1-Dichloroethene
07CE18-01, 07CE18-43

Vinyl chloride
07CE18-29, 07CE18-70

1,2-Dichloroethane
07CE18-35

Summary of Sample Results (only SAS requested analytes):

Analytes	07CE18-01	07CE18-03	07CE18-05	07CE18-06	07CE18-08
Dilution factors =	500.0	20.0 / 50.0	1.0	1.0	1.0
Chloromethane	25 U	1.0 U	0.050 U	0.30	0.050 U
Bromomethane	30 U	1.2 U	0.060 U	0.060 U	0.060 U
Vinyl chloride	9.0 U	0.56	0.018 U	0.018 U	0.018 U
Chloroethane	25 U	1.0 U	0.050 U	0.050 U	0.050 U
Methylene chloride	75 UJ	3.0 UJ	0.23 J	0.15 UJ	0.15 UJ
Acetone	650 UJ	26 UJ	2.7 J	1.3 UJ	1.3 UJ
Carbon disulfide	50 U	1.0 U	0.10 U	0.10 U	0.10 U
1,1-Dichloroethene	20 U	4.8	0.040 U	0.040 U	0.040 U
1,1-Dichloroethane	30 U	7.8	0.060 U	0.060 U	0.060 U
Chloroform	20 U	0.80 U	0.040 U	0.040 U	0.040 U
1,2-Dichloroethane	15 U	3.1	0.030 U	0.030 U	0.030 U
2-Butanone	250 U	10 U	0.50 U	0.50 U	0.50 U
1,1,1-Trichloroethane	210	180	0.040 U	0.040 U	0.040 U
Carbon tetrachloride	20 U	0.80 U	0.040 U	0.040 U	0.040 U
Bromodichloromethane	31	1.2	0.040 U	0.040 U	0.040 U
1,2-Dichloropropane	25 U	1.0 U	0.050 U	0.050 U	0.050 U
Cis-1,3-Dichloropropene	8.5 U	0.34 U	0.017 U	0.017 U	0.017 U
Trichloroethene	1100	230	0.052 J	0.050 U	0.050 U
Dibromochloromethane	15 U	0.58 U	0.029 U	0.029 U	0.029 U
1,1,2-Trichloroethane	20 U	0.80 U	0.040 U	0.040 U	0.040 U
Benzene	20 U	1.4 J	0.040 U	0.077 U	0.077 J
Trans-1,3-Dichloropropene	9.5 U	0.38 U	0.019 U	0.019 U	0.019 U
Bromoform	20 U	0.80 U	0.040 U	0.040 U	0.040 U
4-Methyl-2-pentanone	200 U	8.0 U	0.40 U	0.40 U	0.40 U
2-Hexanone	400 U	16 U	0.80 U	0.80 U	0.80 U
Tetrachloroethene	25 U	2.5 J	0.050 U	0.050 U	0.050 U
1,1,2,2-Tetrachloroethane	9.0 U	0.36 U	0.018 U	0.018 U	0.018 U
Toluene	25 U	1.0 U	0.050 U	0.26 U	0.28 J
Chlorobenzene	30 U	3.4 J	0.060 U	0.060 U	0.060 U
Ethylbenzene	25 U	1.0 U	0.050 U	0.057 U	0.062
Styrene	25 U	1.0 U	0.050 U	0.12 U	0.30
M & p-Xylene	45 U	1.8 U	0.090 U	0.16 U	0.18 J
Cis-1,2-Dichloroethene	65	30	0.030 U	0.030 U	0.030 U
o-Xylene	25 U	1.0 U	0.050 U	0.071 U	0.85 J
Trans-1,2-Dichloroethene	30 U	1.4 J	0.060 U	0.060 U	0.060 U

Analytes	07CE18-10	07CE18-12	07CE18-14	07CE18-16	07CE18-18
Dilution factors =	1.0	1.0	1.0	1.0	1.0
Chloromethane	0.30 U	1.1 U	0.28 U	0.050 U	0.050 U
Bromomethane	0.060 U	0.060 U	0.060 U	0.060 U	0.060 UJ
Vinyl chloride	0.018 U	0.043	0.018 U	0.018 U	0.018 U
Chloroethane	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U
Methylene chloride	0.15 UJ	0.15 UJ	0.15 UJ	0.15 UJ	0.15 UJ
Acetone	1.3 UJ	1.3 UJ	1.3 UJ	1.3 UJ	1.3 UJ
Carbon disulfide	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
1,1-Dichloroethene	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U
1,1-Dichloroethane	0.060 U	0.060 U	0.060 U	0.060 U	0.060 U
Chloroform	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U
1,2-Dichloroethane	0.030 U	0.030 U	0.030 U	0.030 U	0.030 U
2-Butanone	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1,1-Trichloroethane	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U
Carbon tetrachloride	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U
Bromodichloromethane	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U
1,2-Dichloropropane	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U
Cis-1,3-Dichloropropene	0.017 U	0.017 U	0.017 U	0.017 U	0.017 U
Trichloroethene	0.050 U	0.050 U	0.18 J	0.050 U	0.062 J
Dibromochloromethane	0.029 U	0.029 U	0.029 U	0.029 U	0.029 U
1,1,2-Trichloroethane	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U
Benzene	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U
Trans-1,3-Dichloropropene	0.019 U	0.019 U	0.019 U	0.019 U	0.019 U
Bromoform	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U
4-Methyl-2-pentanone	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U
2-Hexanone	0.80 U	0.80 U	0.80 U	0.80 U	0.80 U
Tetrachloroethene	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U
1,1,2,2-Tetrachloroethane	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U
Toluene	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U
Chlorobenzene	0.060 U	0.060 U	0.060 U	0.060 U	0.060 U
Ethylbenzene	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U
Styrene	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U
M & p-Xylene	0.090 U	0.090 U	0.090 U	0.090 U	0.090 U
Cis-1,2-Dichloroethene	0.030 U	0.030 U	0.26	0.030 U	0.030 U
o-Xylene	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U
Trans-1,2-Dichloroethene	0.060 U	0.060 U	0.060 U	0.060 U	0.060 U

Analytes	07CE18-19		07CE18-20		07CE18-21		07CE18-23		07CE18-25	
Dilution factors=	1.0		1.0		1.0		1.0		1.0	
Chloromethane	0.050	U	0.050	U	0.43	U	0.35	U	0.37	U
Bromomethane	0.060	U	0.060	U	0.060	U	0.060	U	0.060	U
Vinyl chloride	0.018	U	0.018	U	0.018	U	0.018	U	0.018	U
Chloroethane	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U
Methylene chloride	2.4	J	0.18	J	0.15	UJ	0.15	UJ	0.15	UJ
Acetone	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ
Carbon disulfide	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U
1,1-Dichloroethene	0.040	U	0.040	U	0.040	U	0.040	U	0.040	U
1,1-Dichloroethane	0.060	U	0.060	U	0.060	U	0.060	U	0.060	U
Chloroform	0.040	U	0.040	U	0.040	U	0.040	U	0.040	U
1,2-Dichloroethane	0.030	U	0.030	U	0.030	U	0.030	U	0.030	U
2-Butanone	0.50	U	0.50	U	0.50	U	0.50	U	0.50	U
1,1,1-Trichloroethane	0.040	U	0.040	U	0.040	U	0.12	J	0.12	J
Carbon tetrachloride	0.040	U	0.040	U	0.040	U	0.040	U	0.040	U
Bromodichloromethane	0.040	U	0.040	U	0.040	U	0.040	U	0.040	U
1,2-Dichloropropane	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U
Cis-1,3-Dichloropropene	0.017	U	0.017	U	0.017	U	0.017	U	0.017	U
Trichloroethene	0.050	U	0.050	U	0.050	U	0.051	U	0.059	U
Dibromochloromethane	0.029	U	0.029	U	0.029	U	0.029	U	0.029	U
1,1,2-Trichloroethane	0.040	U	0.040	U	0.040	U	0.040	U	0.040	U
Benzene	0.040	U	0.040	U	0.040	U	0.040	U	0.040	U
Trans-1,3-Dichloropropene	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U
Bromoform	0.040	U	0.040	U	0.040	U	0.040	U	0.040	U
4-Methyl-2-pentanone	0.40	U	0.40	U	0.40	U	0.40	U	0.40	U
2-Hexanone	0.80	U	0.80	U	0.80	U	0.80	U	0.80	U
Tetrachloroethene	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U
1,1,2,2-Tetrachloroethane	0.018	U	0.018	U	0.018	U	0.018	U	0.018	U
Toluene	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U
Chlorobenzene	0.060	U	0.060	U	0.060	U	0.060	U	0.060	U
Ethylbenzene	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U
Styrene	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U
M & p-Xylene	0.090	U	0.090	U	0.090	U	0.090	U	0.090	U
Cis-1,2-Dichloroethene	0.030	U	0.030	U	0.030	U	0.030	U	0.030	U
o-Xylene	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U
Trans-1,2-Dichloroethene	0.060	U	0.060	U	0.060	U	0.060	U	0.060	U

Analytes	**07CE18-27**	**07CE18-29**	**07CE18-31**	**07CE18-32**	**07CE18-33**
Dilution factors=	1.0	50.0	1.0	1.0	1.0
Chloromethane	0.33 U	2.5 U	0.050 U	0.050 U	0.12 U
Bromomethane	0.060 U	3.0 U	0.060 U	0.060 U	0.060 UJ
Vinyl chloride	0.018 U	0.90 U	0.018 U	0.018 U	0.018 U
Chloroethane	0.050 U	2.5 U	0.050 U	0.050 U	0.050 U
Methylene chloride	0.15 UJ	7.5 UJ	0.33 J	0.15 UJ	0.15 R
Acetone	1.3 UJ	65 UJ	1.3 UJ	3.8 J	1.3 UJ
Carbon disulfide	0.10 U	5.0 U	0.10 U	0.10 U	0.10 U
1,1-Dichloroethene	0.040 U	2.0 U	0.040 U	0.040 U	0.040 U
1,1-Dichloroethane	0.060 U	11	0.060 U	0.060 U	0.060 U
Chloroform	0.040 U	2.0 U	0.040 U	0.040 U	0.040 U
1,2-Dichloroethane	0.030 U	1.5 U	0.030 U	0.030 U	0.34
2-Butanone	0.50 U	25 U	0.50 U	0.50 U	0.50 U
1,1,1-Trichloroethane	0.040 U	2.0 U	0.040 U	0.040 U	0.040 U
Carbon tetrachloride	0.040 U	2.0 U	0.040 U	0.040 U	0.040 U
Bromodichloromethane	0.040 U	3.0 J	0.040 U	0.040 U	0.040 U
1,2-Dichloropropane	0.050 U	2.5 U	0.050 U	0.050 U	0.050 U
Cis-1,3-Dichloropropene	0.017 U	0.85 U	0.017 U	0.017 U	0.017 U
Trichloroethene	0.065 U	170	0.051 J	0.050 J	0.050 U
Dibromochloromethane	0.029 U	1.5 U	0.029 U	0.029 U	0.029 U
1,1,2-Trichloroethane	0.040 U	2.0 U	0.040 U	0.040 U	0.040 U
Benzene	0.040 U	2.0 U	0.040 U	0.040 U	0.040 U
Trans-1,3-Dichloropropene	0.019 U	0.95 U	0.019 U	0.019 U	0.019 U
Bromoform	0.040 U	2.0 U	0.040 U	0.040 U	0.040 U
4-Methyl-2-pentanone	0.40 U	20 U	0.40 U	0.40 U	0.40 U
2-Hexanone	0.80 U	40 U	0.80 U	0.80 U	0.80 U
Tetrachloroethene	0.050 U	2.5 U	0.050 U	0.050 U	0.050 U
1,1,2,2-Tetrachloroethane	0.018 U	0.90 U	0.018 U	0.018 U	0.018 U
Toluene	0.050 U	2.5 U	0.050 U	0.050 U	0.050 U
Chlorobenzene	0.060 U	3.0 U	0.060 U	0.060 U	0.060 U
Ethylbenzene	0.050 U	2.5 U	0.050 U	0.050 U	0.050 U
Styrene	0.050 U	2.5 U	0.050 U	0.050 U	0.050 U
M & p-Xylene	0.090 U	4.5 U	0.090 U	0.090 U	0.090 U
Cis-1,2-Dichloroethene	0.067 J	110	0.030 U	0.030 U	0.030 U
o-Xylene	0.050 U	2.5 U	0.050 U	0.050 U	0.050 U
Trans-1,2-Dichloroethene	0.060 U	6.2	0.060 U	0.060 U	0.060 U

Analytes	07CE18-34	07CE18-35	07CE18-36	07CE18-37	07CE18-38
Dilution factors=	1.0	1.0	1.0	1.0	1.0
Chloromethane	0.22 U	0.19 U	0.25 U	0.19 U	0.17 U
Bromomethane	0.060 UJ	0.060 UJ	0.060 UJ	0.060 UJ	0.060 UJ
Vinyl chloride	0.018 U	0.018 U	0.021	0.046	0.040
Chloroethane	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U
Methylene chloride	0.15 R	0.15 R	0.15 R	0.15 R	0.15 R
Acetone	1.3 UJ	1.3 UJ	1.3 UJ	1.3 UJ	1.3 UJ
Carbon disulfide	0.10 J	0.10 U	0.10 U	0.10 U	0.10 U
1,1-Dichloroethene	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U
1,1-Dichloroethane	0.060 U	0.060 U	0.060 U	0.060 U	0.060 U
Chloroform	0.040 U	0.040 U	0.040 U	0.040 U	0.10 J
1,2-Dichloroethane	0.030 U	0.030 U	0.030 U	0.054 J	0.072 J
2-Butanone	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1,1-Trichloroethane	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U
Carbon tetrachloride	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U
Bromodichloromethane	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U
1,2-Dichloropropane	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U
Cis-1,3-Dichloropropene	0.017 U	0.017 U	0.017 U	0.017 U	0.017 U
Trichloroethene	0.050 U	0.050	0.074 J	0.076 J	0.11 J
Dibromochloromethane	0.029 U	0.029 U	0.029 U	0.029 U	0.029 U
1,1,2-Trichloroethane	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U
Benzene	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U
Trans-1,3-Dichloropropene	0.019 U	0.019 U	0.019 U	0.019 U	0.019 U
Bromoform	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U
4-Methyl-2-pentanone	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U
2-Hexanone	0.80 U	0.80 U	0.80 U	0.80 U	0.80 U
Tetrachloroethene	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U
1,1,2,2-Tetrachloroethane	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U
Toluene	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U
Chlorobenzene	0.060 U	0.060 U	0.060 U	0.060 U	0.060 U
Ethylbenzene	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U
Styrene	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U
M & p-Xylene	0.45 U	0.090 U	0.090 U	0.090 U	0.090 U
Cis-1,2-Dichloroethene	0.030 U	0.62	1.1	4.5	5.7
o-Xylene	0.58	0.050 U	0.050 U	0.050 U	0.050 U
Trans-1,2-Dichloroethene	0.060 U	0.075 J	0.090 J	0.33	0.36

Analytes	07CE18-39		07CE18-41		07CE18-43		07CE18-44		07CE18-46	
Dilution factors=	1.0 / 5.0		1.0 / 5.0		1.0		1.0		1.0	
Chloromethane	0.36	U	0.39	U	0.33	U	0.050	U	0.050	U
Bromomethane	0.060	UJ	0.060	UJ	0.060	UJ	0.060	U	0.060	UJ
Vinyl chloride	0.023		0.11		0.018	U	0.018	U	0.018	U
Chloroethane	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U
Methylene chloride	0.15	R	0.15	R	0.15	UJ	0.15	UJ	0.15	R
Acetone	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ	1.3	UJ
Carbon disulfide	0.10	U	0.10	U	0.10	U	0.10	U	0.10	U
1,1-Dichloroethene	0.11	J	0.094	J	0.040	U	0.040	U	0.040	U
1,1-Dichloroethane	0.067	J	0.060	U	0.060	U	0.060	U	0.065	J
Chloroform	0.040	U	0.040	U	0.040	U	0.040	U	0.040	U
1,2-Dichloroethane	0.030	U	0.38		0.030	U	0.030	U	0.030	U
2-Butanone	0.50	U	0.50	U	0.50	UJ	0.50	U	0.50	U
1,1,1-Trichloroethane	0.040	U	0.040	U	0.040	U	0.089	J	0.11	J
Carbon tetrachloride	0.040	U	0.040	U	0.040	U	0.040	U	0.040	U
Bromodichloromethane	0.040	U	0.040	U	0.040	U	0.040	U	0.040	U
1,2-Dichloropropane	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U
Cis-1,3-Dichloropropene	0.017	U	0.017	U	0.017	U	0.017	U	0.017	U
Trichloroethene	25	J	1.0		0.050	U	0.51		0.53	
Dibromochloromethane	0.029	U	0.029	U	0.029	U	0.029	U	0.029	U
1,1,2-Trichloroethane	0.040	U	0.040	U	0.040	U	0.040	U	0.040	U
Benzene	0.040	U	0.040	U	0.040	U	0.040	U	0.040	U
Trans-1,3-Dichloropropene	0.019	U	0.019	U	0.019	U	0.019	U	0.019	U
Bromoform	0.040	U	0.040	U	0.040	U	0.040	U	0.040	U
4-Methyl-2-pentanone	0.40	U	0.40	U	0.40	U	0.40	U	0.40	U
2-Hexanone	0.80	U	0.80	U	0.80	U	0.80	U	0.80	U
Tetrachloroethene	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U
1,1,2,2-Tetrachloroethane	0.018	U	0.018	U	0.018	U	0.018	U	0.018	U
Toluene	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U
Chlorobenzene	3.3		0.060	U	0.060	U	0.060	U	0.060	U
Ethylbenzene	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U
Styrene	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U
M & p-Xylene	0.090	U	0.090	U	0.090	U	0.090	U	0.090	U
Cis-1,2-Dichloroethene	2.8	J	26		0.030	U	0.29		0.28	
o-Xylene	0.050	U	0.050	U	0.050	U	0.050	U	0.050	U
Trans-1,2-Dichloroethene	0.26		1.5		0.060	U	0.060	U	0.060	U

Analytes	07CE18-48	07CE18-49	07CE18-50	07CE18-51	07CE18-53
Dilution factors=	1.0	1.0	1.0	1.0	1.0
Chloromethane	0.22 U	0.19 U	0.24 U	0.40 U	0.35 U
Bromomethane	0.060 UJ	0.060 UJ	0.060 UJ	0.060 UJ	0.060 UJ
Vinyl chloride	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U
Chloroethane	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U
Methylene chloride	0.15 R	0.15 R	0.15 R	0.15 R	0.15 R
Acetone	1.3 UJ	1.3 UJ	1.3 UJ	1.3 UJ	1.3 UJ
Carbon disulfide	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
1,1-Dichloroethene	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U
1,1-Dichloroethane	0.060 U	0.060 U	0.060 U	0.060 U	0.060 U
Chloroform	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U
1,2-Dichloroethane	0.030 U	0.030 U	0.030 U	0.030 U	0.030 U
2-Butanone	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1,1-Trichloroethane	0.040 U	0.040 U	0.040 U	0.092 J	0.086 J
Carbon tetrachloride	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U
Bromodichloromethane	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U
1,2-Dichloropropane	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U
Cis-1,3-Dichloropropene	0.017 U	0.017 U	0.017 U	0.017 U	0.017 U
Trichloroethene	0.050 U	0.050 U	0.050 U	0.11 J	0.083 J
Dibromochloromethane	0.029 U	0.029 U	0.029 U	0.029 U	0.029 U
1,1,2-Trichloroethane	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U
Benzene	0.090 U	0.081 U	0.090 U	0.040 U	0.040 U
Trans-1,3-Dichloropropene	0.019 U	0.019 U	0.019 U	0.019 U	0.019 U
Bromoform	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U
4-Methyl-2-pentanone	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U
2-Hexanone	0.80 U	0.80 U	0.80 U	0.80 U	0.80 U
Tetrachloroethene	0.063 J	0.067 J	0.065 J	0.074 U	0.062 U
1,1,2,2-Tetrachloroethane	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U
Toluene	0.29 U	0.31 U	0.32 U	0.050 U	0.050 U
Chlorobenzene	0.060 U	0.060 U	0.060 U	0.060 U	0.060 U
Ethylbenzene	0.065 U	0.061 U	0.069 U	0.050 U	0.050 U
Styrene	0.050 U	0.050 U	0.12 U	0.050 U	0.050 U
M & p-Xylene	0.12 U	0.13 U	0.17 U	0.090 U	0.090 U
Cis-1,2-Dichloroethene	0.030 U	0.030 U	0.030 U	0.030 U	0.030 U
o-Xylene	0.050 U	0.065 U	0.068 U	0.050 U	0.050 U
Trans-1,2-Dichloroethene	0.060 U	0.060 U	0.060 U	0.060 U	0.060 U

Analytes	07CE18-55	07CE18-57	07CE18-58	07CE18-59	07CE18-61
Dilution factors=	1.0	1.0	1.0	1.0	5.0 / 25
Chloromethane	0.44 U	0.15 U	0.15 U	0.41 U	0.51 U
Bromomethane	0.060 UJ	0.060 UJ	0.060 UJ	0.060 UJ	0.30 UJ
Vinyl chloride	0.044	0.018 U	0.018 U	0.043	0.70
Chloroethane	0.050 U	0.050 U	0.050 U	0.050 U	0.25 U
Methylene chloride	0.15 R	0.15 R	0.15 R	0.15 UJ	0.75 UJ
Acetone	1.3 UJ	1.3 UJ	1.3 UJ	1.3 UJ	6.5 UJ
Carbon disulfide	0.10 U	0.10 U	0.10 U	0.10 U	0.50 U
1,1-Dichloroethene	0.040 U	0.040 U	0.040 U	0.040 U	1.5
1,1-Dichloroethane	0.060 U	0.060 U	0.060 U	0.063 J	8.4
Chloroform	0.040 U	0.040 U	0.040 U	0.040 U	0.20 U
1,2-Dichloroethane	0.030 U	0.030 U	0.030 U	0.030 U	0.15 U
2-Butanone	0.50 U	0.50 U	0.50 U	0.50 U	2.5 U
1,1,1-Trichloroethane	0.040 U	0.040 U	0.040 U	0.040 U	0.20 U
Carbon tetrachloride	0.040 U	0.040 U	0.040 U	0.040 U	0.20 U
Bromodichloromethane	0.040 U	0.040 U	0.040 U	0.040 U	0.20 U
1,2-Dichloropropane	0.050 U	0.050 U	0.050 U	0.050 U	0.25 U
Cis-1,3-Dichloropropene	0.017 U	0.017 U	0.017 U	0.017 U	0.085 U
Trichloroethene	0.066 J	0.050 U	0.050 U	0.066 J	42
Dibromochloromethane	0.029 U	0.029 U	0.029 U	0.029 U	0.15 U
1,1,2-Trichloroethane	0.040 U	0.040 U	0.040 U	0.040 U	0.20 U
Benzene	0.040 U	0.088 U	0.950 U	0.040 U	0.20 U
Trans-1,3-Dichloropropene	0.019 U	0.019 U	0.019 U	0.019 U	0.095 U
Bromoform	0.040 U	0.040 U	0.040 U	0.040 U	0.20 U
4-Methyl-2-pentanone	0.40 U	0.40 U	0.40 U	0.40 U	2.0 U
2-Hexanone	0.80 U	0.80 U	0.80 U	0.80 U	4.0 U
Tetrachloroethene	0.050 U	0.068 J	0.075 J	0.050 U	0.25 U
1,1,2,2-Tetrachloroethane	0.018 U	0.018 U	0.018 U	0.018 U	0.090 U
Toluene	0.050 U	0.32 U	0.33 U	0.050 U	0.25 U
Chlorobenzene	0.060 U	0.060 U	0.060 U	0.060 U	0.30 U
Ethylbenzene	0.050 U	0.063 U	0.066 U	0.050 U	0.25 U
Styrene	0.050 U	0.054 U	0.075 U	0.050 U	0.25 U
M & p-Xylene	0.090 U	0.14 U	0.16 U	0.090 U	0.45 U
Cis-1,2-Dichloroethene	0.68	0.030 U	0.030 U	0.23	39
o-Xylene	0.050 U	0.064 U	0.082 U	0.050 U	0.25 U
Trans-1,2-Dichloroethene	0.060 U	0.060 U	0.060 U	0.060 U	1.4

Analytes	**07CE18-63**		**07CE18-65**		**07CE18-67**		**07CE18-69**		**07CE18-70**	
Dilution factors=	25.0		5.0		20.0		1.0		1.0	
Chloromethane	1.3	U	0.43	U	1.0	U	0.23	U	0.18	U
Bromomethane	1.5	UJ	0.30	UJ	1.2	UJ	0.060	UJ	0.060	UJ
Vinyl chloride	11		0.57		1.1		0.023		0.018	U
Chloroethane	1.3	U	0.25	U	1.0	U	0.050	U	0.050	U
Methylene chloride	3.8	UJ	0.75	R	3.0	R	0.15	UJ	0.15	UJ
Acetone	33	UJ	6.5	UJ	26	UJ	1.3	UJ	1.3	UJ
Carbon disulfide	2.5	U	0.50	U	2.0	U	0.10	U	0.10	U
1,1-Dichloroethene	10	U	0.57		15		0.040	U	0.040	U
1,1-Dichloroethane	55		19		61		0.060	U	0.060	U
Chloroform	1.0	U	0.20	U	0.80	U	0.040	U	0.040	U
1,2-Dichloroethane	0.75	U	0.15	U	0.60	U	0.030	U	0.030	U
2-Butanone	13	U	2.5	U	1.0	U	0.50	U	0.50	U
1,1,1-Trichloroethane	3.3	J	3.9	J	120		0.040	U	0.040	U
Carbon tetrachloride	1.0	U	0.20	U	0.80	U	0.040	U	0.040	U
Bromodichloromethane	1.5		0.20	U	1.3		0.040	U	0.040	U
1,2-Dichloropropane	1.3	U	0.25	U	1.0	U	0.050	U	0.050	U
Cis-1,3-Dichloropropene	0.43	U	0.085	U	0.34	U	0.017	U	0.017	U
Trichloroethene	290		2.5		130		0.050	U	0.050	U
Dibromochloromethane	0.73	U	0.15	U	0.58	U	0.029	U	0.029	U
1,1,2-Trichloroethane	1.0	U	0.20	U	0.80	U	0.040	U	0.040	U
Benzene	1.0	U	0.20	U	0.80	U	0.040	U	0.040	U
Trans-1,3-Dichloropropene	0.48	U	0.095	U	0.38	U	0.019	U	0.019	U
Bromoform	1.0	U	0.20	U	0.80	U	0.040	U	0.040	U
4-Methyl-2-pentanone	10	U	2.0	U	8.0	U	0.40	U	0.40	U
2-Hexanone	20	U	4.0	U	16	U	0.80	U	0.80	U
Tetrachloroethene	1.3	U	0.25	U	1.0	U	0.050	U	0.050	U
1,1,2,2-Tetrachloroethane	0.45	U	0.090	U	0.36	U	0.018	U	0.018	U
Toluene	1.3	U	0.25	U	1.0	U	0.050	U	0.050	U
Chlorobenzene	1.5	U	0.30	U	1.2	U	0.060	U	0.060	U
Ethylbenzene	1.3	U	0.25	U	1.0	U	0.050	U	0.050	U
Styrene	1.3	U	0.25	U	1.0	U	0.050	U	0.050	U
M & p-Xylene	2.3	U	0.45	U	1.8	U	0.090	U	0.090	U
Cis-1,2-Dichloroethene	280		6.2		33		0.62		0.54	
o-Xylene	1.3	U	0.25	U	1.0	U	0.050	U	0.050	U
Trans-1,2-Dichloroethene	2.8	J	1.2		21		0.066	J	0.060	U

Analytes	**07CE18-71**	**07CE18-72**	**07CE18-73**	**07CE18-74**	**07CE18-75**
Dilution factors=	1.0	1.0	1.0	1.0	1.0
Chloromethane	0.050 U	0.050 U	0.050 U	0.30 U	0.42 U
Bromomethane	0.060 UJ	0.060 UJ	0.060 UJ	0.060 UJ	0.060 UJ
Vinyl chloride	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U
Chloroethane	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U
Methylene chloride	0.15 UJ	0.15 UJ	0.15 UJ	0.15 UJ	0.15 UJ
Acetone	1.3 UJ	1.3 UJ	1.3 UJ	1.3 UJ	1.3 UJ
Carbon disulfide	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
1,1-Dichloroethene	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U
1,1-Dichloroethane	0.060 U	0.060 U	0.060 U	0.060 U	0.060 U
Chloroform	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U
1,2-Dichloroethane	0.030 U	0.030 U	0.030 U	0.030 U	0.030 U
2-Butanone	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1,1-Trichloroethane	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U
Carbon tetrachloride	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U
Bromodichloromethane	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U
1,2-Dichloropropane	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U
Cis-1,3-Dichloropropene	0.017 U	0.017 U	0.017 U	0.017 U	0.017 U
Trichloroethene	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U
Dibromochloromethane	0.029 U	0.029 U	0.029 U	0.029 U	0.029 U
1,1,2-Trichloroethane	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U
Benzene	0.096 U	0.086 U	0.086 U	0.040 U	0.040 U
Trans-1,3-Dichloropropene	0.019 U	0.019 U	0.019 U	0.019 U	0.019 U
Bromoform	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U
4-Methyl-2-pentanone	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U
2-Hexanone	0.80 U	0.80 U	0.80 U	0.80 U	0.80 U
Tetrachloroethene	0.078 J	0.077 J	0.078 J	0.050 U	0.050 U
1,1,2,2-Tetrachloroethane	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U
Toluene	0.30 U	0.32 U	0.29 U	0.050 U	0.050 U
Chlorobenzene	0.060 U	0.060 U	0.060 U	0.060 U	0.060 U
Ethylbenzene	0.066 U	0.65 U	0.060 U	0.050 U	0.050 U
Styrene	0.050 U	0.068 U	0.050 U	0.050 R	0.050 U
M & p-Xylene	0.12 U	0.16 U	0.12 U	0.090 U	0.090 U
Cis-1,2-Dichloroethene	0.030 U	0.030 U	0.030 U	0.030 U	0.030 U
o-Xylene	0.062 U	0.073 U	0.056 U	0.050 U	0.050 U
Trans-1,2-Dichloroethene	0.060 U	0.060 U	0.060 U	0.060 U	0.060 U

Analytes	**07CE18-76**	**07CE18-77**	**07CE18-79**	**07CE18-80**	**07CE18-81**
Dilution factors=	1.0	1.0	1.0	1.0	1.0
Chloromethane	0.15 U	0.32 U	0.37 U	0.17 U	0.55 U
Bromomethane	0.060 UJ	0.060 U	0.060 UJ	0.060 UJ	0.060 UJ
Vinyl chloride	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U
Chloroethane	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U
Methylene chloride	0.15 UJ	0.15 UJ	0.15 UJ	0.15 UJ	0.15 UJ
Acetone	1.3 UJ	1.3 UJ	1.3 UJ	1.3 UJ	1.3 UJ
Carbon disulfide	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
1,1-Dichloroethene	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U
1,1-Dichloroethane	0.060 U	0.060 U	0.060 U	0.060 U	0.060 U
Chloroform	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U
1,2-Dichloroethane	0.030 U	0.030 U	0.030 U	0.030 U	0.030 U
2-Butanone	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1,1-Trichloroethane	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U
Carbon tetrachloride	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U
Bromodichloromethane	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U
1,2-Dichloropropane	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U
Cis-1,3-Dichloropropene	0.017 U	0.017 U	0.017 U	0.017 U	0.017 U
Trichloroethene	0.084 J	0.050 U	0.050 U	0.050 U	0.050 U
Dibromochloromethane	0.029 U	0.029 U	0.029 U	0.029 U	0.029 U
1,1,2-Trichloroethane	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U
Benzene	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U
Trans-1,3-Dichloropropene	0.019 U	0.019 U	0.019 U	0.019 U	0.019 U
Bromoform	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U
4-Methyl-2-pentanone	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U
2-Hexanone	0.80 U	0.80 U	0.80 U	0.80 U	0.80 U
Tetrachloroethene	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U
1,1,2,2-Tetrachloroethane	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U
Toluene	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U
Chlorobenzene	0.060 U	0.060 U	0.060 U	0.060 U	0.060 U
Ethylbenzene	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U
Styrene	0.050 U	0.050 R	0.050 U	0.050 U	0.050 U
M & p-Xylene	0.090 U	0.090 U	0.090 U	0.090 U	0.090 U
Cis-1,2-Dichloroethene	0.47	0.030 U	0.030 U	0.030 U	0.030 U
o-Xylene	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U
Trans-1,2-Dichloroethene	0.060 U	0.060 U	0.060 U	0.060 U	0.060 U

SAS RLs	Analytes	**07CE18-82**	**07CE18-83**	**07CE18-84**	**07CE18-85**
	Dilution factors=	1.0	1.0	1.0	200.0
0.2	Chloromethane	0.17	0.13 J	0.17 J	10 U
0.2	Bromomethane	0.060 UJ	0.060 UJ	0.060 UJ	12 UJ
0.018	Vinyl chloride	0.018 U	0.018 U	0.018 U	35
0.2	Chloroethane	0.050 U	0.050 U	0.050 U	10 U
0.2	Methylene chloride	0.15 UJ	0.15 UJ	0.15 UJ	30 UJ
2.0	Acetone	1.3 UJ	1.3 UJ	1.3 UJ	260 UJ
0.4	Carbon disulfide	0.10 U	0.10 U	0.10 U	20 U
0.2	1,1-Dichloroethene	0.040 U	0.040 U	0.040 U	8.0 U
0.2	1,1-Dichloroethane	0.060 U	0.060 U	0.060 U	12 U
0.2	Chloroform	0.040 U	0.040 U	0.040 U	8.0 U
0.2	1,2-Dichloroethane	0.030 U	0.030 U	0.030 U	6.0 U
2.0	2-Butanone	0.50 U	0.50 U	0.50 U	100 U
1.0	1,1,1-Trichloroethane	0.040 U	0.040 U	0.040 U	8.0 U
0.2	Carbon tetrachloride	0.040 U	0.040 U	0.040 U	8.0 U
0.05	Bromodichloromethane	0.040 U	0.040 U	0.040 U	12
0.2	1,2-Dichloropropane	0.050 U	0.050 U	0.050 U	10 U
0.016	Cis-1,3-Dichloropropene	0.017 U	0.017 U	0.017 U	3.4 U
0.2	Trichloroethene	0.050 U	0.050 U	0.050 U	10 U
0.2	Dibromochloromethane	0.029 U	0.029 U	0.029 U	5.8 U
0.2	1,1,2-Trichloroethane	0.040 U	0.040 U	0.040 U	8.0 U
0.2	Benzene	0.091 U	0.098 U	0.092 U	8.0 U
0.015	Trans-1,3-Dichloropropene	0.019 U	0.019 U	0.019 U	3.8 U
0.2	Bromoform	0.040 U	0.040 U	0.040 U	8.0 U
2.0	4-Methyl-2-pentanone	0.40 U	0.40 U	0.40 U	80 U
2.0	2-Hexanone	0.80 U	0.80 U	0.80 U	160 U
0.2	Tetrachloroethene	0.065 J	0.74 J	0.070 J	10 U
0.018	1,1,2,2-Tetrachloroethane	0.018 U	0.018 U	0.018 U	3.6 U
1.0	Toluene	0.31 U	0.30 U	0.29 U	10 U
0.2	Chlorobenzene	0.060 U	0.060 U	0.060 U	12 U
0.05	Ethylbenzene	0.057 U	0.061 U	0.056 U	10 U
0.2	Styrene	0.050 U	0.050 U	0.050 U	10 U
0.2	M & p-Xylene	0.11 U	0.11 U	0.097 U	18 U
0.2	Cis-1,2-Dichloroethene	0.030 U	0.030 U	0.030 U	1300
0.2	o-Xylene	0.057 U	0.060 U	0.052 U	10 U
0.2	Trans-1,2-Dichloroethene	0.060 U	0.060 U	0.060 U	28 J

	07CE18-01		07CE18-03		07CE18-06		07CE18-08		07CE18-10	
	Df=	4.0	Df=	1.0	Df=	1.0	Df=	1.0	Df=	1.0
Ethane	1.0	0.50 UJ	1.0	0.50 UJ	1.0	0.50 UJ	1.0	0.50 UJ	1.0	0.50 UJ
Ethene	1.0	0.50 U	1.0	0.50 U	1.0	0.50 U	1.0	0.50 U	1.0	0.50 U
Methane	4.0	12 J	1.0	4.5 J	1.0	0.80 U	1.0	0.42 J	1.0	1.1 U

	07CE18-12		07CE18-14		07CE18-16		07CE18-21		07CE18-23	
	Df=	1.0 / 4.0	Df=	1.0	Df=	1.0 / 10	Df=	1.0 / 50	Df=	1.0
Ethane	1.0	0.50 UJ	1.0	0.50 UJ	1.0	0.50 UJ	1.0	0.50 UJ	1.0	0.50 UJ
Ethene	1.0	0.50 U	1.0	0.50 U	1.0	0.50 U	1.0	0.50 U	1.0	0.50 U
Methane	4.0	22 J	1.0	2.2 J	10	71 J	50	440 J	1.0	1.2 U

	07CE18-25		07CE18-27		07CE18-29		07CE18-39		07CE18-41	
	Df=	1.0	Df=	1.0 / 4.0	Df=	1.0	Df=	1.0	Df=	1.0
Ethane	1.0	0.50 UJ	1.0	0.50 UJ	1.0	0.50 UJ	1.0	0.50 UJ	1.0	0.50 UJ
Ethene	1.0	0.50 U	1.0	0.50 U	1.0	0.50 U	1.0	0.50 U	1.0	0.50 U
Methane	1.0	0.87 U	4.0	31 J	1.0	16	1.0	3.1 J	1.0	4.7 J

	07CE18-44		07CE18-46		07CE18-51		07CE18-53		07CE18-55	
	Df=	1.0	Df=	1.0	Df=	1.0	Df=	1.0	Df=	1.0
Ethane	1.0	0.50 UJ	1.0	0.50 UJ	1.0	0.50 UJ	1.0	0.50 UJ	1.0	0.50 UJ
Ethene	1.0	0.50 U	1.0	0.50 U	1.0	0.50 U	1.0	0.50 U	1.0	0.50 U
Methane	1.0	1.5 U	1.0	1.3 U	1.0	0.35 U	1.0	0.31 U	1.0	6.4 J

	07CE18-59		07CE18-61		07CE18-63		07CE18-65		07CE18-67	
	Df=	1.0 / 40	Df=	1.0 / 5.0	Df=	1.0 / 40	Df=	1.0	Df=	1.0
Ethane	1.0	0.50 UJ	1.0	0.50 UJ	1.0	1.3 J	1.0	0.50 UJ	1.0	0.50 UJ
Ethene	1.0	0.50 U	1.0	0.50 U	1.0	0.50 U	1.0	0.50 U	1.0	0.50 U
Methane	40	440	5.0	46 J	40	280 J	1.0	6.0 J	1.0	11

	07CE18-77		07CE18-85	
	Df=	1.0	Df=	1.0 / 4.0
Ethane	1.0	0.50 UJ	1.0	3.5 J
Ethene	1.0	0.50 U	1.0	0.50 U
Methane	1.0	18 J	4.0	49

Data Qualifier Sheet

For the purpose of defining the flagging nomenclature utilized in this document, the following code letters and associated definitions are provided:

VALUE – if the result is a value greater than or equal to the Contract Required Quantitation Limit (CRQL).

U	Indicates that the compound was analyzed for, but not detected. The sample quantitation limit corrected for dilution and percent moisture is reported.
J	Indicates an estimated value. This flag is used either when estimating a concentration for a tentatively identified compound or when the data indicates the presence of a compound but the result is less than the sample quantitation limit, but greater than zero. The flag is also used to indicate a reported result having an associated QC problem.
N	Indicates presumptive evidence of a compound. This flag is only used for a tentatively identified compound (TIC), where the identification is based on a mass spectral library search.
R	Indicates the data are unusable. (The compound may or may not be present.)
P	Indicates a pesticide/Aroclor target analyte when there is greater than 25% difference for the detect concentrations between the two GC columns. The lower of the two results is reported.
C	Indicates pesticide results that have been confirmed by GC/MS.
B	Indicates the analyte is detected in the associated method blank as well as the sample.
E	Indicates compounds whose concentrations exceeded the calibration range of the instrument.
D	Indicates an identified compound in an analysis has been diluted. This flag alert the data user to any difference between the concentrations rported in the two analyses.
A	Indicates TICs that are suspected to be aldol condensation products.
G	Indicates the TCLP Matrix Spike Recovery was greater than the upper limit of the analytical method.
L	Indicates the TCLP Matrix Spike Recovery was less than the lower limit of the analytical method.
T	Indicates the analyte is found in the associated TCLP extraction blank as well as in the sample.

X, Y, Z are reserved for laboratory defined flags.

Regional Transmittal Form

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION V

DATE: 4/16/07

SUBJECT: Review of Data
Received for review on 2/8/07

FROM: Stephen L. Ostrodka, Chief (SRT-4J)
Superfund Field Services Section

TO: Data User: CH2M Hill

We have reviewed the data for the following case:

SITE NAME: Oconomowoc Electroplating (WI)

CASE NUMBER: 07CE18 **SDG NUMBER:** 58355-M

Number and Type of Samples: 54 waters (27 total/27 dissolved)

Sample Numbers: 07CE18-01 thru -04, -06 thru -17, -21 thru -30, -39 thru -42, -44 thru -47, -51 thru -56, -59 thru -68, -77, -78, -85, -86

Laboratory: CT Laboratories **Hrs. for Review:**

Following are our findings:

CC: Howard Pham
Region 5 TOPO
Mail Code: SRT-4J

Narrative

The laboratory's portion of this case contains 54 water samples (27 dissolved, 27 total, see attached table) which were collected between January 15 and 19, 2007. They were analyzed for iron and manganese. All sample results are reported to the MDL. The samples were analyzed using SW846 6010B (ICP-AES) analysis procedures.

Evidential Audit: All provided ICP reporting forms are CLP-like documents. All documents provided are copies. No location is noted for the originals. No DC-1 or DC-2 forms, airbills or sample tags were provided. CLP equivalent forms for ICSA/ABs or CRI were not provided.

No analytical date was provided on the MDL summary form or the linearity form. MDL and linearity values recorded on the forms provided were used for evaluation of the data. Differing values were provided for MDLs on the calibration blanks forms (29.2 and 33 for Fe, 5.7, 1.11 and 1.1 for Mn). Those values also differed from the Level of Detection (LOD) listed on the sample results forms (39 total Fe, 10 dissolved Fe, 0.5 total Mn, 0.4 dissolved Mn).LOD and RL values are the same on the Form 1s (sample results).

The Duplicate Forms included are for the LCS/LCSD. Duplicate forms are also included for the MS/MSD. The date analyzed recorded on the result form for 07CE18-17 dissolved Mn is listed as January 26, 2007; the result is reported from the January 23, 2007 analytical run.

The Analysis Run Log lists one analytical run which started January 23 and ended January 30, 2007. Further investigation shows that there are 2 analytical runs included on the Form. No times are included for either of the calibrations. The run summary included in the Metals Logbook Documents section of the SAS indicates that there were analyses performed on samples where no raw data is present in the case. It appears that serial dilutions performed during the January 30, 2007 analytical run were analyzed twice but raw data is present for only one analysis. No sample dates and times were included for 07CE18-55/-56 (total and dissolved samples for OEP-MW13D).

Several errors were found on reporting forms by this reviewer. They were corrected.

ICP-AES: Section 8(d) of the SAS requires that the RL must be shown to have been met before any samples are analyzed; since the "CRDL" sample was not analyzed at the SAS required RL (it appears that the sample contains 1000 ug/L Fe and 10 ug/L Mn; the SAS requires 30 ug/L Fe and 6 ug/L Mn), this requirement was not met. All Fe results less than 1000 ug/L and Mn results less than 10 ug/L are estimated "J" for detects and "UJ" for non-detects due to the failure of the laboratory to meet the SAS required reporting limit.

For Fe, the SAS required reporting limit for total Fe (30 ug/L) was not met by the laboratory. All non-detect total Fe results (07CE18-01, -03, -06, -08 and -25) are estimated "UJ." Additionally, all Fe results (total and dissolved) greater than the MDL but less than 1000 ug/L are estimated for the laboratory failing to meeting the SAS requirement of showing they were able to meet the SAS required reporting limit (see above). Total Fe results for 07CE18-10, -14, -16, -21, -23, -39, -44, -46, -51, -53, -59, -65, -67, -77, and dissolved Fe results for 07CE18-11, -17, -22, -28, -45, -47, -56, -60, -66, -68, -78 are estimated "J" due to the laboratory not demonstrating that they could meet the SAS required reporting limit.

For Mn, the serial dilution performed on total sample 07CE18-77 was greater than 10% difference indicating possible physical or chemical interference; samples in that digestion batch (07CE18-59, -61, -63, 65, -67, -77, -85) are estimated "J" due to possible physical or chemical interference. Additionally, the serial dilution performed on dissolved sample 07CE18-40 was greater than 10% difference indicating possible physical or chemical interference; samples associated with that sample (07CE18-02, -04, -07, -09, -11, -13, -15, -17, -22, -24, -26, -28, -30, -40, -42, -45, -47, -52, -54, -56) are estimated "J" due to possible physical or chemical interference. Finally, total Mn results for 07CE18-51 and -53 are estimated "J" because the reported results are between the MDL and the SAS required RL.

Other comments: Samples 07CE18-23/-25, -24/-26 -44/-46 and -45/-47 were identified as field duplicates. Duplicates were evaluated according to the same criteria as laboratory duplicates. All showed good correlation except 07CE18-23/-25 (both elements); no sample results were qualified for field duplicate failure. Samples 07CE18-06 and -07 were identified as equipment blanks. Samples 07CE18-08 and -09 were identified as field blanks. No contamination was found in any of the field blanks.

Reviewed by: Stephen Connet
Date: 4/16/2007

Lab ID	**Sample ID**	**Lab ID**	**Sample ID**	**Sample Point**	**Sample Date**	**Sample Time**
	(Total)		(Dissolved)			
449938	07CE18-01	449939	07CE18-02	OEP-MW-103D	1/15/2007	17:25
449940	07CE18-03	449941	07CE18-04	OEP-MW-103S	1/15/2007	17:30
450206	07CE18-06	450207	07CE18-07	OEP-EB-01	1/16/2007	13:30
450208	07CE18-08	450209	07CE18-09	OEP-FB-01	1/16/2007	13:00
450184	07CE18-10	450185	07CE18-11	OEP-MW-4S	1/16/2007	10:30
450186	07CE18-12	450187	07CE18-13	OEP-MW-4D	1/16/2007	12:27
450201	07CE18-14	450202	07CE18-15	OEP-MW-1S	1/16/2007	10:55
450203	07CE18-16	450204	07CE18-17	OEP-MW-1D	1/16/2007	12:15
450194	07CE18-21	450195	07CE18-22	OEP-MW-15B	1/16/2007	15:30
450196	07CE18-23	450197	07CE18-24	OEP-MW-15S	1/16/2007	16:50
450198	07CE18-25	450199	07CE18-26	OEP-MW-15SFR	1/16/2007	16:50
450189	07CE18-27	450190	07CE18-28	OEP-MW-3D	1/16/2007	17:35
450191	07CE18-29	450192	07CE18-30	OEP-MW-5D	1/16/2007	15:40
450394	07CE18-39	450395	07CE18-40	OEP-MW-15D	1/17/2007	10:20
450389	07CE18-41	450390	07CE18-42	OEP-MW-102D	1/17/2007	12:20
450379	07CE18-44	450380	07CE18-45	OEP-SW-03	1/17/2007	13:00
450381	07CE18-46	450382	07CE18-47	OEP-SW-03FR	1/17/2007	13:00
450384	07CE18-51	450385	07CE18-52	OEP-MW-13S	1/17/2007	15:20
450386	07CE18-53	450387	07CE18-54	OEP-MW-13SFR	1/17/2007	15:20
450391	07CE18-55	450392	07CE18-56	OEP-MW-13D	??	??
450630	07CE18-59	450631	07CE18-60	OEP-MW-105B	1/18/2007	10:20
450632	07CE18-61	450633	07CE18-62	OEP-MW-105D	1/18/2007	9:50
450634	07CE18-63	450635	07CE18-64	OEP-MW-105S	1/18/2007	10:45
450625	07CE18-65	450626	07CE18-66	OEP-MW12D	1/18/2007	11:45
450627	07CE18-67	450628	07CE18-68	OEP-MW-12S	1/18/2007	11:45
450858	07CE18-77	450859	07CE18-78	OEP-MW-12B	1/19/2007	12:00
450862	07CE18-85	450863	07CE18-86	OEP-MW-16S	1/19/2007	16:10

Reviewed by: Stephen Connet
Date: 4/16/2007

ILM05.3 Data Qualifier Sheet

Qualifiers	Data Qualifier Definitions
U	The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
J	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
J+	The result is an estimated quantity, but the result may be biased high.
J-	The result is an estimated quantity, but the result may be biased low.
R	The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.
UJ	The analyte was analyzed for, but not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

Reviewed by: Stephen Connet
Date: 4/16/2007

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION V
SUPERFUND DIVISION

DATE:

SUBJECT: Review of Data
Received for Review on: February 28, 2007

FROM: Stephen L. Ostrodka, Chief (SRT-4J)
Superfund Field Services Section

TO: Data User: Ch2m Hill

We have reviewed the data for the following case:

SITE Name: Oconomowoc Electroplating (WI)

SAS Project: 07CE18

SDG Number: 58588-VOC

Number and Type of Samples: 2 Waters (VOCs)

Sample Numbers: 07CE18-87, 07CE18-88

Laboratory: CT Laboratories

Hrs for Review:

Following are our findings:

CC: Howard Pham
Region 5 TPO
Mail Code: SRT-4J

Below is a summary of the out-of-control audits and the possible effects on the data for this case:

Two (2) preserved water samples, 07CE18-87 and 07CE18-88 were collected January 30 - 31, 2007. The laboratory received the samples on February 1, 2007 intact with a cooler temperature of 1.4 °C. All pH values were less than 2. All samples were analyzed February 8, 2007 by SW-846 Method 8260 for the volatile list of organic analytes identified in the SAS contract for estimated dates of collection January 2007 through March 2011.

The laboratory reported the results of 46 volatile analytes. Only the following 36 volatile analytes were requested in the SAS contract and only these analytes will be discussed in the following validation report. The VOC SAS contract incorrectly identifies analyte 1,1-Dichloroethene as 1,2-Dichloroethene.

Acetone	Benzene	Bromodichloromethane
Bromoform	Bromomethane	2-Butanone (MEK)
Carbon disulfide	Carbon tetrachloride	Chlorobenzene
Chloroethane	Chloroform	Chloromethane
Dibromochloromethane	1,1-Dichloroethane	1,2-Dichloroethane
1,1-Dichloroethene	Cis-1,2-Dichloroethene	Trans-1,2-Dichloroethene
1,2-Dichloropropane	Cis-1,3-Dichloropropene	Trans-1,3-Dichloropropene
Ethylbenzene	2-Hexanone	4-Methyl-2-pentanone (MIBK)
Methylene chloride	Styrene	1,1,2,2-Tetrachloroethane
Tetrachloroethene	Toluene	1,1,1-Trichloroethane
1,1,2-Trichloroethane	Trichloroethene	Vinyl chloride
[Xylenes, total]	M & p-Xylene	o-Xylene

The VOC method blank is MB-454040 for the SW-846 Method 8260B analyses.

Samples 07CE18-87 is the parent sample used for the VOC Matrix Spike / Matrix Spike Duplicate analyses.

The VOC laboratory control sample is LCS-454039. The VOC laboratory control sample duplicate is LCSD-454127.

One (1) sample, 07CE18-88, is identified as a Trip Blank.

The VOA analyses were performed within the technical holding time of 14 days after sample collection; therefore, the results are acceptable.

1. HOLDING TIME

Two (2) preserved water samples, 07CE18-87 and 07CE18-88 were collected January 30 - 31, 2007. The laboratory received the samples on February 1, 2007 intact with a cooler temperature of 1.4 °C. All pH values were less than 2. All samples were analyzed February 8, 2007 by SW-846 Method 8260 for the volatile list of organic analytes identified in the SAS contract for estimated dates of collection January 2007 through March 2011.

The VOA analyses were performed within the technical holding time of 14 days after sample collection; therefore, the results are acceptable.

2. GC/MS TUNING AND GC INSTRUMENT PERFORMANCE

All GC/MS tuning for SW-846 Method 8260B complied with the mass list and ion abundance criteria for BFB, and all samples were analyzed within the twelve (12) hour periods for instrument performance checks.

3. CALIBRATION

A 7-point calibration curve (0.2, 0.4, 1.0, 2.0, 4.0, 6.0 and 8.0 µg/L) was performed on February 7, 2007. No minimum RRF values were identified in the SAS contract. The average RRFs for Acetone, 2-Butanone, 4-Methyl-2-pentanone and 2-Hexanone were less than 0.05 but greater than the minimum RRF of 0.01 currently used in SOW SOM01.1. All %RSDs were less than 15%. The average RRF for surrogate 1,2-Dichloroethane-d_4 was less than 0.05 and less than the minimum RRF of 0.05 currently used in SOW SOM01.1. Sample results are not qualified based on the RRF values or %RSD of the surrogates alone.

Continuing Calibrations were conducted at the start of every analytical sequence. All analytes are evaluated for %Ds less than 20%. No minimum RRF values were identified in the SAS contract. The average RRFs for Acetone, 2-Butanone, 4-Methyl-2-pentanone and 2-Hexanone were less than 0.05 but greater than the minimum RRF of 0.01 currently used in SOW SOM01.1. All %Ds for the surrogates were greater than 20%. Sample results are not qualified based on the RRF values or %D of the surrogates alone.

The following samples are associated with a continuing calibration where one or more analytes has a %D greater than 20%.

Detected compounds should be qualified "J".

Bromomethane
LCSD-454127

Methylene chloride
07CE18-87MS, 07CE18-87MSD, LCS-454039, LCSD-454127

Non-detected quantitation limits should be qualified "UJ".

Methylene chloride
07CE18-87, 07CE18-88, MB-454040

4. BLANKS

The VOC method blank is MB-454040 for the SW-846 Method 8260B analyses. Method MB-454040 contained no target analytes. The Volatile Method Blank Summary lists the samples associated with the method blank.

5. SYSTEM MONITORING COMPOUND AND SURROGATE RECOVERY

All SW-846 Method 8260B volatile surrogate compounds (1,2-Dichloroethane-d_4, Bromofluorobenzene, Dibromofluoromethane, Toluene-d_8) were within the QC limits (75-135%) for all VOC samples.

6A. MATRIX SPIKE/MATRIX SPIKE DUPLICATE

Samples 07CE18-87 is the parent sample used for the VOC Matrix Spike / Matrix Spike Duplicate analyses. The percent recoveries for all compounds, except Styrene, were within the QC limits (60 – 130%) for samples 07CE18-87MS and 07CE18-87MSD. The percent recoveries for Styrene were less than the lower limit of 60% but greater than 20% in both samples 07CE18-87MS and 07CE18-87MSD. The compound was not detected in the unspiked sample. The quantitation limit for Styrene in the unspiked sample, 07CE18-87, should be qualified "UJ".

6B. LABORATORY CONTROL SAMPLES

The VOC laboratory control sample is LCS-454039. The VOC laboratory control sample duplicate is LCSD-454127. The percent recoveries for all compounds were within the QC limits (60 – 130%) and all relative percent differences (RPDs) were less than 30%. No qualifications were required for this criterion.

7. FIELD BLANK AND FIELD DUPLICATE

One (1) sample, 07CE18-88, is identified as a Trip Blank. The sample contained Trichloroethene @ 0.050 µg/L.

8. INTERNAL STANDARDS

The three internal standard's (Fluorobenzene, Chlorobenzene-d_5, 1,4-Dichlorobenzene-d_4) retention times and area counts for the VOC samples were within the QC limits; therefore, the results are acceptable.

Reviewed by: Allison C Harvey / TechLaw-ESAT
Date: April 13, 2007

9. COMPOUND IDENTIFICATION

After reviewing the mass spectra and chromatograms it appears that all VOC compounds were properly identified.

10. COMPOUND QUANTITATION AND REPORTED DETECTION LIMITS

All samples were waters and dilutions were run. The reporting limits for the VOC compounds were less than or equal to the reporting limits specified in the SAS contract for all analytes except cis-1,3-Dichloropropene and trans-1,3-Dichloropropene. The requested reporting limit for cis-1,3-Dichloropropene was 0.016 µg/L and the actual reporting limit was 0.017 µg/L. The requested reporting limit for trans-1,3-Dichloropropene was 0.015 µg/L and the actual reporting limit was 0.019 µg/L. Xylenes (total) was reported as m,p-Xylene and o-Xylene. All target compound quantitations were properly reported. The Laboratory's Reporting Limits are equal to their Method Detection Limits (MDL) [The MDL is equivalent to the Level of Detection-LOD]. Per SW-846 Method 8260B, the Reporting Limit or Estimated Quantitation Limit is generally 5 – 10 times the MDL.

The following VOC samples reported analyte concentrations below the SAS reporting limits but above the laboratory's detection limits. The concentrations should be qualified as estimated, "J".

07CE18-87
Chloromethane

07CE18-88
Trichloroethene

11. SYSTEM PERFORMANCE

GC/MS baseline indicated acceptable performance.

12. ADDITIONAL INFORMATION

The final shipment of samples arrived at the Laboratory on February 1, 2007. The Laboratory Case Narrative was generated on February 20, 2007 and forwarded to EPA by Ch2mHill on February 27, 2007. If Ch2mHill received the package on or before February 22, 2007 then the package was completed within 21 calendar days of sample receipt.

Photocopies of the airbills were included with this package. The original sample tags, packing list and airbills should have been sent to CH2M HILL.

Reviewed by: Allison C Harvey / TechLaw-ESAT
Date: April 13, 2007

Copies of the most recent MDL studies were not included with this data package but MDL (LOD – Level of Detection) values are present on the Laboratory Form Is.

The laboratory did not report detections that were below their reporting limits (RL) and their reporting limit is equal to their method detection limit (LOD). Some analytes were quantitated but examination of the RICs demonstrated that the system integrated noise and not valid detections. Non-detects were highlighted with 'minus signs' on the raw data. A copy of the raw data for sample 07CE18-88, pgs 31 – 38, are included with the hard copy data as an example. The samples and analytes with 'false positives' are summarized in the following table.

07CE18-87
Bromomethane, Acetone, 2-Butanone

07CE18-88
Bromomethane, Chloromethane, Acetone, 2-Butanone

Summary of Sample Results (only SAS requested analytes):

SAS RLs	Analytes	**07CE18-87**	**07CE18-88**
	Dilution factors=	1.0	1.0
0.2	Chloromethane	0.079 J	0.050 U
0.2	Bromomethane	0.060 U	0.060 U
0.018	Vinyl chloride	0.018 U	0.018 U
0.2	Chloroethane	0.050 U	0.050 U
0.2	Methylene chloride	0.15 UJ	0.15 UJ
2.0	Acetone	1.3 U	1.3 U
0.4	Carbon disulfide	0.10 U	0.10 U
0.2	1,1-Dichloroethene	0.040 U	0.040 U
0.2	1,1-Dichloroethane	0.060 U	0.060 U
0.2	Chloroform	0.040 U	0.040 U
0.2	1,2-Dichloroethane	0.030 U	0.030 U
2.0	2-Butanone	0.50 U	0.50 U
1.0	1,1,1-Trichloroethane	0.040 U	0.040 U
0.2	Carbon tetrachloride	0.040 U	0.040 U
0.05	Bromodichloromethane	0.040 U	0.040 U
0.2	1,2-Dichloropropane	0.050 U	0.050 U
0.016	Cis-1,3-Dichloropropene	0.017 U	0.017 U
0.2	Trichloroethene	0.050 U	0.050 J
0.2	Dibromochloromethane	0.029 U	0.029 U
0.2	1,1,2-Trichloroethane	0.040 U	0.040 U
0.2	Benzene	0.040 U	0.040 U
0.015	Trans-1,3-Dichloropropene	0.019 U	0.019 U
0.2	Bromoform	0.040 U	0.040 U
2.0	4-Methyl-2-pentanone	0.40 U	0.40 U
2.0	2-Hexanone	0.80 U	0.80 U
0.2	Tetrachloroethene	0.050 U	0.050 U
0.018	1,1,2,2-Tetrachloroethane	0.018 U	0.018 U
1.0	Toluene	0.050 U	0.050 U
0.2	Chlorobenzene	0.060 U	0.060 U
0.05	Ethylbenzene	0.050 U	0.050 U
0.2	Styrene	0.050 UJ	0.050 U
0.2	M & p-Xylene	0.090 U	0.090 U
0.2	Cis-1,2-Dichloroethene	0.030 U	0.030 U
0.2	o-Xylene	0.050 U	0.050 U
0.2	Trans-1,2-Dichloroethene	0.060 U	0.060 U

Reviewed by: Allison C Harvey / TechLaw-ESAT
Date: April 13, 2007

Data Qualifier Sheet

For the purpose of defining the flagging nomenclature utilized in this document, the following code letters and associated definitions are provided:

VALUE – if the result is a value greater than or equal to the Contract Required Quantitation Limit (CRQL).

U	Indicates that the compound was analyzed for, but not detected. The sample quantitation limit corrected for dilution and percent moisture is reported.
J	Indicates an estimated value. This flag is used either when estimating a concentration for a tentatively identified compound or when the data indicates the presence of a compound but the result is less than the sample quantitation limit, but greater than zero. The flag is also used to indicate a reported result having an associated QC problem.
N	Indicates presumptive evidence of a compound. This flag is only used for a tentatively identified compound (TIC), where the identification is based on a mass spectral library search.
R	Indicates the data are unusable. (The compound may or may not be present.)
P	Indicates a pesticide/Aroclor target analyte when there is greater than 25% difference for the detect concentrations between the two GC columns. The lower of the two results is reported.
C	Indicates pesticide results that have been confirmed by GC/MS.
B	Indicates the analyte is detected in the associated method blank as well as the sample.
E	Indicates compounds whose concentrations exceeded the calibration range of the instrument.
D	Indicates an identified compound in an analysis has been diluted. This flag alert the data user to any difference between the concentrations rported in the two analyses.
A	Indicates TICs that are suspected to be aldol condensation products.
G	Indicates the TCLP Matrix Spike Recovery was greater than the upper limit of the analytical method.
L	Indicates the TCLP Matrix Spike Recovery was less than the lower limit of the analytical method.
T	Indicates the analyte is found in the associated TCLP extraction blank as well as in the sample.

X, Y, Z are reserved for laboratory defined flags.

Regional Transmittal Form

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION V

DATE: 4/20/07

SUBJECT: Review of Data
Received for review on 2/8/07

FROM: Stephen L. Ostrodka, Chief (SRT-4J)
Superfund Field Services Section

TO: Data User: CH2M Hill

We have reviewed the data for the following case:

SITE NAME: Oconomowoc Electroplating (WI)

CASE NUMBER: 07CE18 **SDG NUMBER:** 58355-INO

Number and Type of Samples: 27 water samples

Sample Numbers: 07CE18-01, -03, -06, -08, -10, -12, -14, -16, -21, -23, -25, -27, -29, -39, -41, -44, -46, -51, -53, -55, -59, -61, -63, -65, -67, -77, -85

Laboratory: CT Laboratories **Hrs. for Review:**

Following are our findings:

CC: Howard Pham
Region 5 TOPO
Mail Code: SRT-4J

Narrative

The laboratory's portion of this case contains 27 water samples (see attached table) which were collected between January 15 and 19, 2007. They were analyzed for alkalinity, total organic carbon (TOC), sulfide, ammonia, nitrate, sulfate, chloride, and ortho-phosphate. Not all analytes were analyzed for all samples. Some of the coolers had temperatures outside the acceptance criteria of 4°C ± 2 °C. Affected samples were 07CE18-06, -08, -14, -16, -21, -23, -25, and -39. No results are qualified for this discrepancy. All sample results are reported to the MDL. The samples were analyzed using SW846 9056 (anions), 9060 (total organic carbon), EPA 310.2 (alkalinity), 350.1 (ammonia), and 376.1 (sulfide) analysis procedures.

Evidential Audit: All reporting forms provided are CLP-like documents. All documents provided are copies. No location is noted for the originals. No DC-1 or DC-2 forms or sample tags were provided.

No MDL summaries were provided. It is unknown when MDLs were performed. MDL (LOD) values recorded on the results Form 1 were used for evaluation of the data. MDL and RL values on Form 1s are equal.

Errors were found on reporting forms by this reviewer. They were corrected. No sample date or time was provided for 07CE18-55.

Alkalinity: The laboratory reporting limit is 7.0 mg/L. The SAS requires the RL to be 5.0 mg/L. The SAS requires that the lowest calibration point be run at 5.0 mg/L. The lowest point performed was 25 mg/L. All sample results were above 25 mg/L except 07CE18-06 and -07, which are non-detects. These results are estimated "UJ" due to the laboratories inability to meet the SAS required RL. All other alkalinity results are acceptable.

Ammonia: No defects were found. All ammonia results are acceptable

Chloride: No defects were found. All chloride results are acceptable.

Nitrate: Samples 07CE18-78 and -85 were analyzed past the 48 hour method holding time. The results are estimated "J" for failing to meet the holding time criteria. All other nitrate results are acceptable.

Sulfate: No defects were found. All sulfate results are acceptable.

Ortho-phosphate: No defects were found. All ortho-phosphate results are acceptable.

Sulfide: The SAS requires a low standard be run to confirm the reporting limit. This was not performed. All results are estimated "J" for detects and "UJ" for non-detects for failing to verify the reporting limit.

Reviewed by: Paul Little
Date: 4/30/2007

TOC: The SAS requires a low standard be run to confirm the reporting limit. This was not performed. All results below the lowest calibration standard of 10 mg/L (all results except 07CE18-44 and -46) are estimated "J" for detects and "UJ" for non-detects. TOC results for 07CE18-44 and -46 are greater than 10 mg/L and are acceptable.

Other comments: Samples 07CE18-23/-25, -44/-46 and -45/-47 were identified as field duplicates. Duplicates were evaluated according to the same criteria as laboratory duplicates. All showed good correlation. Sample 07CE18-06 was identified as an equipment blank. Sample 07CE18-08 was identified as a field blanks. No contamination was found in any of the field blanks.

Lab ID	Sample ID	Sample Point	Sample Date	Sample Time
449938	07CE18-01	OEP-MW-103D	1/15/2007	17:25
449940	07CE18-03	OEP-MW-103S	1/15/2007	17:30
450206	07CE18-06	OEP-EB-01	1/16/2007	13:30
450208	07CE18-08	OEP-FB-01	1/16/2007	13:00
450184	07CE18-10	OEP-MW-4S	1/16/2007	10:30
450186	07CE18-12	OEP-MW-4D	1/16/2007	12:27
450201	07CE18-14	OEP-MW-1S	1/16/2007	10:55
450203	07CE18-16	OEP-MW-1D	1/16/2007	12:15
450194	07CE18-21	OEP-MW-15B	1/16/2007	15:30
450196	07CE18-23	OEP-MW-15S	1/16/2007	16:50
450198	07CE18-25	OEP-MW-15SFR	1/16/2007	16:50
450189	07CE18-27	OEP-MW-3D	1/16/2007	17:35
450191	07CE18-29	OEP-MW-5D	1/16/2007	15:40
450394	07CE18-39	OEP-MW-15D	1/17/2007	10:20
450389	07CE18-41	OEP-MW-102D	1/17/2007	12:20
450379	07CE18-44	OEP-SW-03	1/17/2007	13:00
450381	07CE18-46	OEP-SW-03FR	1/17/2007	13:00
450384	07CE18-51	OEP-MW-13S	1/17/2007	15:20
450386	07CE18-53	OEP-MW-13SFR	1/17/2007	15:20
450391	07CE18-55	OEP-MW-13D	??	??
450630	07CE18-59	OEP-MW-105B	1/18/2007	10:20
450632	07CE18-61	OEP-MW-105D	1/18/2007	9:50
450634	07CE18-63	OEP-MW-105S	1/18/2007	10:45
450625	07CE18-65	OEP-MW12D	1/18/2007	11:45
450627	07CE18-67	OEP-MW-12S	1/18/2007	11:45
450858	07CE18-77	OEP-MW-12B	1/19/2007	12:00
450862	07CE18-85	OEP-MW-16S	1/19/2007	16:10

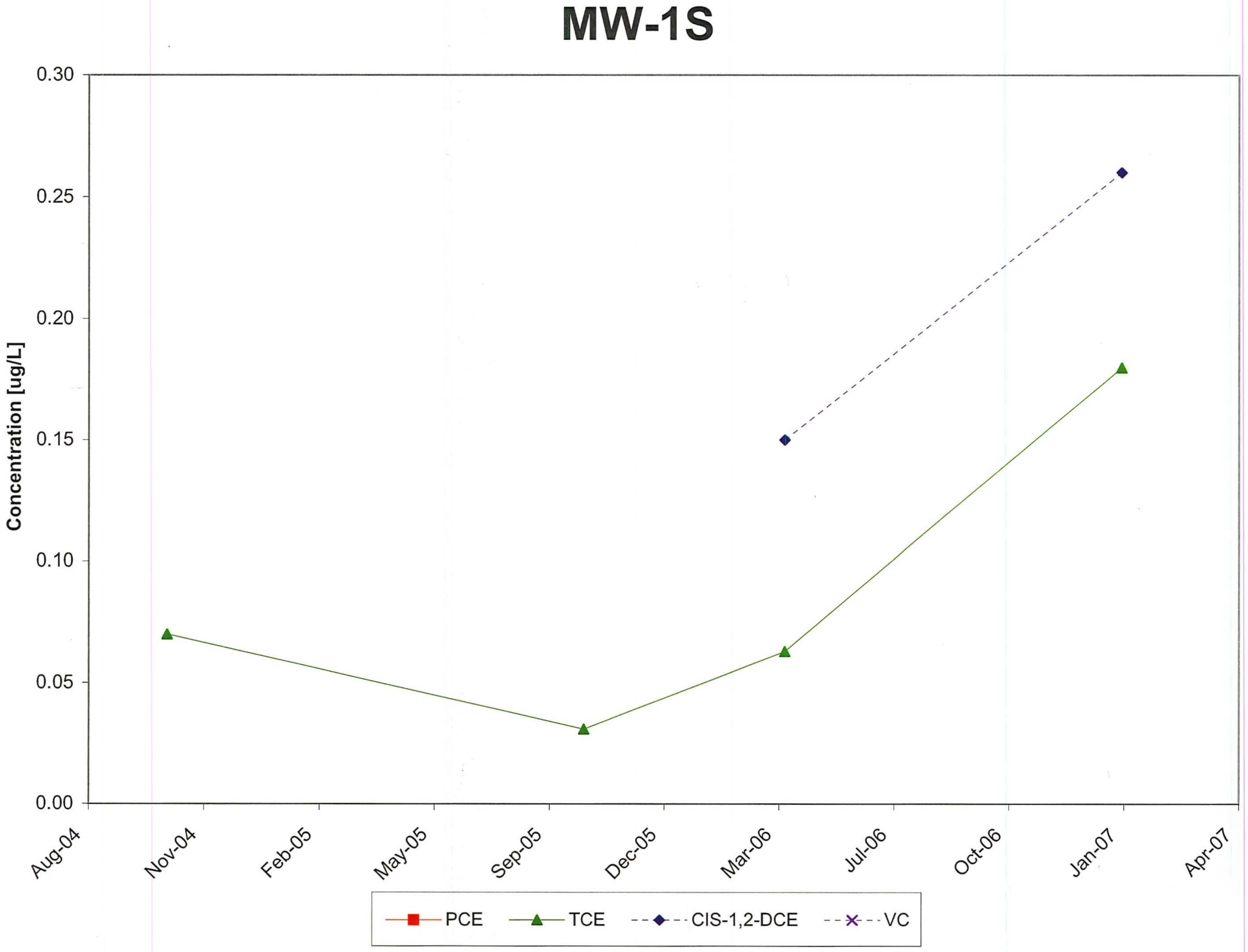
Reviewed by: Paul Little
Date: 4/30/2007

ILM05.3 Data Qualifier Sheet

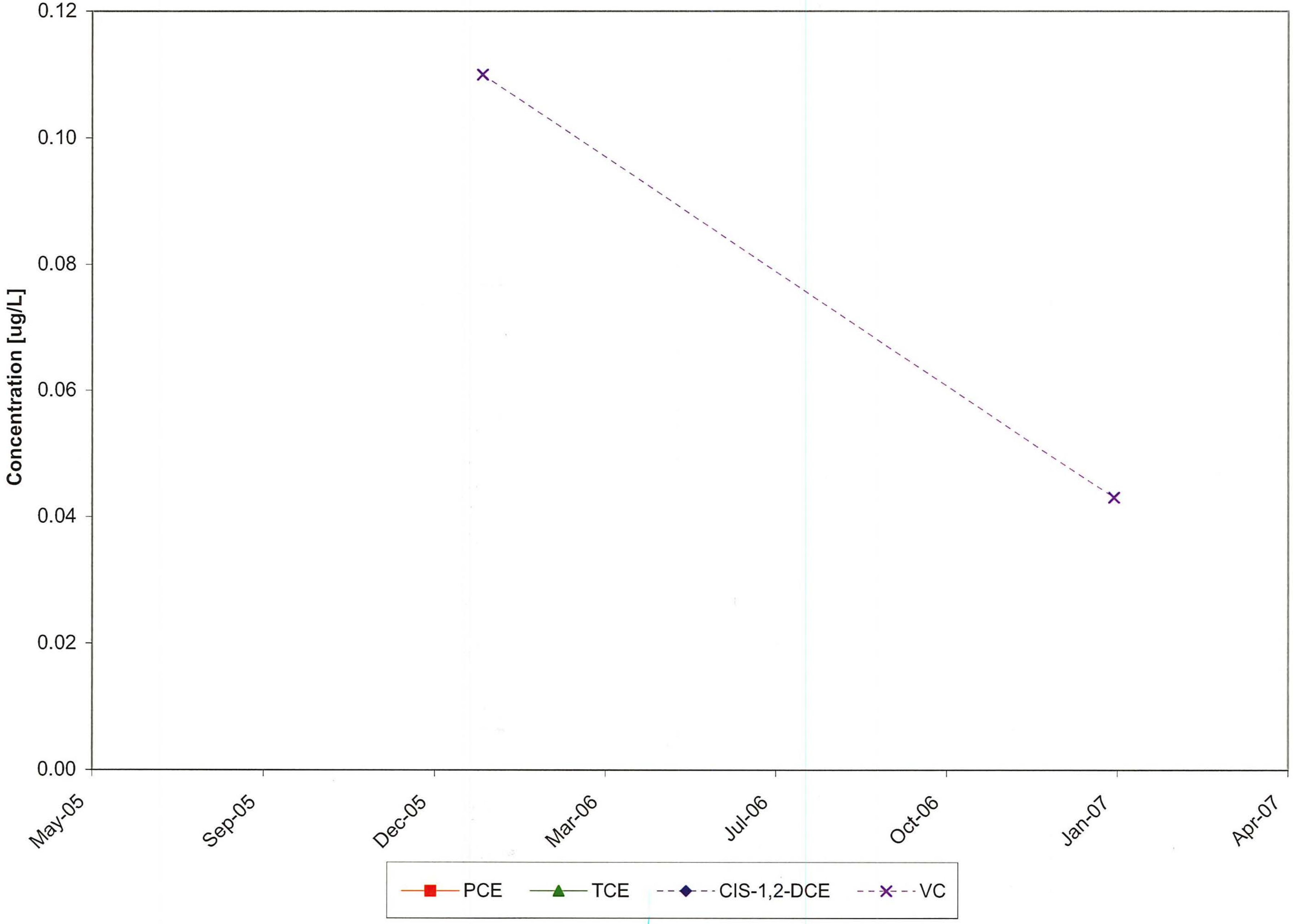
Qualifiers	Data Qualifier Definitions
U	The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
J	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
J+	The result is an estimated quantity, but the result may be biased high.
J-	The result is an estimated quantity, but the result may be biased low.
R	The data are unusable. The sample results are rejected due to serious deficiencies in meeting Quality Control (QC) criteria. The analyte may or may not be present in the sample.
UJ	The analyte was analyzed for, but not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

Reviewed by: Paul Little
Date: 4/30/2007

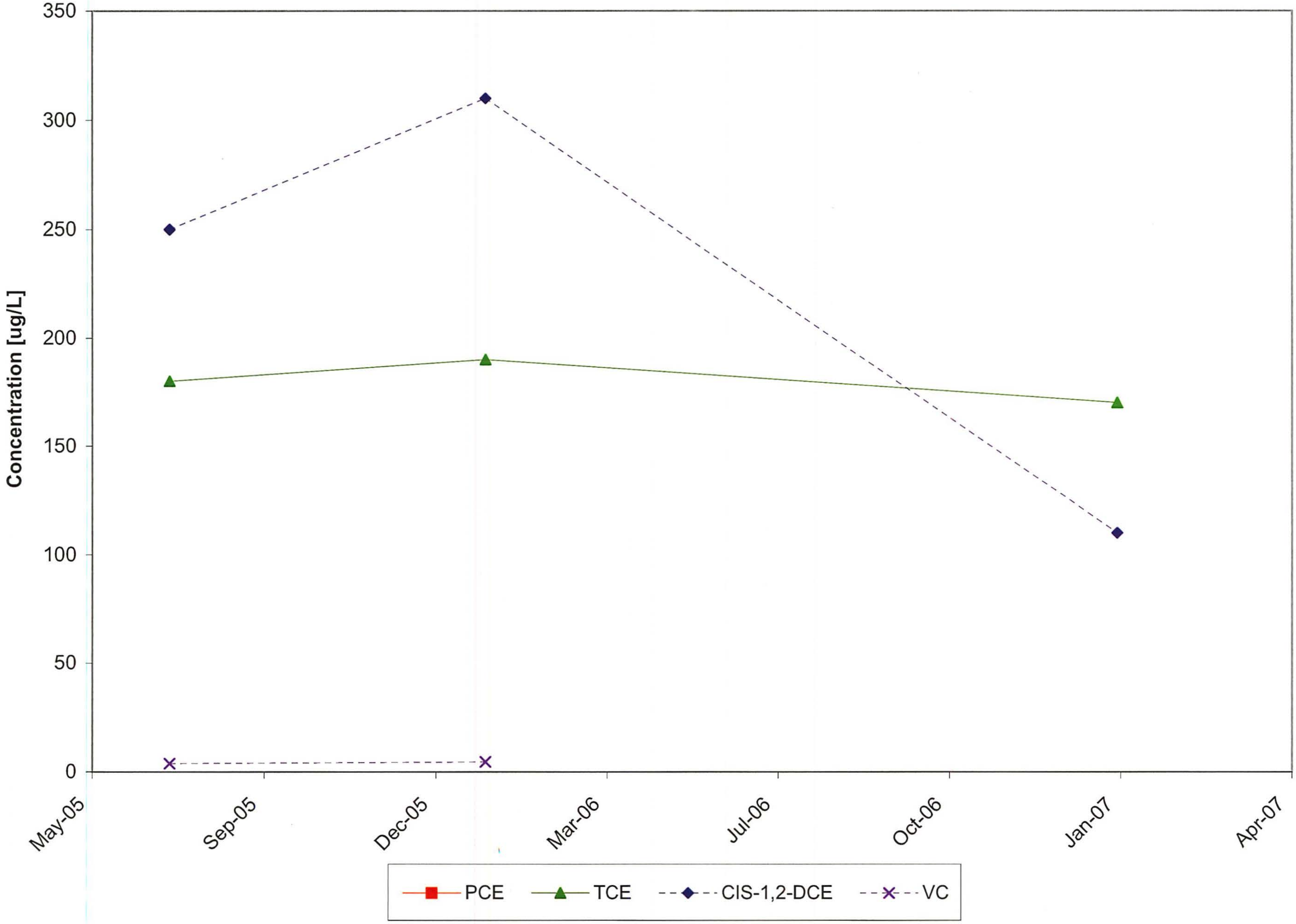
Appendix B
VOC Concentration Trend Graphs

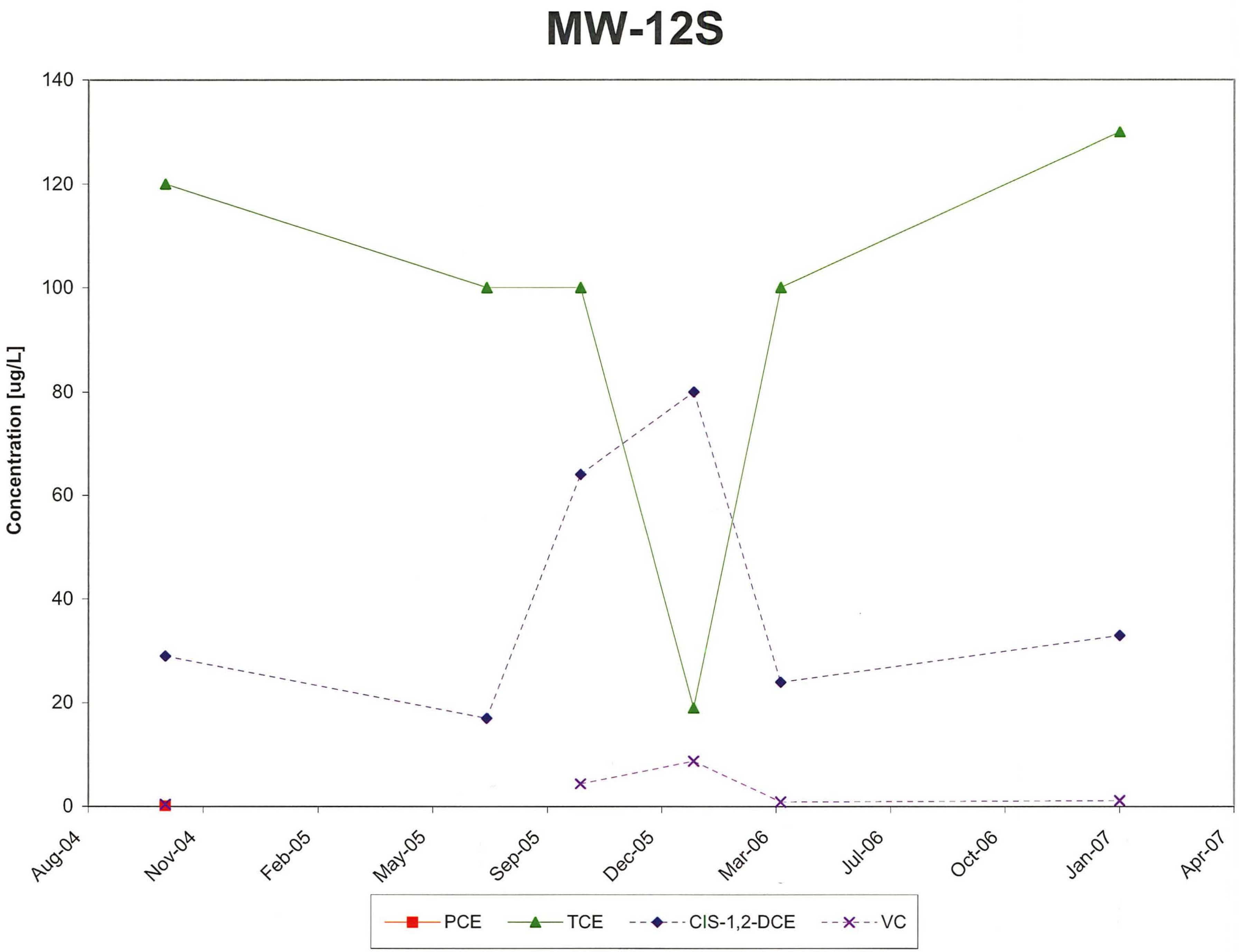

MW-1S
Concentration [ug/L]
0.30
0.25
0.20
0.15
0.10
0.05
0.00
Aug-04
Nov-04
Feb-05
May-05
Sep-05
Dec-05
Mar-06
Jul-06
Oct-06
Jan-07
Apr-07
PCE
TCE
CIS-1,2-DCE
VC

MW-4D

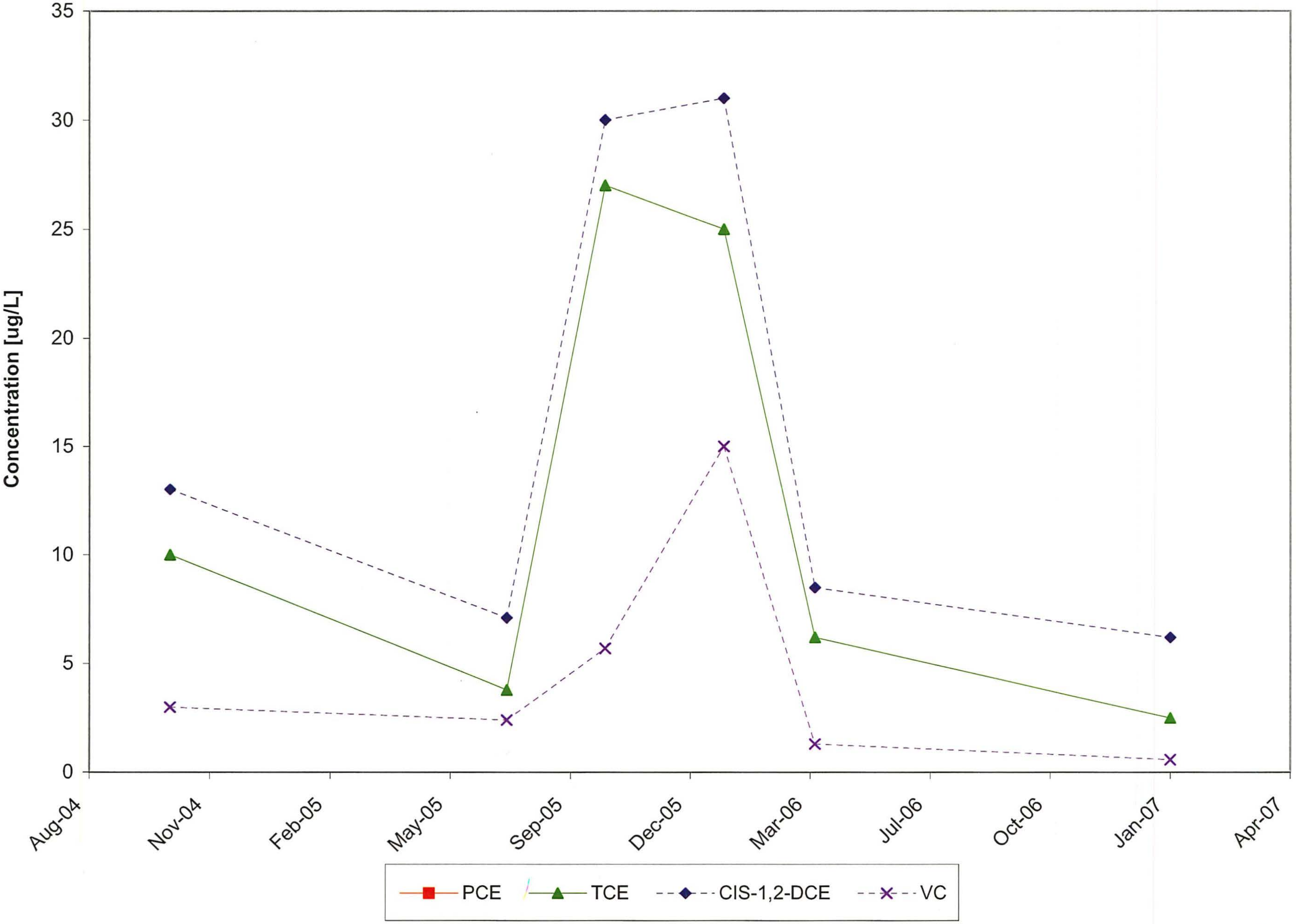

0.12
0.10
0.08
0.06
0.04
0.02
0.00
Concentration [ug/L]
May-05
Sep-05
Dec-05
Mar-06
Jul-06
Oct-06
Jan-07
Apr-07
PCE
TCE
CIS-1,2-DCE
VC

MW-5D

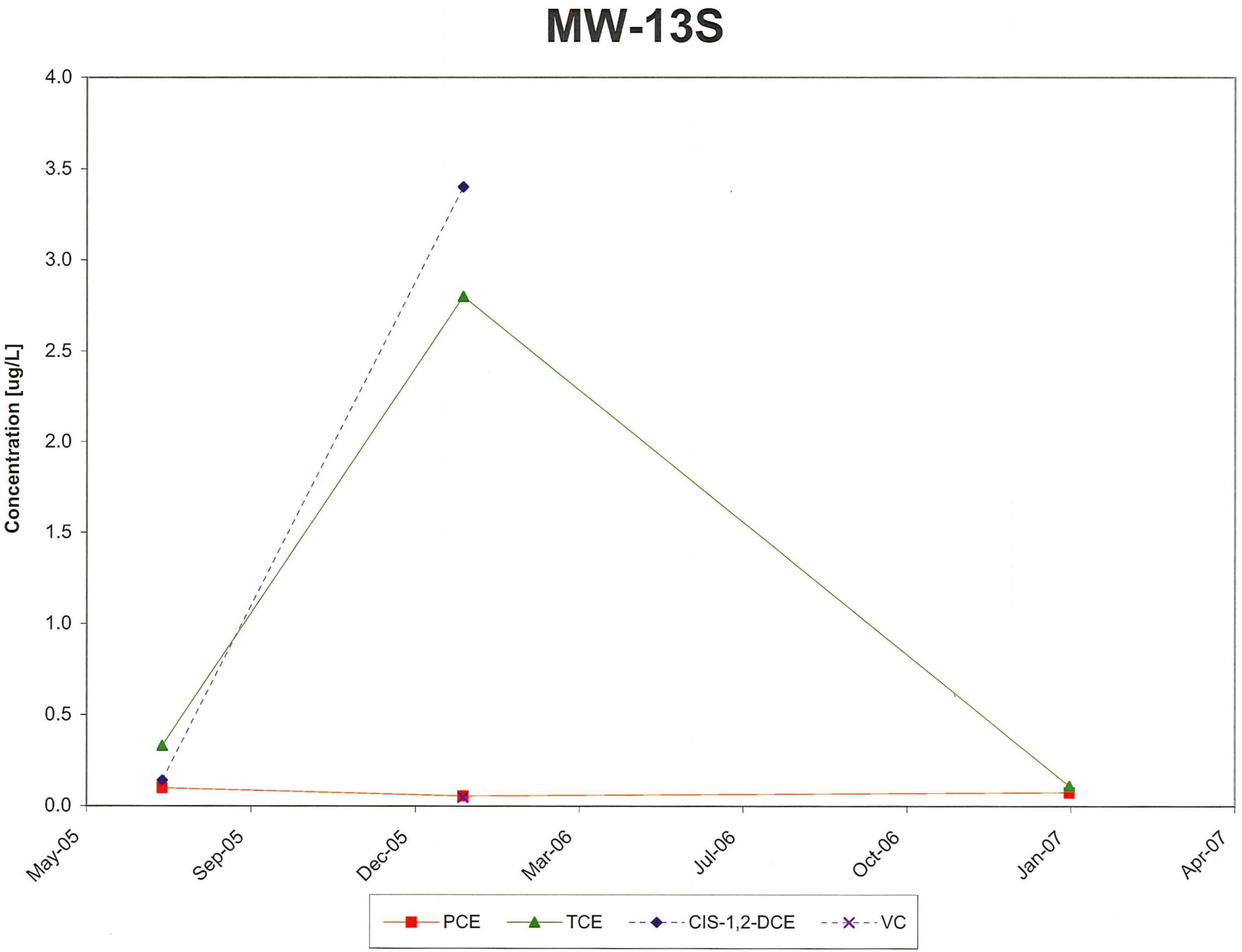

350
300
250
200
150
100
50
0
Concentration [ug/L]
May-05
Sep-05
Dec-05
Mar-06
Jul-06
Oct-06
Jan-07
Apr-07
PCE
TCE
CIS-1,2-DCE
VC


MW-12S
Concentration [ug/L]
140
120
100
80
60
40
20
0
Aug-04
Nov-04
Feb-05
May-05
Sep-05
Dec-05
Mar-06
Jul-06
Oct-06
Jan-07
Apr-07
PCE
TCE
CIS-1,2-DCE
VC

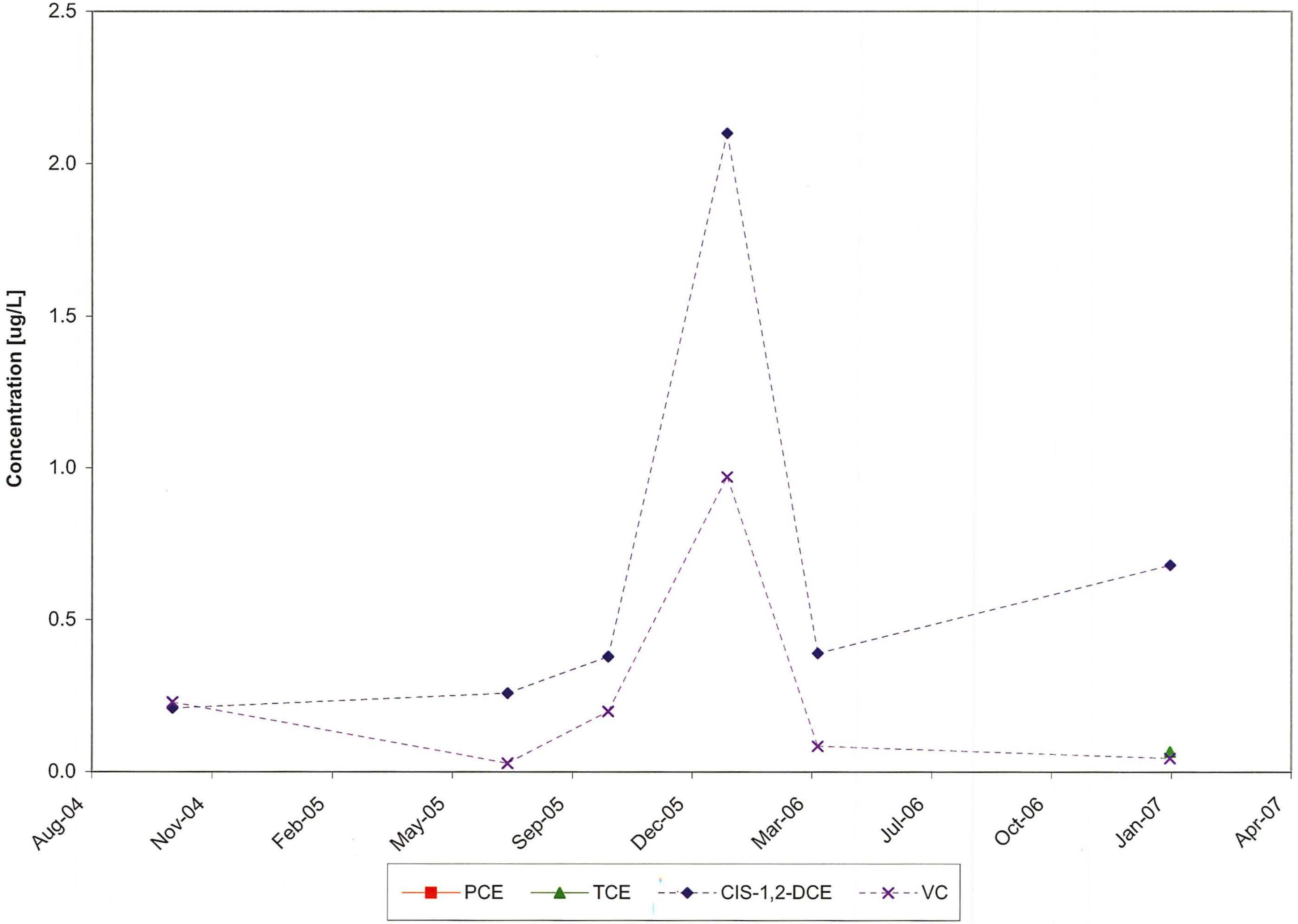
MW-12D



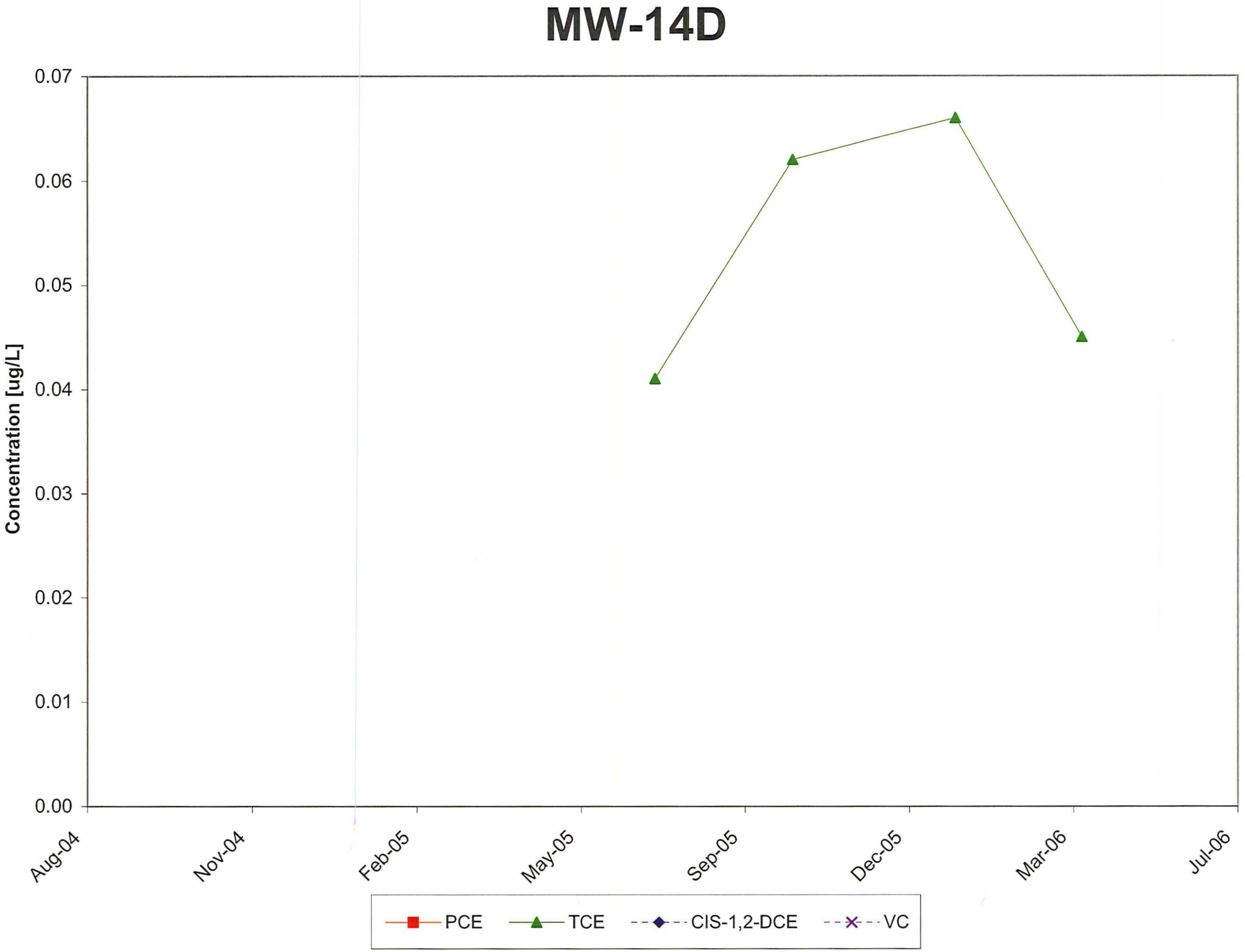
35
30
25
20
15
10
5
0
Concentration [ug/L]
Aug-04
Nov-04
Feb-05
May-05
Sep-05
Dec-05
Mar-06
Jul-06
Oct-06
Jan-07
Apr-07
PCE
TCE
CIS-1,2-DCE
VC

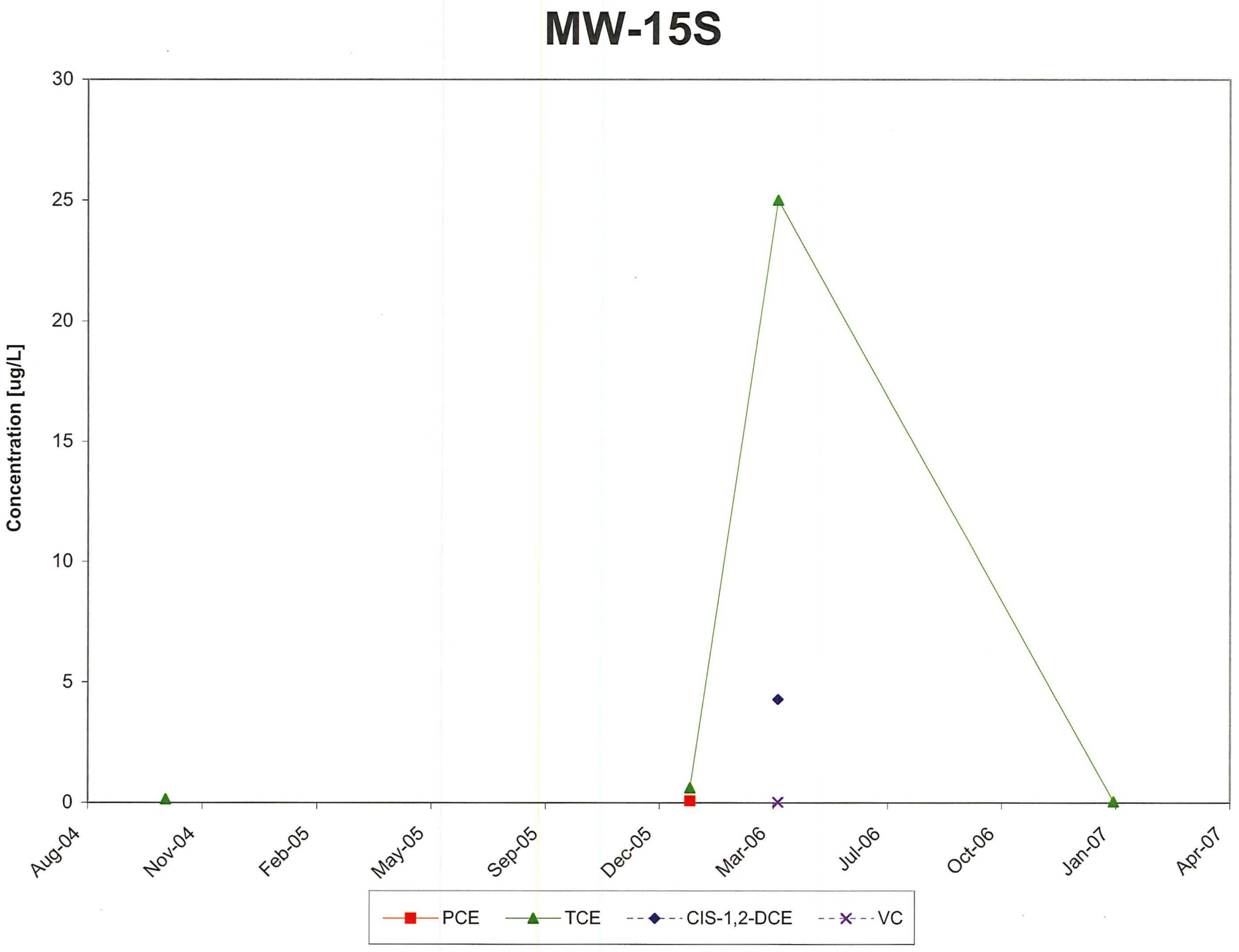

MW-13S
Concentration [ug/L]
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
May-05
Sep-05
Dec-05
Mar-06
Jul-06
Oct-06
Jan-07
Apr-07
PCE
TCE
CIS-1,2-DCE
VC

MW-13D

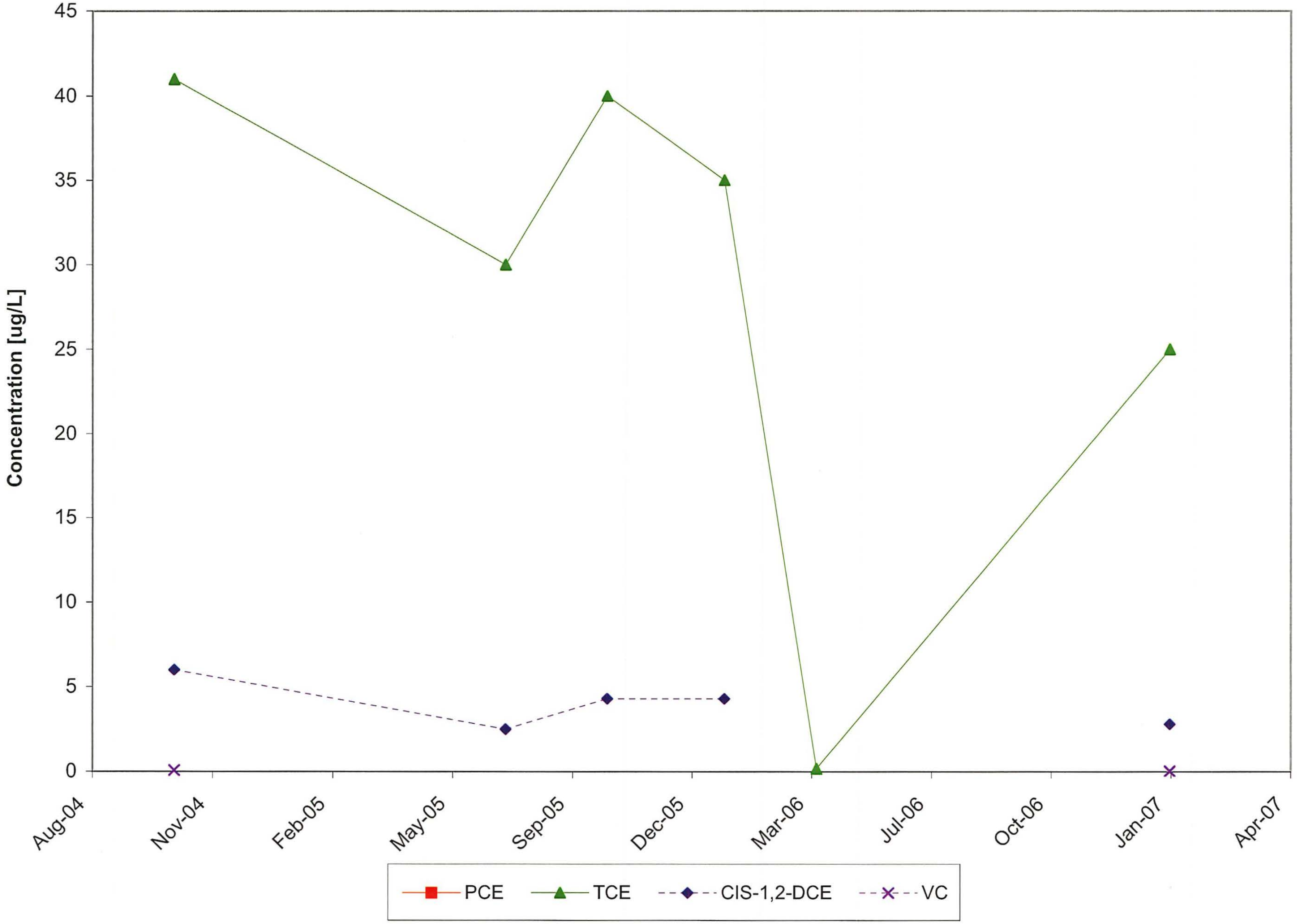


Concentration [ug/L]
0.0
0.5
1.0
1.5
2.0
2.5
Aug-04
Nov-04
Feb-05
May-05
Sep-05
Dec-05
Mar-06
Jul-06
Oct-06
Jan-07
Apr-07
PCE
TCE
CIS-1,2-DCE
VC


MW-14D
Concentration [ug/L]
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
Aug-04
Nov-04
Feb-05
May-05
Sep-05
Dec-05
Mar-06
Jul-06
PCE
TCE
CIS-1,2-DCE
VC

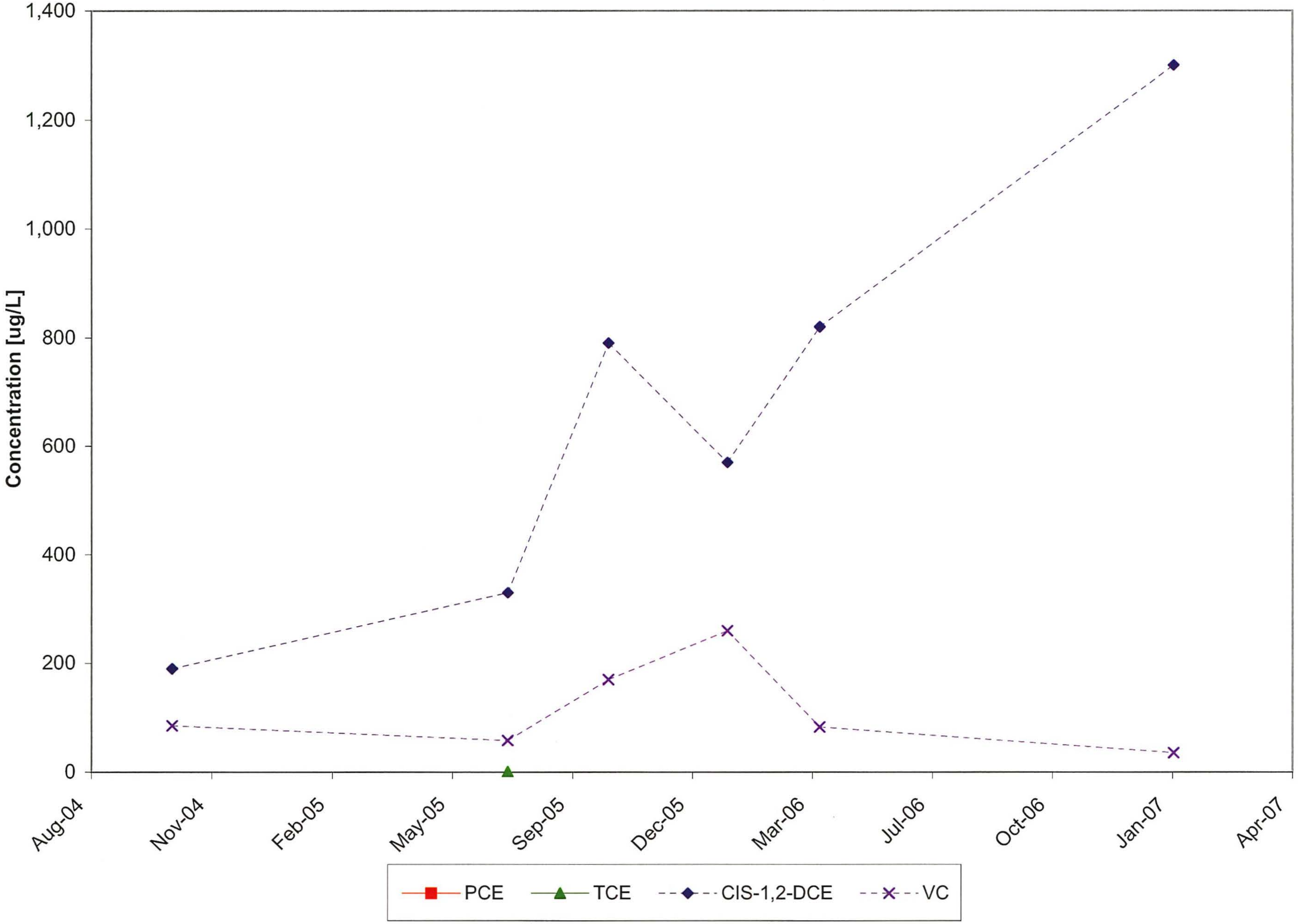

MW-15S
Concentration [ug/L]
30
25
20
15
10
5
0
Aug-04
Nov-04
Feb-05
May-05
Sep-05
Dec-05
Mar-06
Jul-06
Oct-06
Jan-07
Apr-07
PCE
TCE
CIS-1,2-DCE
VC

MW-15D

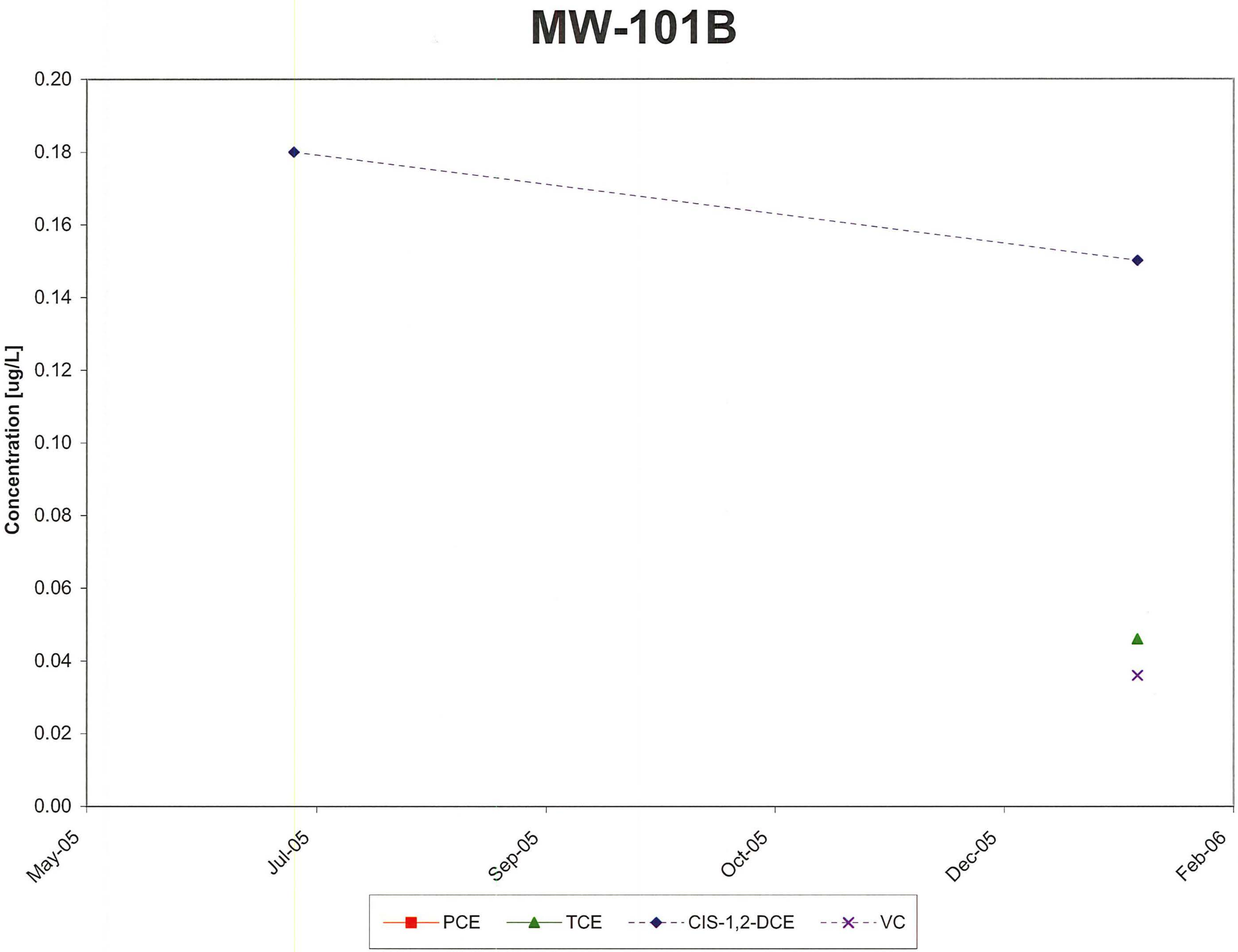


Concentration [ug/L]
45
40
35
30
25
20
15
10
5
0
Aug-04
Nov-04
Feb-05
May-05
Sep-05
Dec-05
Mar-06
Jul-06
Oct-06
Jan-07
Apr-07
PCE
TCE
CIS-1,2-DCE
VC

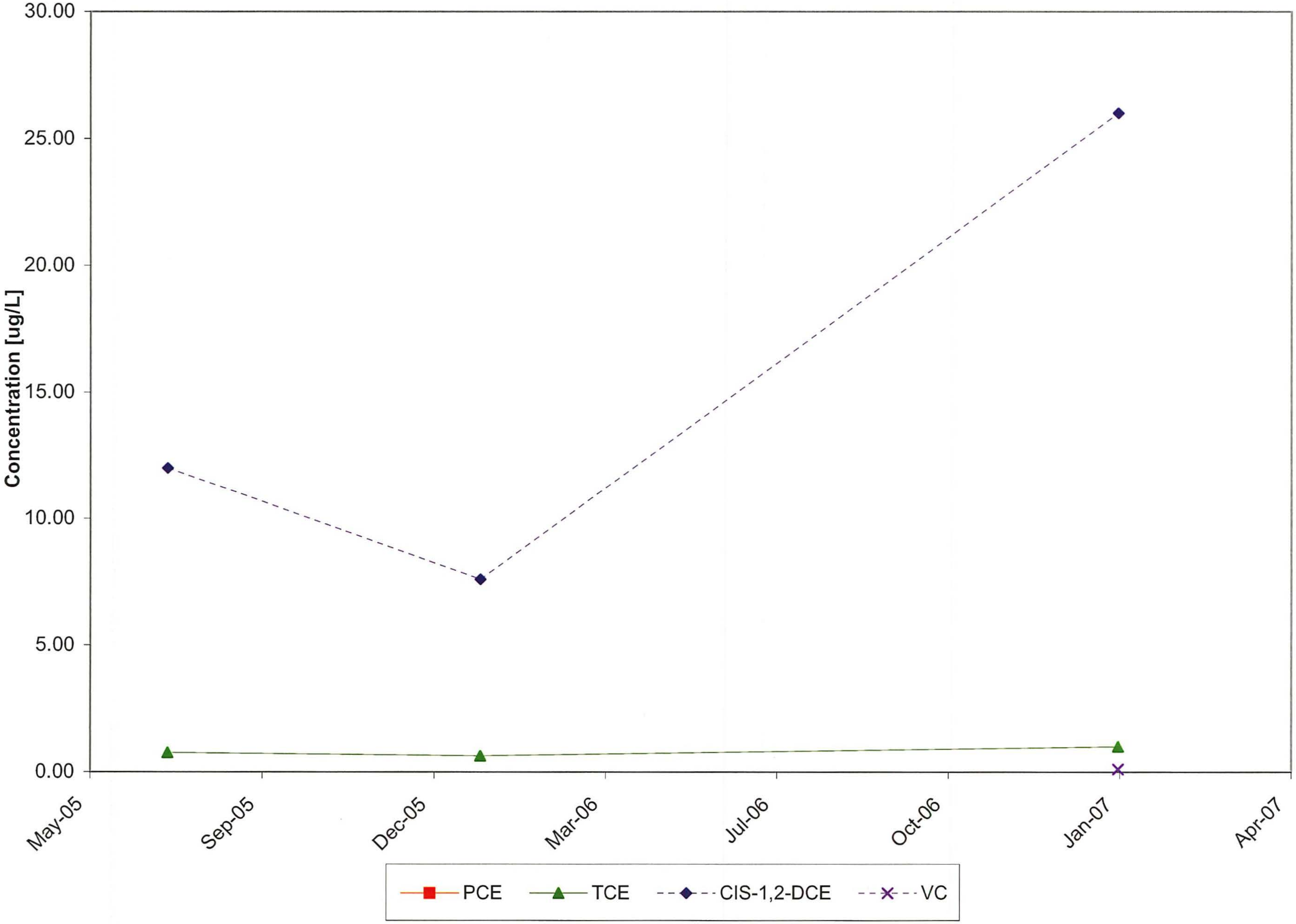
MW-16S



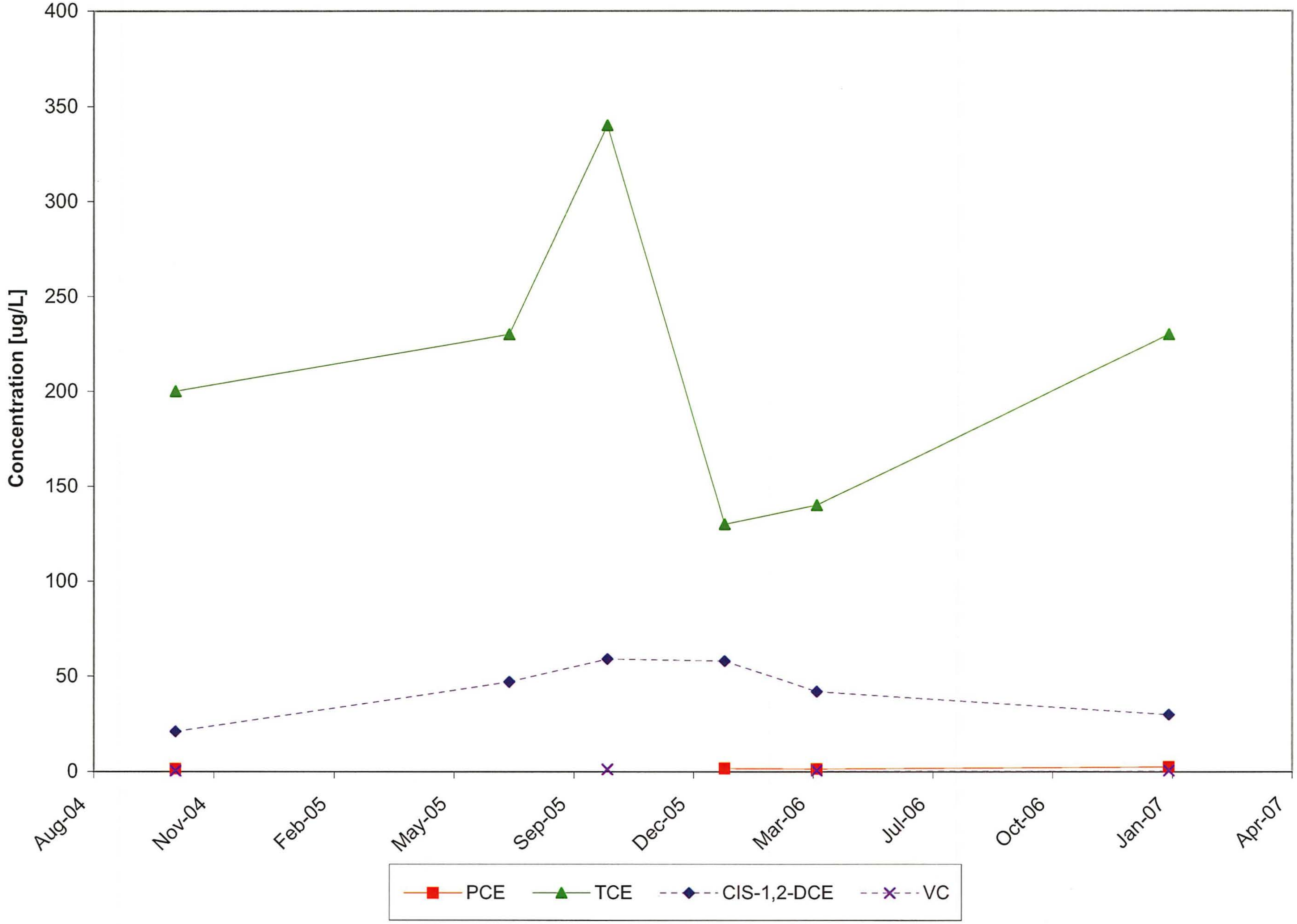
Concentration [ug/L]
1,400
1,200
1,000
800
600
400
200
0
Aug-04
Nov-04
Feb-05
May-05
Sep-05
Dec-05
Mar-06
Jul-06
Oct-06
Jan-07
Apr-07
PCE
TCE
CIS-1,2-DCE
VC

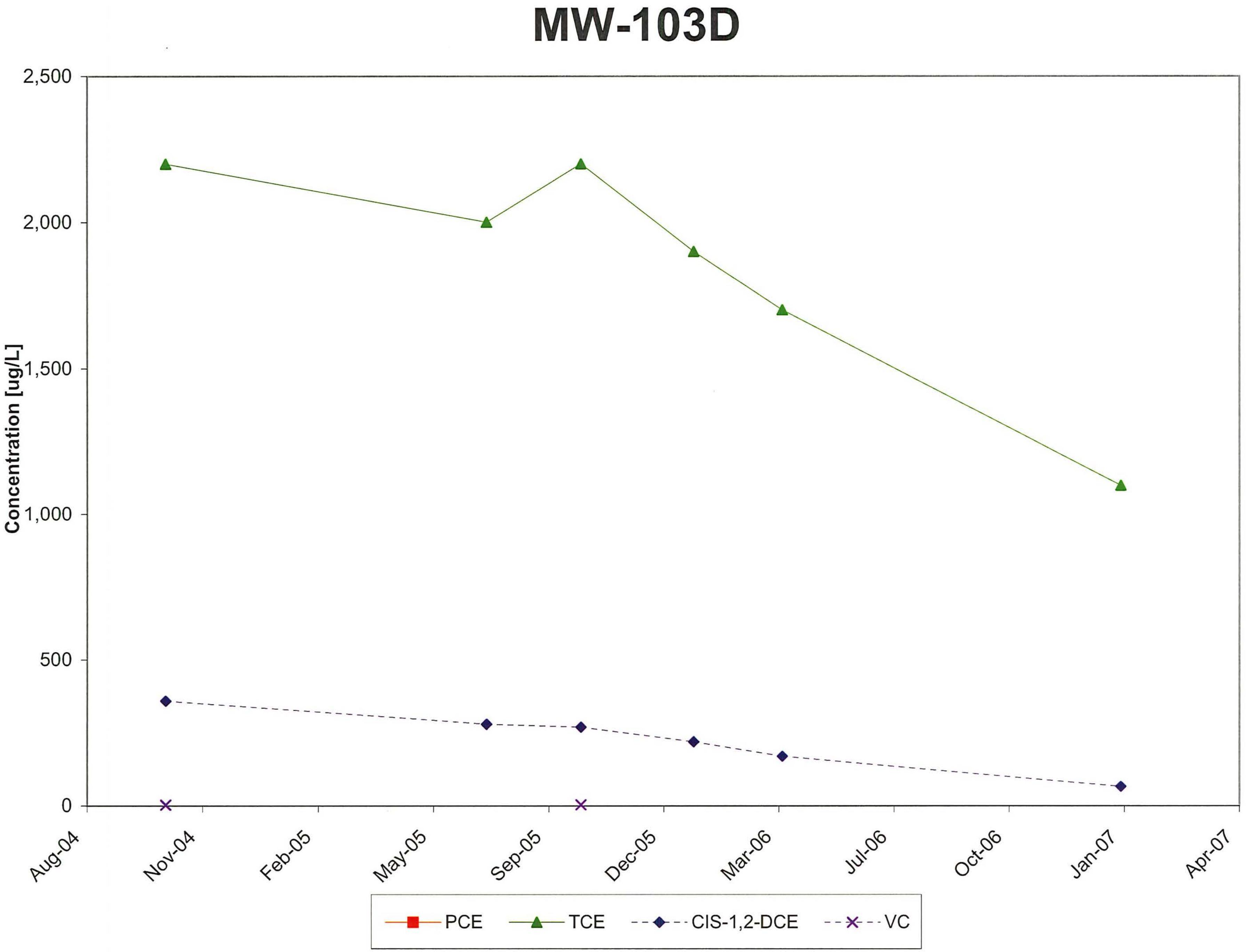

MW-101B
Concentration [ug/L]
0.20
0.18
0.16
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
May-05
Jul-05
Sep-05
Oct-05
Dec-05
Feb-06
PCE
TCE
CIS-1,2-DCE
VC

MW-102D

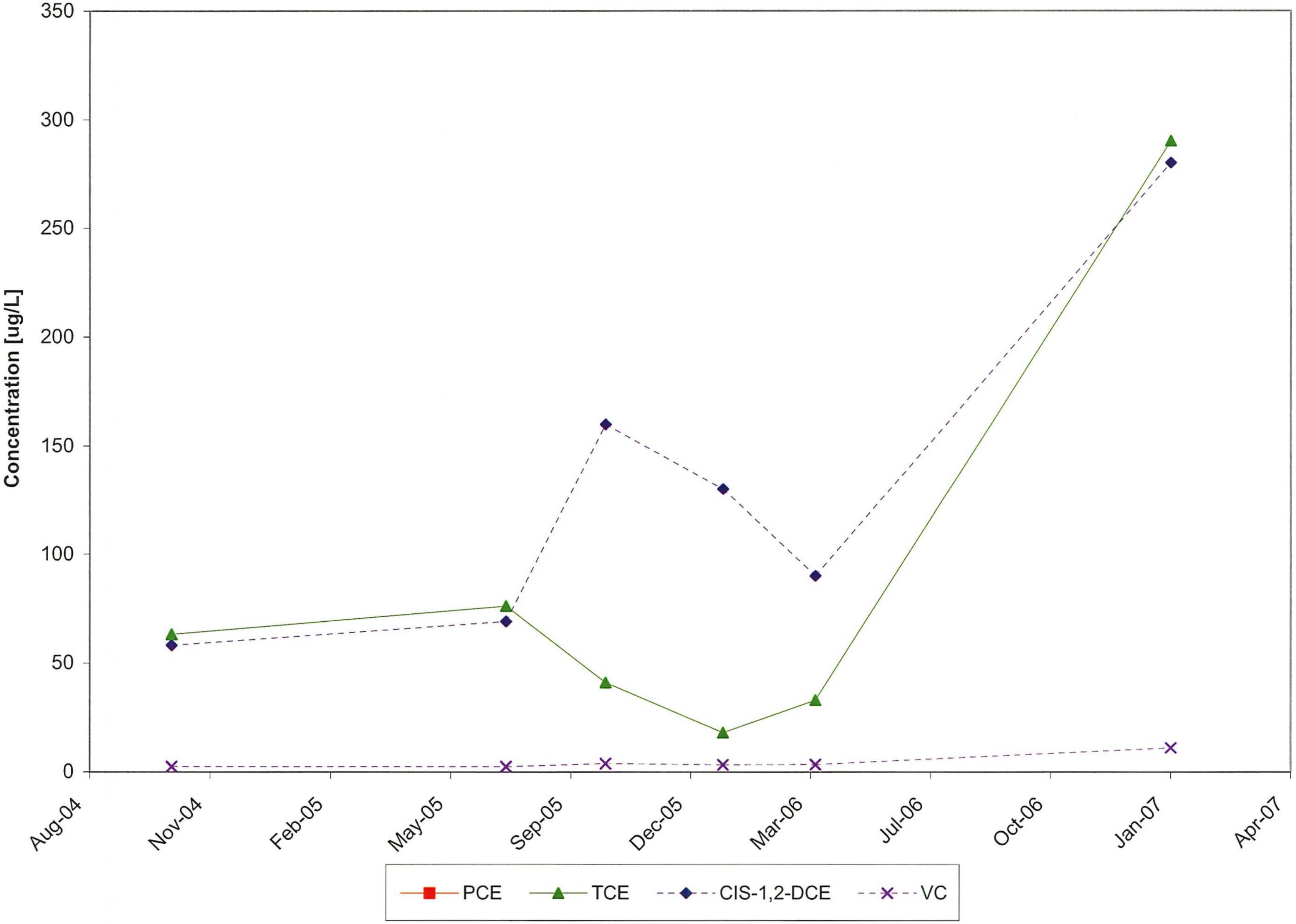

30.00
25.00
20.00
15.00
10.00
5.00
0.00
Concentration [ug/L]
May-05
Sep-05
Dec-05
Mar-06
Jul-06
Oct-06
Jan-07
Apr-07
PCE
TCE
CIS-1,2-DCE
VC

MW-103S


Concentration [ug/L]
400
350
300
250
200
150
100
50
0
Aug-04
Nov-04
Feb-05
May-05
Sep-05
Dec-05
Mar-06
Jul-06
Oct-06
Jan-07
Apr-07
PCE
TCE
CIS-1,2-DCE
VC

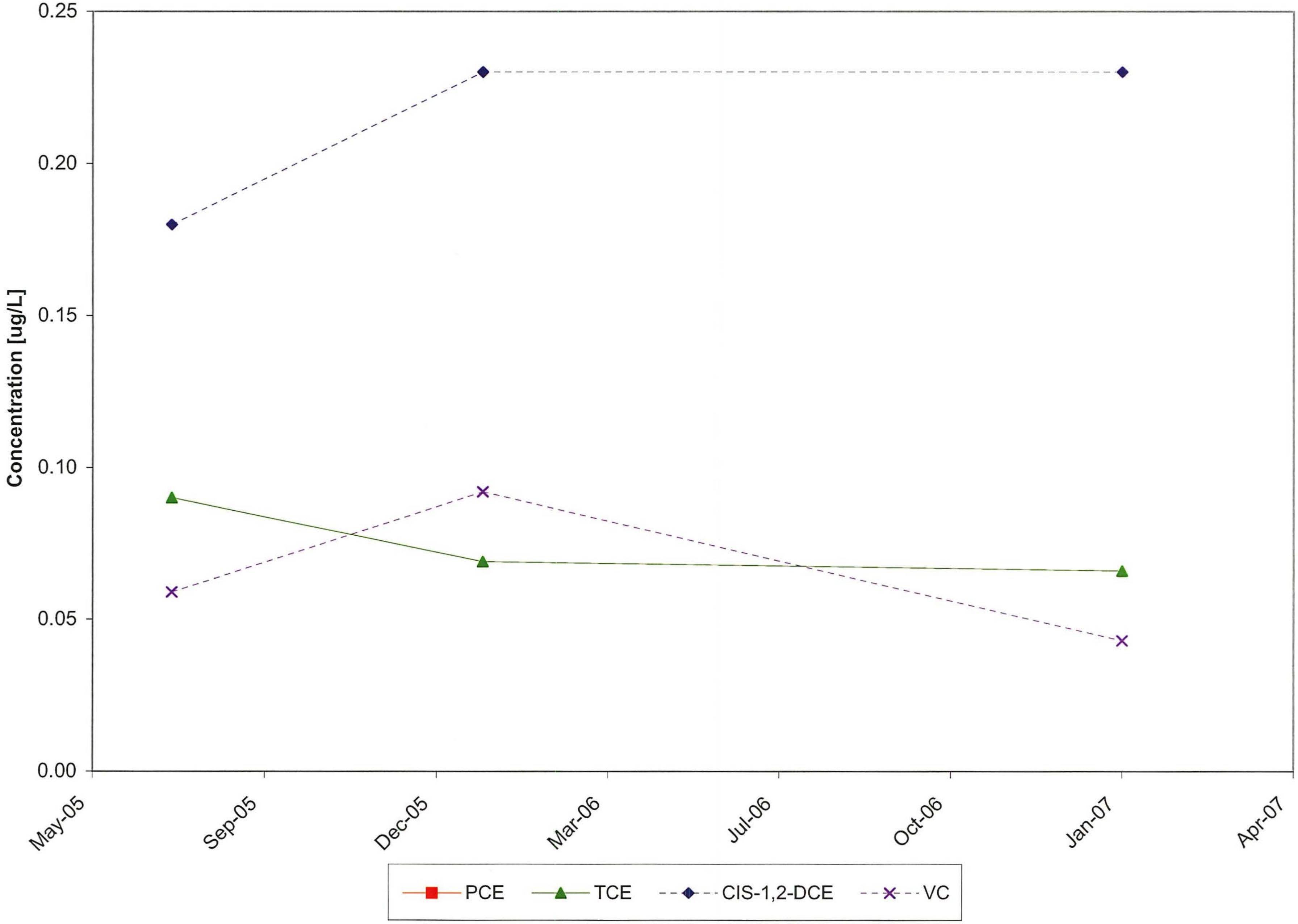

MW-103D
2,500
2,000
1,500
1,000
500
0
Concentration [ug/L]
Aug-04
Nov-04
Feb-05
May-05
Sep-05
Dec-05
Mar-06
Jul-06
Oct-06
Jan-07
Apr-07
PCE
TCE
CIS-1,2-DCE
VC

MW-105S

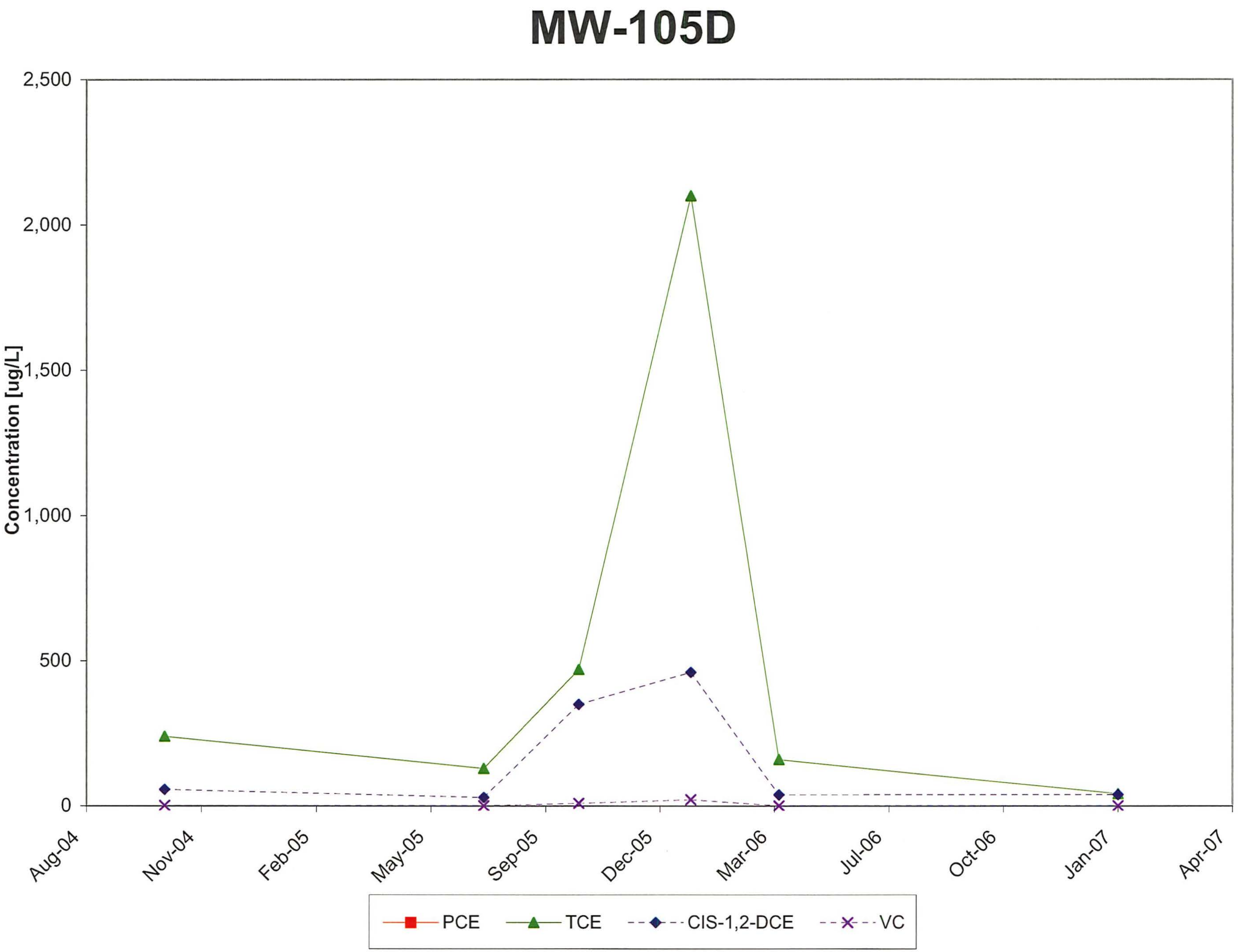


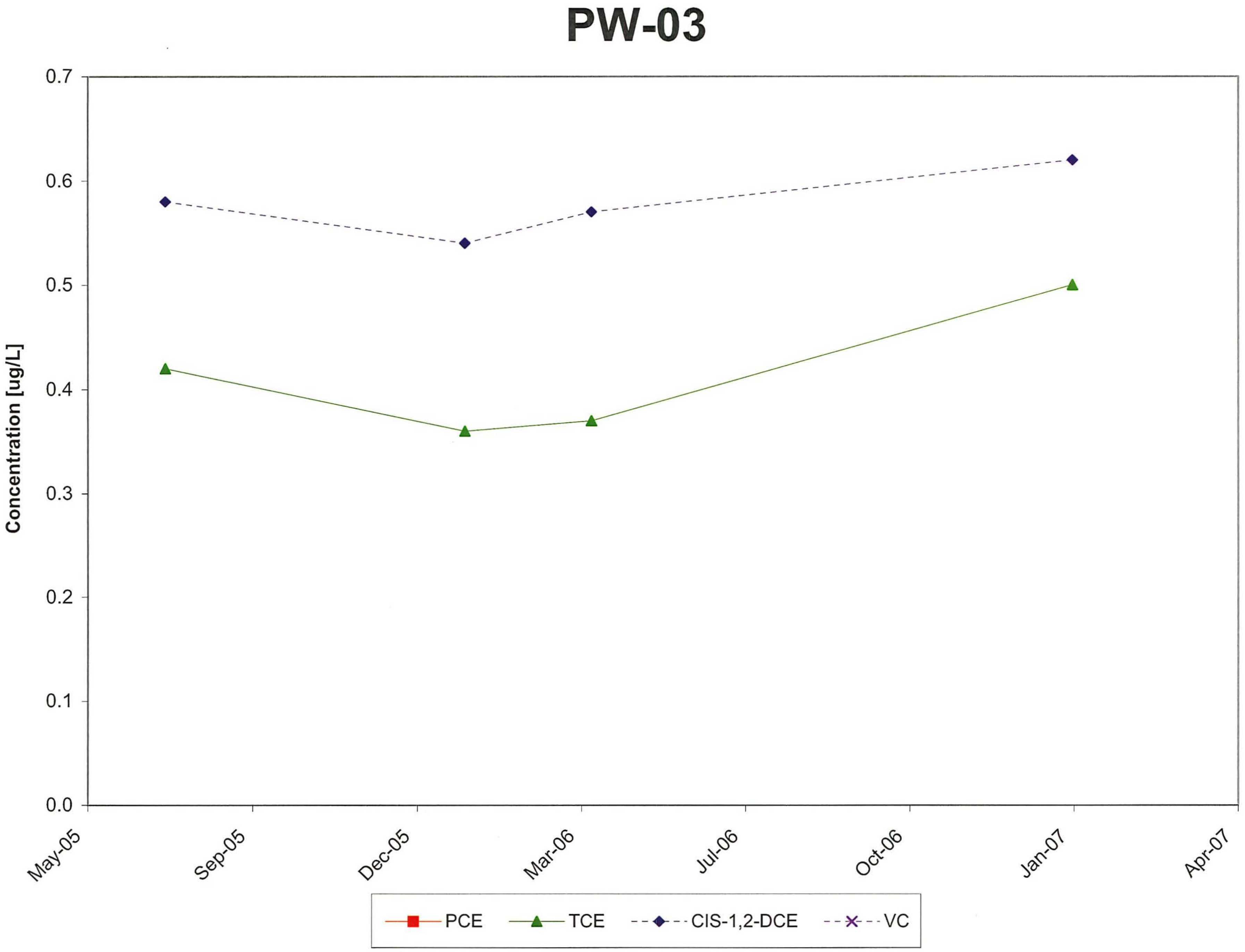
Concentration [ug/L]
350
300
250
200
150
100
50
0
Aug-04
Nov-04
Feb-05
May-05
Sep-05
Dec-05
Mar-06
Jul-06
Oct-06
Jan-07
Apr-07
PCE
TCE
CIS-1,2-DCE
VC

MW-105B

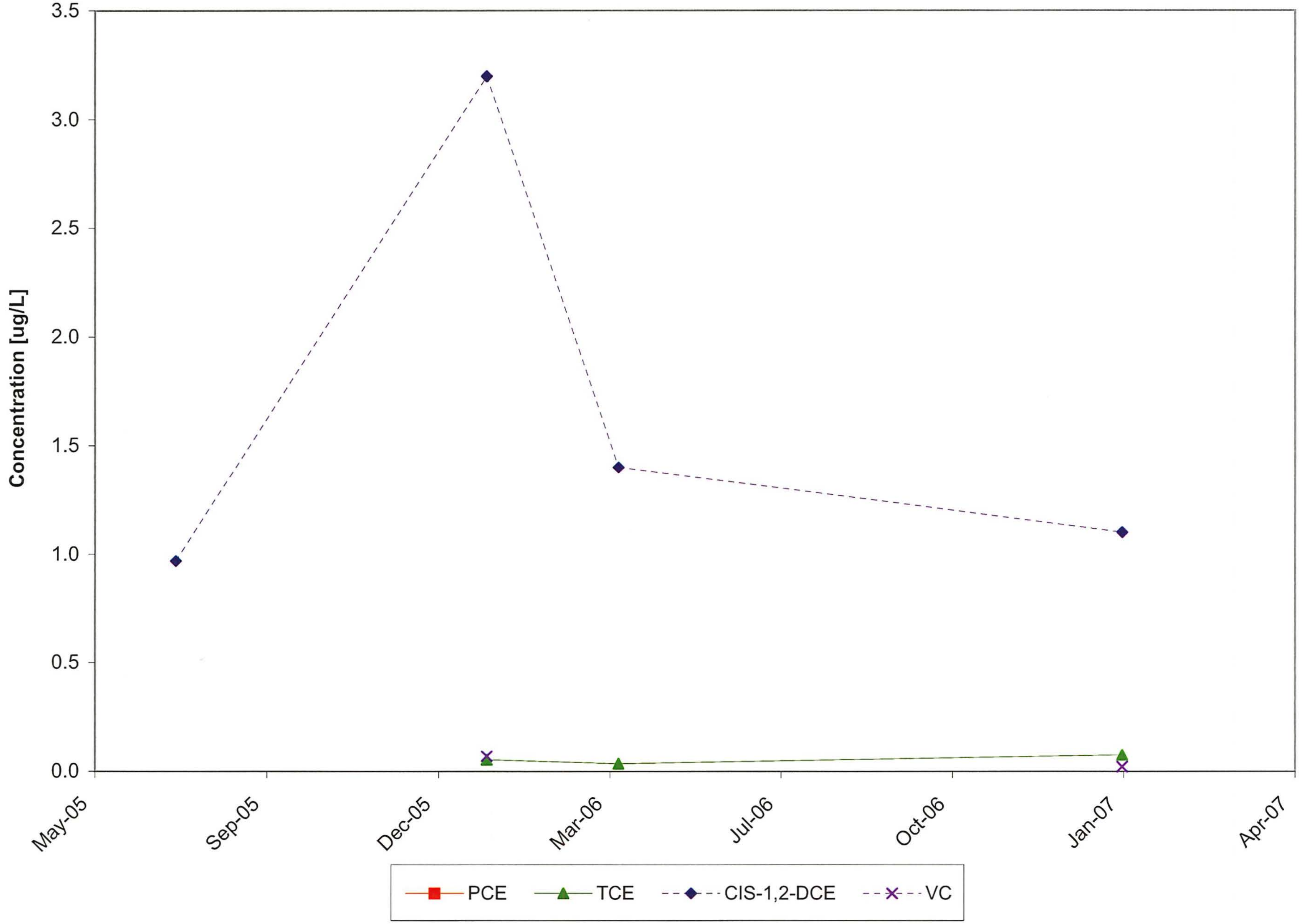


Concentration [ug/L]
0.25
0.20
0.15
0.10
0.05
0.00
May-05
Sep-05
Dec-05
Mar-06
Jul-06
Oct-06
Jan-07
Apr-07
PCE
TCE
CIS-1,2-DCE
VC


MW-105D
Concentration [ug/L]
2,500
2,000
1,500
1,000
500
0
Aug-04
Nov-04
Feb-05
May-05
Sep-05
Dec-05
Mar-06
Jul-06
Oct-06
Jan-07
Apr-07
PCE
TCE
CIS-1,2-DCE
VC

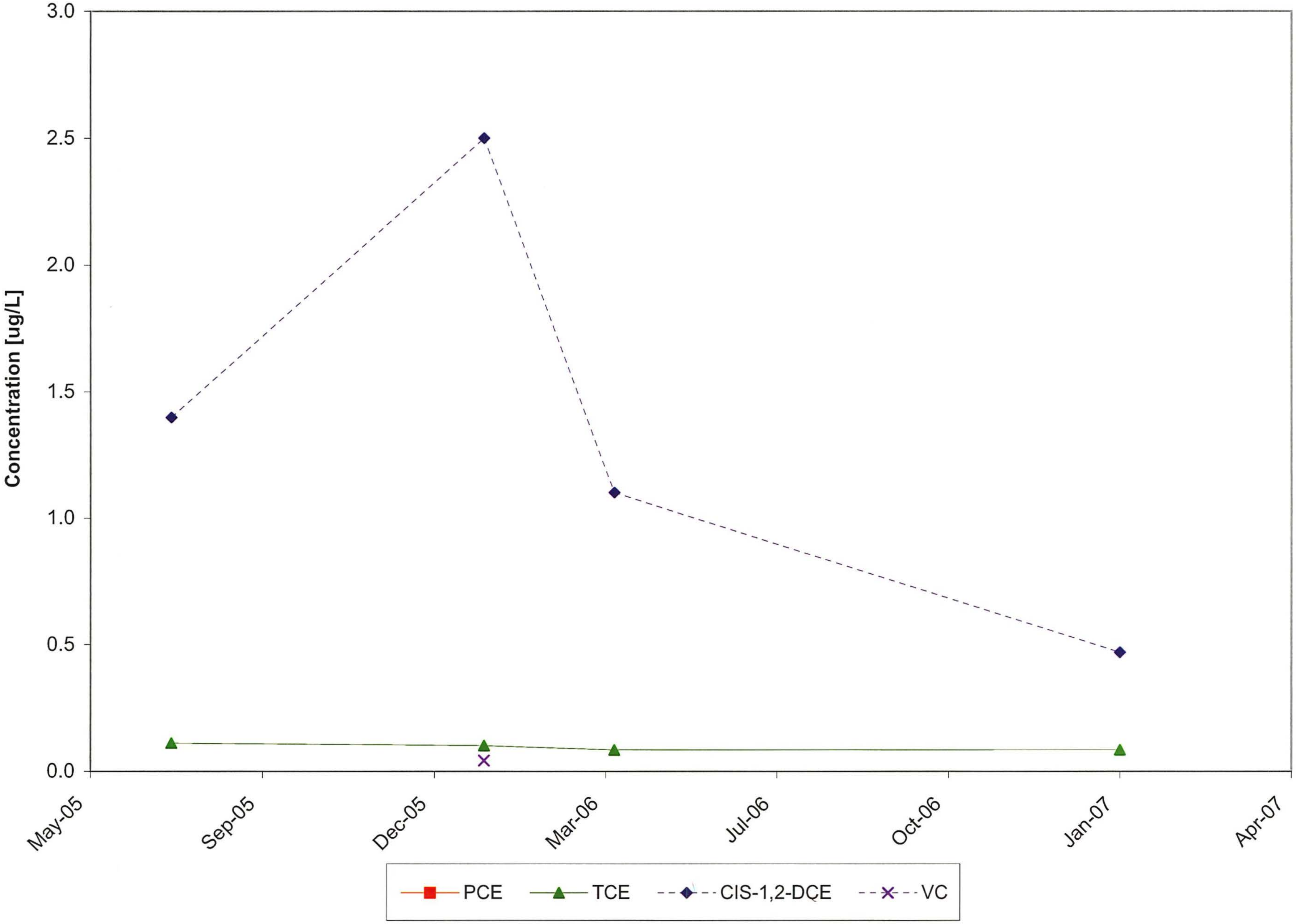

PW-03
Concentration [ug/L]
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
May-05
Sep-05
Dec-05
Mar-06
Jul-06
Oct-06
Jan-07
Apr-07
PCE
TCE
CIS-1,2-DCE
VC

PW-04



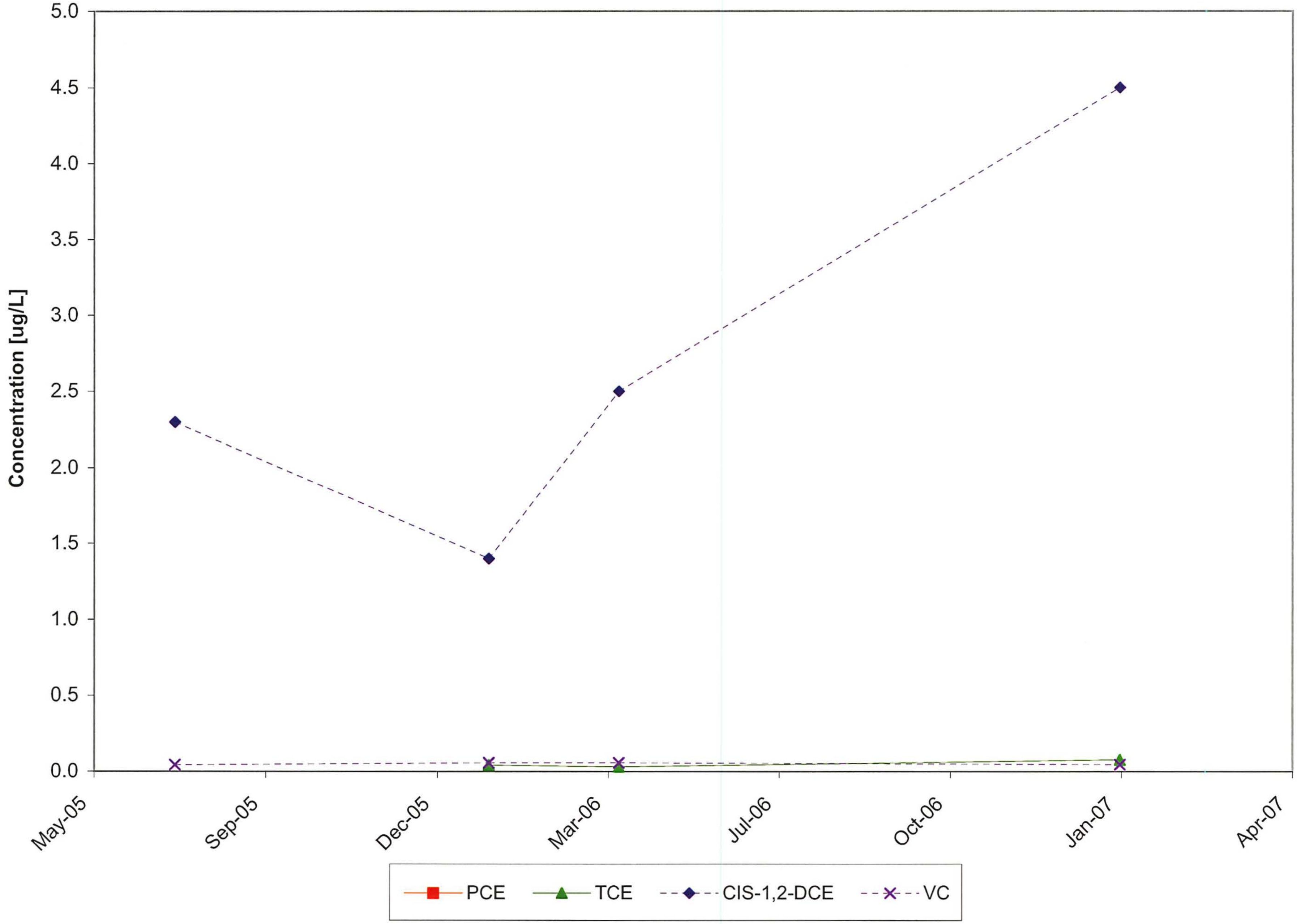
Concentration [ug/L]
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
May-05
Sep-05
Dec-05
Mar-06
Jul-06
Oct-06
Jan-07
Apr-07
PCE
TCE
CIS-1,2-DCE
VC

PW-05



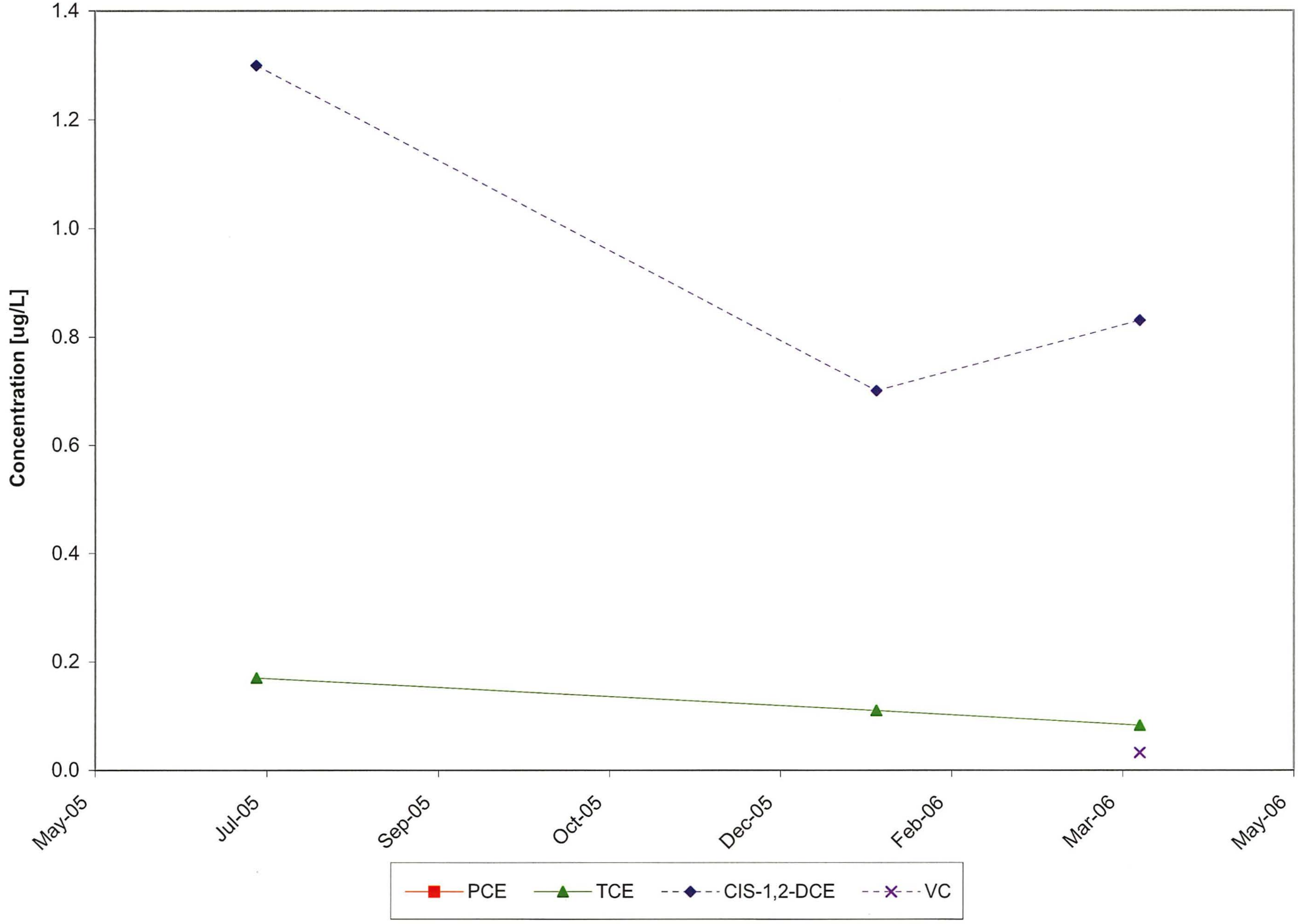
Concentration [ug/L]
3.0
2.5
2.0
1.5
1.0
0.5
0.0
May-05
Sep-05
Dec-05
Mar-06
Jul-06
Oct-06
Jan-07
Apr-07
PCE
TCE
CIS-1,2-DCE
VC

PW-07

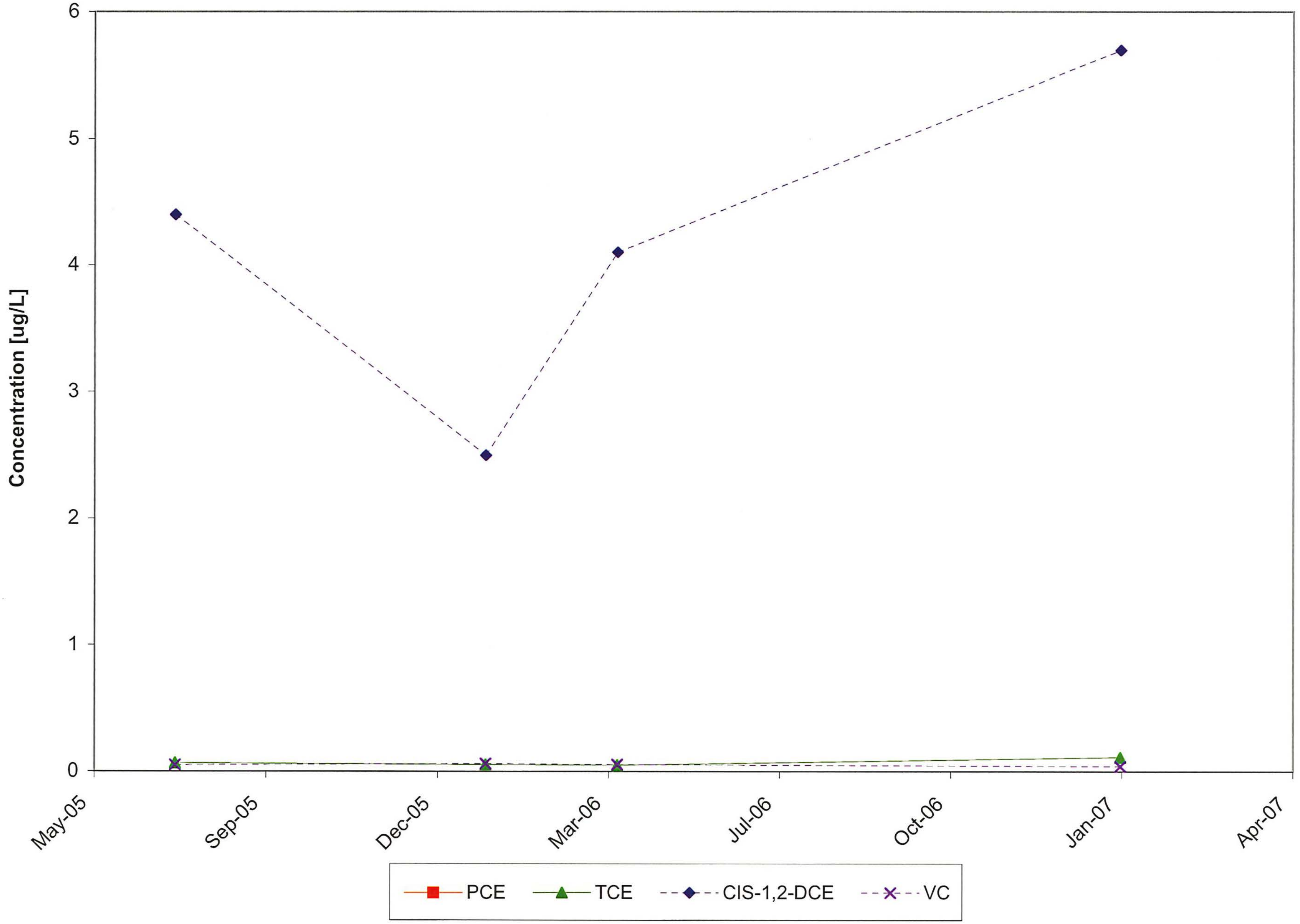


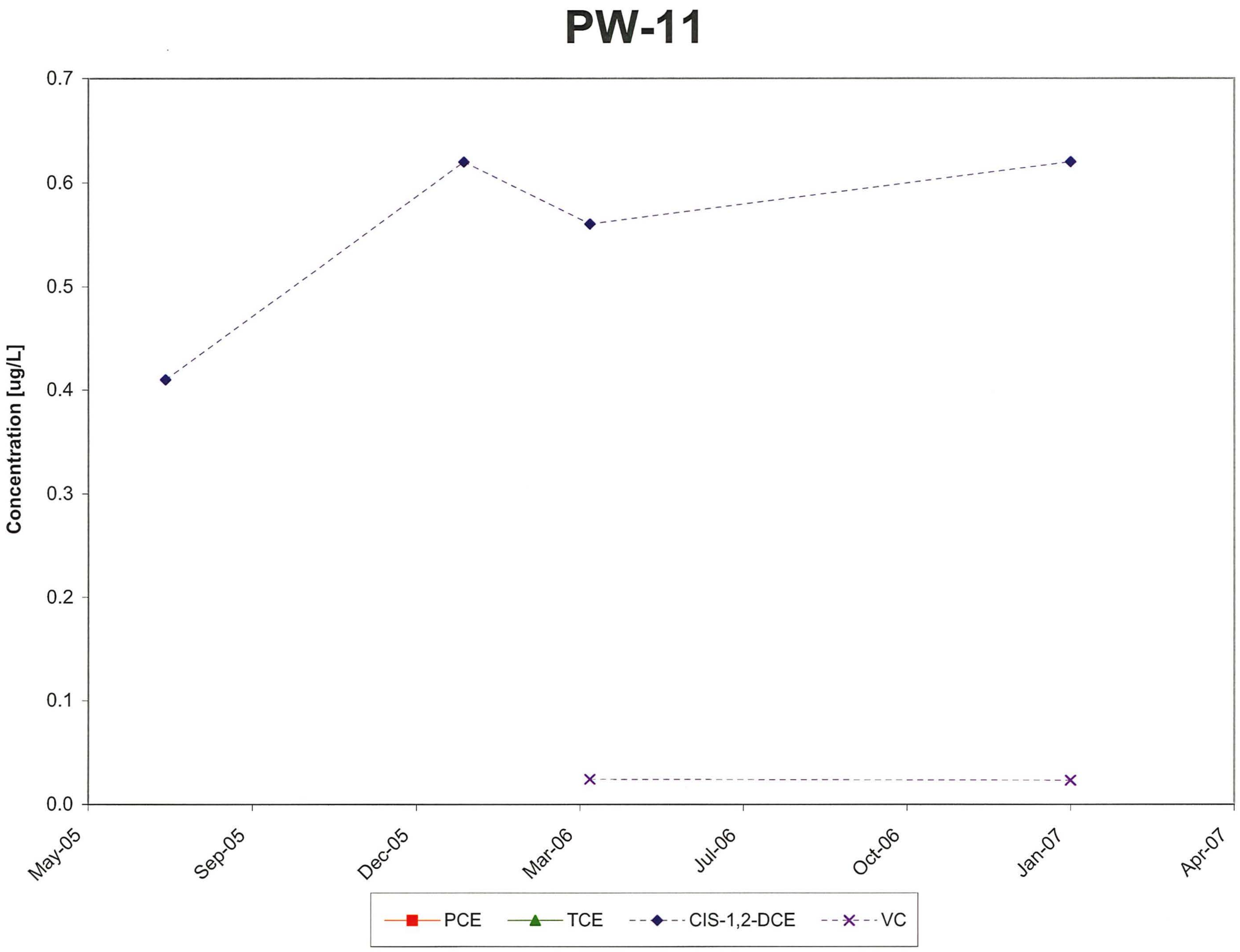
Concentration [ug/L]
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
May-05
Sep-05
Dec-05
Mar-06
Jul-06
Oct-06
Jan-07
Apr-07
PCE
TCE
CIS-1,2-DCE
VC

PW-08

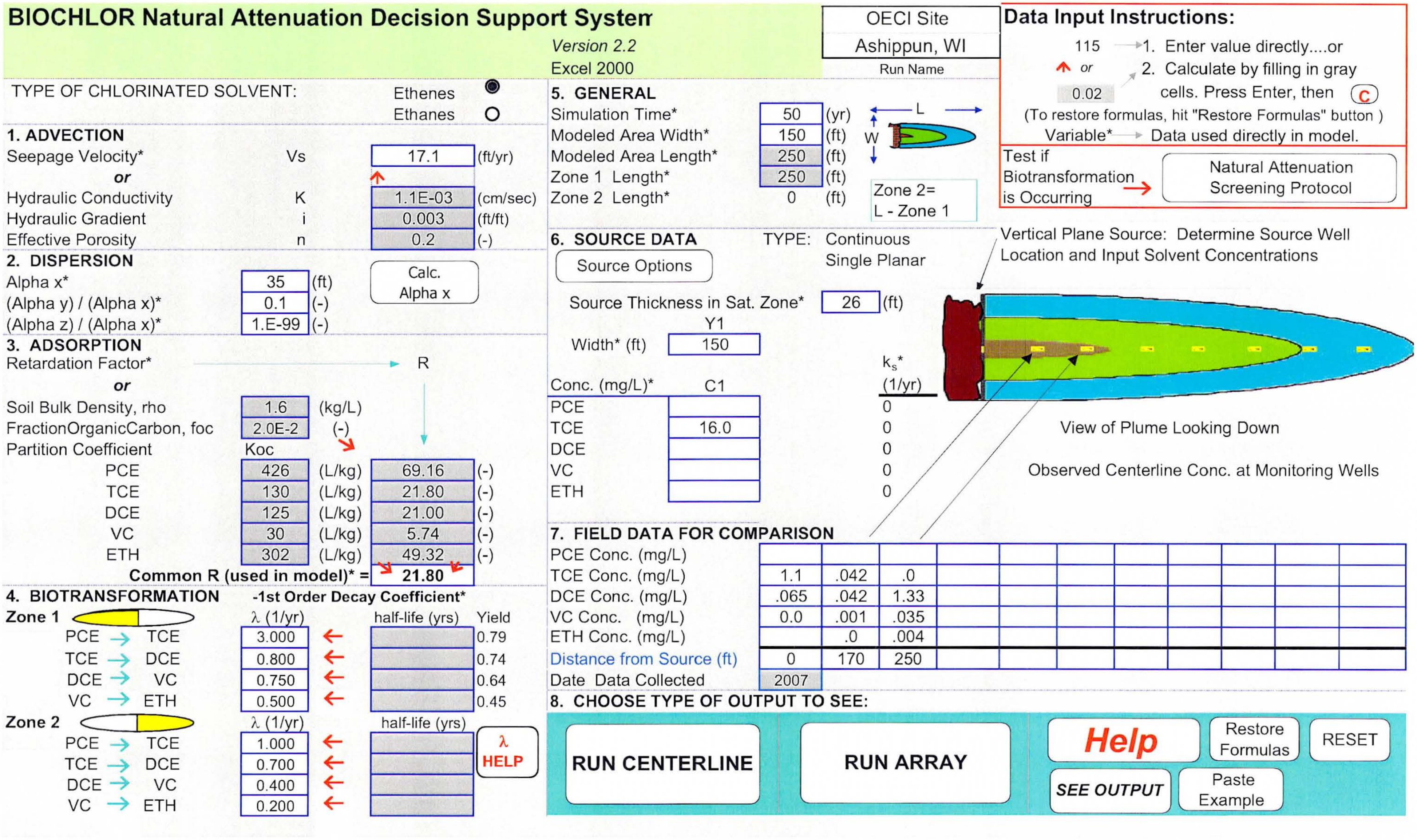

1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
Concentration [ug/L]
May-05
Jul-05
Sep-05
Oct-05
Dec-05
Feb-06
Mar-06
May-06
PCE
TCE
CIS-1,2-DCE
VC

PW-09


6
5
4
3
2
1
0
Concentration [ug/L]
May-05
Sep-05
Dec-05
Mar-06
Jul-06
Oct-06
Jan-07
Apr-07
PCE
TCE
CIS-1,2-DCE
VC


PW-11
Concentration [ug/L]
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
May-05
Sep-05
Dec-05
Mar-06
Jul-06
Oct-06
Jan-07
Apr-07
PCE
TCE
CIS-1,2-DCE
VC

Appendix C
BIOCHLOR Modeling



BIOCHLOR Natural Attenuation Decision Support System

Version 2.2
Excel 2000

OECI Site
Ashippun, WI
Run Name

Data Input Instructions:

115 → 1. Enter value directly....or
or 2. Calculate by filling in gray
0.02 cells. Press Enter, then C
(To restore formulas, hit "Restore Formulas" button)
Variable* → Data used directly in model.

Test if Biotransformation is Occurring → Natural Attenuation Screening Protocol

TYPE OF CHLORINATED SOLVENT: Ethenes ● Ethanes ○

1. ADVECTION

Seepage Velocity*	Vs	17.1	(ft/yr)
or			
Hydraulic Conductivity	K	1.1E-03	(cm/sec)
Hydraulic Gradient	i	0.003	(ft/ft)
Effective Porosity	n	0.2	(-)

2. DISPERSION

Alpha x*	35	(ft)
(Alpha y) / (Alpha x)*	0.1	(-)
(Alpha z) / (Alpha x)*	1.E-99	(-)

Calc. Alpha x

3. ADSORPTION

Retardation Factor* → R

or

Soil Bulk Density, rho	1.6	(kg/L)
FractionOrganicCarbon, foc	2.0E-2	(-)

Partition Coefficient	Koc		R	
PCE	426	(L/kg)	69.16	(-)
TCE	130	(L/kg)	21.80	(-)
DCE	125	(L/kg)	21.00	(-)
VC	30	(L/kg)	5.74	(-)
ETH	302	(L/kg)	49.32	(-)

Common R (used in model)* = 21.80

4. BIOTRANSFORMATION -1st Order Decay Coefficient*

Zone 1	λ (1/yr)	half-life (yrs)	Yield
PCE → TCE	3.000		0.79
TCE → DCE	0.800		0.74
DCE → VC	0.750		0.64
VC → ETH	0.500		0.45

Zone 2	λ (1/yr)	half-life (yrs)
PCE → TCE	1.000	
TCE → DCE	0.700	
DCE → VC	0.400	
VC → ETH	0.200	

λ HELP

5. GENERAL

Simulation Time*	50	(yr)
Modeled Area Width*	150	(ft)
Modeled Area Length*	250	(ft)
Zone 1 Length*	250	(ft)
Zone 2 Length*	0	(ft)

Zone 2= L - Zone 1

6. SOURCE DATA TYPE: Continuous Single Planar

Source Options

Source Thickness in Sat. Zone* 26 (ft)

Width* (ft) Y1 150

Conc. (mg/L)*	C1	k_s* (1/yr)
PCE		0
TCE	16.0	0
DCE		0
VC		0
ETH		0

Vertical Plane Source: Determine Source Well Location and Input Solvent Concentrations

View of Plume Looking Down

Observed Centerline Conc. at Monitoring Wells

7. FIELD DATA FOR COMPARISON

PCE Conc. (mg/L)			
TCE Conc. (mg/L)	1.1	.042	.0
DCE Conc. (mg/L)	.065	.042	1.33
VC Conc. (mg/L)	0.0	.001	.035
ETH Conc. (mg/L)		.0	.004
Distance from Source (ft)	0	170	250
Date Data Collected	2007		

8. CHOOSE TYPE OF OUTPUT TO SEE:

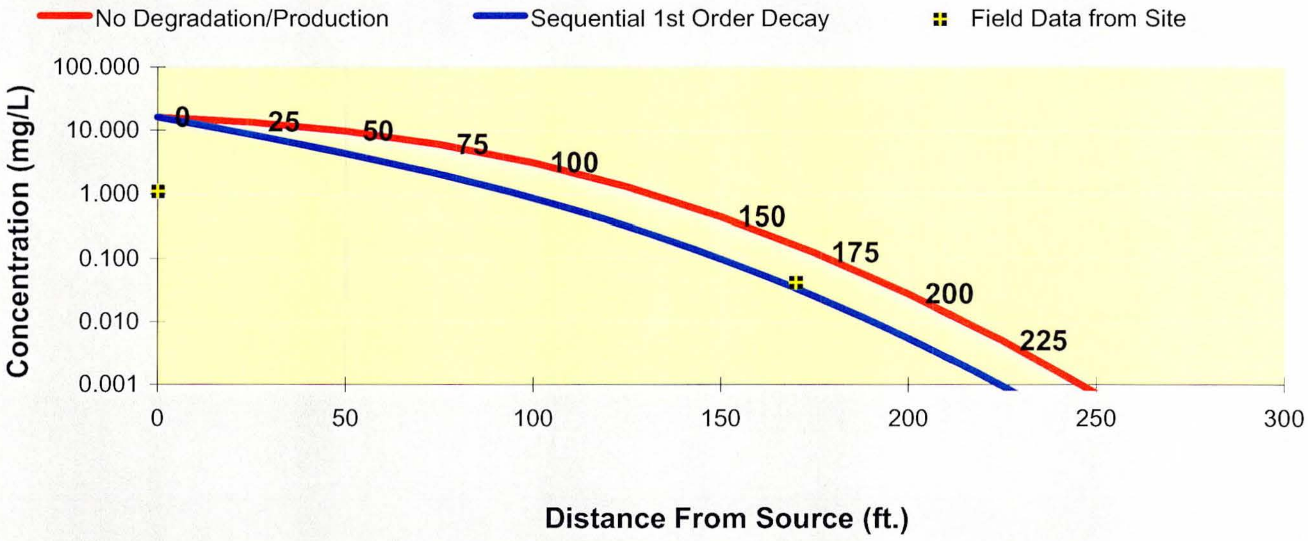
DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

Distance from Source (ft)

TCE	0	25	50	75	100	125	150	175	200	225	250
No Degradation	16.000	13.307	9.643	5.935	3.042	1.282	0.441	0.123	0.028	0.005	0.001
Biotransformation	16.0000	8.420	4.267	2.014	0.853	0.314	0.098	0.025	0.005	0.001	0.000

Monitoring Well Locations (ft)

	0	170	250								
Field Data from Site	1.100	0.042	0.000								



See PCE

See TCE

See DCE

See VC

See ETH

Prepare Animation

Time:

50.0 Years

Log ⟺ Linear

Return to Input

To All

To Array

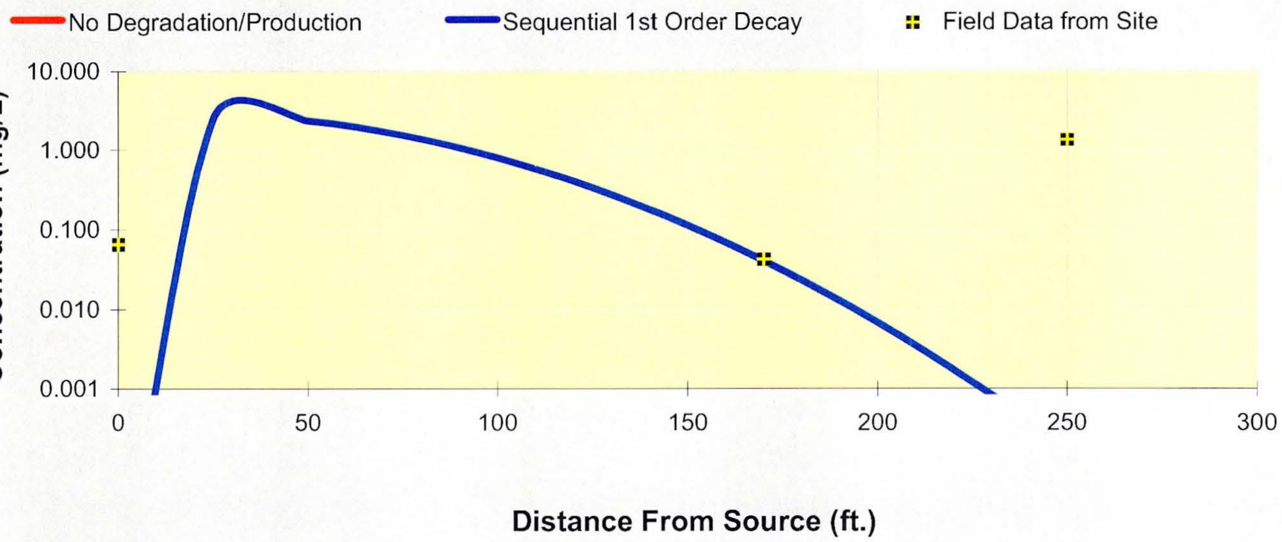
DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

Distance from Source (ft)

DCE	0	25	50	75	100	125	150	175	200	225	250
No Degradation	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Biotransformation	0.0000	2.481	2.370	1.548	0.795	0.330	0.112	0.031	0.007	0.001	0.000

Monitoring Well Locations (ft)

	0	170	250								
Field Data from Site	0.065	0.042	1.330								



See PCE

See TCE

See DCE

See VC

See ETH

Prepare Animation

Time:

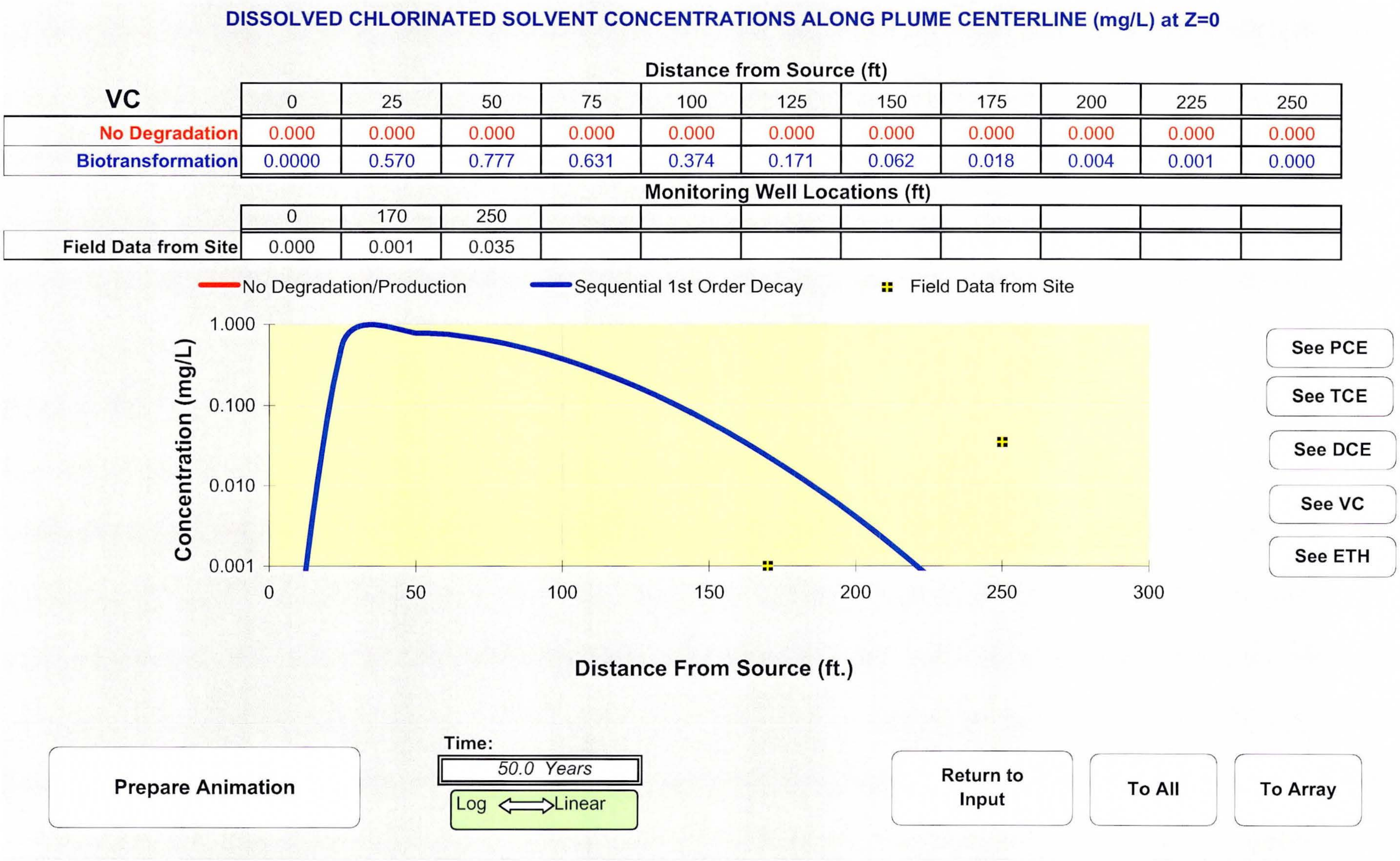
50.0 Years

Log ⟺ Linear

Return to Input

To All

To Array



DISSOLVED CHLORINATED SOLVENT CONCENTRATIONS ALONG PLUME CENTERLINE (mg/L) at Z=0

Distance from Source (ft)

VC	0	25	50	75	100	125	150	175	200	225	250
No Degradation	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Biotransformation	0.0000	0.570	0.777	0.631	0.374	0.171	0.062	0.018	0.004	0.001	0.000

Monitoring Well Locations (ft)

	0	170	250								
Field Data from Site	0.000	0.001	0.035								

Time: 50.0 Years